

AN INSTITUTIONAL ASSESSMENT OF THE ROLE OF SOVEREIGN WEALTH FUNDS IN MANAGING RESOURCE REVENUES

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Dissertation presented for the Degree of Doctor of Philosophy (Economics) in the
Graduate School of Economics and Management Sciences at the University of Stellenbosch

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December 2016

Declaration

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Abstract

This dissertation studies the contribution of sovereign wealth funds to the management of fiscal revenues derived from the extraction of natural resources. The literature on the “resource curse” has increasingly identified the institutional and political-economic foundations of the observed cross-country variation in the management of resource revenues. This literature has found the quality of general (or “meta”) institutions – such as the rule of law, democracy, government accountability and low levels of corruption – to be a critical differentiating factor in determining the success and failure of resource revenue management. The growing consensus around this argument – particularly the recent emphasis on “initial institutions” (the institutional quality at the time of resource discovery) – is noteworthy given the dismissal of the importance of institutions in the early resource-curse literature. From a policy perspective, however, a more productive line of enquiry pertains not to institutions at the general level, but to institutional responses to political-economy problems directly related to the management of resource revenues.

Using the tools of institutional economics, the dissertation analyses the governance of sovereign wealth funds and the fiscal frameworks that accompany them. An evaluation of leading sovereign wealth funds and their fiscal rules is presented, as well as an empirical assessment of the impact of various fiscal rules in a number of illustrative country cases. The full embrace of the sovereign wealth fund model requires an often-elaborate institutional infrastructure to govern the policies and operations of independent operational investment authorities tasked with managing the assets. The dissertation therefore assesses the institutional arrangements between the owners and managers of the sovereign wealth fund, and a set rule-based investment policies through which to manage the principal-agent relationship established by the delegation of authority to an independent investment manager.

It is contended that sovereign wealth funds can address a number of these specific political-economy and institutional problems, even in the context of relatively poor general institutions. A central argument advanced in the dissertation is that sovereign wealth funds alone have limited effectiveness, and that they should therefore form part of a broader fiscal framework that is rule based, constraining and countercyclical. The model of institutional reform developed here can be described as incremental or piecemeal. Considerable attention is paid to “second-best institutions”, particularly in the areas of fiscal rules and asset allocation, as intermediate steps towards more complex institutional arrangements.

Opsomming

Hierdie proefskrif ondersoek die bydrae van sowereine welvaartfondse tot die bestuur van fiskale inkomste uit die ontgunning van natuurlike hulpbronne. Die literatuur aangaande die “hulpbronvloek” identifiseer toenemend die institusionele en politiek-ekonomiese grondslag van die variasie tussen lande in terme van die bestuur van hulpbron-inkomste. Hierdie literatuur dui toenemend op die kwaliteit van algemene (of “meta”) institusies – die oppergesag van die reg, demokrasie, publieke verantwoording, en lae vlakke van korruksie – as ‘n kritiese onderskeidende faktor in die sukses en mislukking rondom die bestuur van hulpbron inkomstes. Die groeiende konsensus rondom hierdie argument - veral die onlangse klem op die gehalte van institusies ten tyde van hulpbron-ontdekking) – is opmerklik gegewe die ontslag van die belangrikheid van institusies in die vroeë literatuur. Vanuit ‘n beleidsoogpunt is ‘n meer produktiewe lyn van ondersoek egter een wat betrekking het op spesifieke institusionele reaksies tot politiek-ekonomiese probleme wat direk verband hou met die bestuur van hulpbron inkomste.

Hierdie proefskrif gebruik die lens van institusionele ekonomie om die bestuur van soewereinewelvaart fondse en hul fiskale raamwerke te ontlleed. ‘n Bespreking van vooraanstaande soewereine welvaartfondse en hul fiskale reëls word aangebied, sowel as ‘n empiriese evaluering van die impak van verskillende fiskale reëls in ‘n aantal lande. Die volledige “soewereine welvaartfonds-model” vereis ‘n dikwels-omvattende institusionele raamwerk rondom die beleid en bestuur van onafhanklike owerhede wat belas word met die belegging van die fonds se bates. Die proefskrif beoordeel vervolgens die institusionele reëlings tussen eienaars en bestuurders van soewereine welvaartfondse, en die rol ‘n reël-gebaseerde beleggingsbeleid in die bestuur van hierdie verhouding.

Dit word in hierdie proefskrif aangevoer dat soewereine welvaartfondse ‘n aantal van hierdie spesifieke politiek-ekonomiese en institusionele probleme kan aanspreek, selfs in die konteks van relatief swak algemene institusies. ‘n Sentrale argument wat aangevoer word is dat soewereine welvaartfondse alleen ‘n beperkte effektiwiteit het, en dat hulle dus gesien word as deel van ‘n breër fiskaleraamwerk wat reëlgebaseerde, beperkende en anti-siklies is. Die model van institusionele hervorming wat hier ontwikkel word kan beskryf word as ‘n inkrementele of geleidelike proses. Aansienlike aandag word geskenk aan die konsep van “tweede-besté instellings”, veral op die gebied van fiskale reëls en beleggingsstrategie, as intermediére stappe in die rigting van meer komplekse institusionele strukture.

Acknowledgements

The writing of this dissertation has been an enjoyable undertaking. I have numerous colleagues, friends and family to thank for their support and encouragement – all of which contributed to me encountering nothing of psychological isolation that I know typically accompanies the writing of a doctoral thesis.

My parents have supported my academic studies over the many years since I first entered university and instilled in me a love for learning and dedicated study, without which I could never have completed this work. I thank them, and my in-laws, for maintaining (and occasionally, I am sure, feigning) interest in my work – and for the wisdom to stop asking, “when do you think you will be finished?” about 12 months ago. My wife and my mother deserve special thanks for reading various chapters in good spirits. My (Dutch) father’s enthusiastic interest in the concept of “Dutch disease” remains as a fond memory from my first year of doctoral studies.

The debt of gratitude I owe to my supervisor, Professor Stan du Plessis, is difficult to articulate. Prof. du Plessis is very close to the single reason I pursued graduate studies in economics. The quality of his supervision and commitment to my work, which was tirelessly maintained while serving as Dean of the Faculty, is unrivalled. As I have learned from Prof. du Plessis’ thoughtful comments on my thesis, one should not use the word “unrivalled” lightly – but he should know that it is warranted on this occasion. He has been a mentor and personal inspiration to me.

Various colleagues have helped shape my thinking about sovereign wealth funds, fiscal rules and the management of resource revenues. As a Fellow at the Center for International Development at Harvard’s Kennedy School of Government, I had the opportunity to work with an impressive group of economists. Prof. Ricardo Hausmann and Eduardo Lora were generous with their time and ideas, and I enjoyed our interactions immensely. John Jeong and Matias Cuadra provided invaluable advice around the statistical modelling of fiscal rules contained in this dissertation – their patience, enthusiasm and sharp minds were invaluable resources in the writing of this thesis.

The many conversations I enjoyed with fellow sovereign wealth fund scholars, especially Prof. Gordon Clark and Dr. Angela Cummine of the University of Oxford and Dr. Ashby Monk of Stanford University,

were enormously beneficial. Dr. Khalid Alsweilem, a sovereign wealth fund practitioner of note and now Kennedy School Fellow, was another enthusiastic and wise collaborator from whom I have learned a great deal. I thank him for his continuous support for my work and for his friendship.

I am a firm believer of testing and applying theoretical concepts in practice. I had the opportunity to do exactly this during the latter stage of completing my thesis by working with the Governor of Alaska's economic team. I want to thank Dr. John Tichotsky and Craig Richards for the opportunity to work with them, for their interest in the ideas contained in this thesis, and for the insights I gained from trying (I hope not entirely in vain) to communicate them to the Alaska State Legislature. It was an unforgettable experience and one that deepened my practical understanding of sovereign wealth funds.

I want to thank also the faculty and fellow graduate students at the Department of Economics at the Stellenbosch. Professors Estian Calitz, Servaas van der Berg and Ben Smit provided early support for my research proposal. I benefitted from and enjoyed presenting my research to the various research groups in the department.

Finally, to my wife, Ashley, thank you for your love and for the application of your sharp (critical) mind to a topic that I understand might bore you by now. Thank you for your loving parenting of our son, Leo, whose joyous arrival occurred midway through my research into Timor Leste's fiscal rules. I have now joined you as an author of a doctoral thesis, and know that parenting Leo demands a comparable degree of patience and commitment. Leo, thank you for providing the most beautiful distractions imaginable.

Introduction

This dissertation offers an institutional analysis of the sovereign wealth fund model for managing resource revenues. The increasing appeal of sovereign wealth funds is reflected not only in the growth in assets under their collective management, a number for which credible estimates vary between \$6.5 trillion and \$8.3 trillion (as of the end of 2015), but also in the proliferation of new funds. While the origins of the oldest sovereign wealth funds can be traced back to the mid-19th century and many of the largest and most famous of these funds emerged in the Middle East during the oil boom of the late-1970s, an acceleration in the establishment of new funds occurred around the dawn of the 21st century.

Despite their increasing popularity and prominence, the literature has struggled to arrive at a satisfactory definition of sovereign wealth funds. This reflects, in part, the diversity of the sovereign wealth fund landscape, which features institutions with a variety of funding sources (notably resource revenue windfalls and excess foreign exchange reserves) and operational models, as well as a myriad of objectives, including macroeconomic stabilisation, saving, income and wealth diversification, and the funding of developmental projects. In this dissertation, the focus is firmly on sovereign wealth funds that are funded through natural resource revenues.

A central argument advanced in this dissertation is that the full – and most fruitful – embrace of the sovereign wealth fund model in resource-rich countries requires more than the mere establishment of a portfolio of financial assets funded from resource revenues. Rather, the sovereign wealth fund model is best understood as a component of a credible, counter-cyclical rule-based fiscal framework for resource revenues. The sovereign wealth fund model contributes significantly to improved economic performance if it is embedded in a system of rules that govern the flow of resource revenues into the fund and the flow of assets and income out of the sovereign wealth funds (variously designed). Finally, the principal-agent relationships involved in the delegated authority around the management of sovereign investment institutions, requires another set of rules and institutions that are the subject of the final part of the dissertation.

The analysis of the sovereign wealth fund model through an institutional lens proceeds from a particular reading of the literature on the relationship between natural resources and economic performance – also

known as the resource-curse literature. A careful reading of this literature underlines the historic and cross-sectional variation in economic performance of resource economies. Simply put, evidence for the resource-curse hypothesis is suggestive rather than conclusive. Indeed, the initially uncritical empirical support for the resource curse has been reassessed in light of various measurement problems identified in the literature (as discussed in Chapter 1)

The result has been a much more conditional acceptance of the resource-curse hypothesis, in particular one that emphasises the central importance of institutions in determining whether resource wealth promotes or undermines economic growth in the long run. At the same time, it is argued in this dissertation (in line with recent scholarship on the resource curse) that the understanding of “institutions” in this context remains rather general. A fruitful line of enquiry is suggested in which the focus is on the cluster of institutional and policy reforms located around the management of the fiscal revenues generated from the extraction of natural resources. This dissertation presents the sovereign wealth fund model and its most critical components, as described above, as exactly this type of targetted institutional reform.

A dominant question in the debates around sovereign wealth funds – which is also reflected in the literature on the role of institutions in the resource-curse dynamic (and, indeed in the literature on institutions and economic prosperity more generally) – pertains to the sequencing of institutional reforms. One argument suggests that targetted institutional reforms are either unlikely to occur or succeed in the context of weak general institutions. An alternative view is more sympathetic to the potential contribution of piecemeal or incremental institutional reform. Naturally, a generally supportive institutional context increases the odds that sound and durable institutions for the management of resource revenues will emerge; however, many resource-rich countries are not characterised by a general institutional environment conducive to economic prosperity. Yet sovereign wealth funds and fiscal rules for natural resource revenues appear to have contributed to ameliorating a number of the common afflictions associated with the resource curse.

Also of relevance to this discussion is evidence that the emergence of resource revenue windfalls tend to be associated with a subsequent deterioration in institutional quality. This raises the possibility that targetted reforms around the management of resource revenues, particularly in new resource producers without an inherited institutional structure that has been shaped by a long history of resource production,

can contribute to avoiding a dynamic that might otherwise result in a further deterioration of institutions. Finally, it is far from the case that economies with otherwise sound institutions are in some way inoculated from the emergence of weak institutions for the management of resource revenues. This dissertation identifies aspects of the institutional arrangements for sovereign wealth funds and resource revenues in the likes of Norway, Alberta, Chile, Alaska and Wyoming that require reform – or at least have room for improvement. It is argued that the generally supportive view of the prospect for piecemeal institutional reform advanced in this dissertation is in keeping with a number of influential traditions in institutional economics, notably the strand of New Institutional Economics pioneered by Douglass North. A dynamic or evolutionary understanding of institutions, and a more sympathetic view of gradual institutional reform, also strengthens the case for what Rodrik (2008) referred to as “second-best institutions”. Particularly in the areas of fiscal rules and long-term asset allocation considerable attention is paid to sub-optimal rules that have the advantage of simplicity and can serve as an intermediate steps towards more complex institutional arrangements.

In adopting a comprehensive view of the sovereign wealth fund model, which includes its fiscal rules and institutional arrangements that govern its agency relationships, it becomes ever more important to appreciate the diversity in both the form and function of sovereign wealth funds (even within the sub-category of resource-based funds), which includes: fiscal stabilisation funds, future-generations saving funds, investment-income (or permanent) funds, and increasingly popular and multi-faceted sovereign development funds. As with most institutions, sovereign wealth funds are neither normatively or positively “one-size-fits-all solutions”. There is significant scope for tailoring sovereign wealth funds’ functions and their consequent saving and spending policies to meet local requirements, based on the economic (and political) realities. Criticisms of sovereign wealth funds tend to underestimate the degree of nuance and variation in the sovereign wealth fund model; as well as the extent to which resource-based sovereign wealth funds are designed to directly and indirectly address common afflictions associated with the resource curse.

Having argued that the successful adoption of the sovereign wealth fund model situates the fund within a rule-based fiscal framework, the dissertation devotes an entire section to normative and positive assessments of fiscal rules. This section distinguishes between saving rules that govern the flow of resource revenues into sovereign wealth funds, and spending rules that determine the transfer of these

funds' assets and investment income to the budget (or other earmarked purposes). In practice, sovereign wealth funds' saving and spending policies tend to be only loosely integrated with their host governments' overall fiscal framework. A more typical arrangement is to combine either *ad hoc* or mechanistic savings rules with simple spending rules for investment-income funds and poorly designed (and typically *ad hoc*) transfers from stabilisation funds.

The dissertation presents a positive and normative assessment of fiscal rules for sovereign wealth funds, based on both qualitative and quantitative analysis. In the vein of second-best institutions, a number of simple, mechanistic savings rules are described and analysed. These rules are clearly sub-optimal, as the discussion of their shortcomings reveals. However, they are an improvement on the alternative of simply consuming resource revenues as they arise, and therefore being subjected to the considerable volatility inherent to commodity price and production cycles. The use of simple, easy-to-communicate and –enforce saving rules are presented as a possible interim institutional response to the management of resource windfalls that may fruitfully precede a transition to a more complex and integrated fiscal framework for resource revenue and sovereign wealth fund assets. An example of such a complex, integrated fiscal rule is also discussed in the dissertation, and quantitatively evaluated through an application to five illustrative country cases (Kazakhstan, Azerbaijan, Ghana, Nigeria and Saudi Arabia).

The institutional arrangements or governance of the fiscal rule are often overlooked in the literature and policy debates on sovereign wealth funds. Even the best-designed rule-based fiscal framework for resource revenues and sovereign wealth funds can be undermined by weak institutional arrangements. A key objective of the governance of the fiscal rule is to move critical decisions in the management of finite and volatile resource revenues out of the realm of in-period politics to the level of constitutional politics. The discussion of sovereign wealth funds' fiscal rules reveals a wide range of institutional mechanisms through which this is achieved, ranging from constitutional mandates to legislative statutes to presidential decrees to elements of custom (or informal institutions). Three models that have achieved some measure of success and durability provide valuable insights into the specification and governance of fiscal rules for managing resource revenues and sovereign wealth fund assets and income. Norway emerges as an example where the fiscal rule is governed through consensus and custom, Chile as one that champions the contributions of technocratic expertise, and the American state endowment model as one in which the fiscal rule is hardwired into in constitution (albeit in an incomplete manner).

The final section of the dissertation focuses on the institutional aspects of the sovereign wealth fund model that pertain to the investment function, particularly various layers of delegated investment authority typically involved in this part of model. The section considers why and how to achieve a degree of operational independence from government for an investment management authority, how to clarify the roles and responsibilities of the various principals and agents involved in the delegated-authority model of investment, and how the governance and performance of the investment authority may be strengthened by transparency, accountability and an embrace of rule-based investment policies.

Having restated and elaborated on the case for operational independence in the management of long-term sovereign investment portfolios, the institutional question considered in this section deals with a familiar tension in public policy: balancing the desire for assigning operational independence to a technocratic institution (in this case, the investment authority of the sovereign wealth fund) with a degree of government control and oversight of such delegated authority. While the case for operational independence rests on compelling foundations in the case of sovereign wealth funds – including improved investment performance, addressing fears of a regulatory backlash from recipient countries, a desire to escape from public-sector pay scales to attract and cultivate internal human capital, and the political ring fencing of assets – the analysis indicates that independence is typically (and appropriately) a matter of degree. Independence is never absolute, and the exercise of discretionary powers by delegated sovereign investment authorities should be constrained by clearly articulated rules and demands for transparency and accountability.

The dissertation advances a qualified argument in favour of the role the sovereign wealth fund model can play in the management of resource revenues. This conclusion is premised on the understanding that sovereign wealth funds are embedded in a rule-based fiscal framework and institutional framework. The potential contribution of sovereign wealth funds, particularly when narrowly defined as a portfolio of assets funded from a resource revenue windfall, should not be overstated. However, when accompanied by supporting fiscal rules and a sound institutional structure for the management of agency relationships that arise from delegated authority, the sovereign wealth fund model is a promising targeted institutional intervention to the widely understood problems of resource economies.

SECTION I

AN INSTITUTIONAL PERSPECTIVE ON RESOURCE ECONOMIES

Chapter 1

The most disadvantageous lottery in the world: Historic controversies around natural resources and economic prosperity

The anticipated and observed consequences of natural resource wealth on economic prosperity have preoccupied economists for centuries. At first glance, that there is any controversy around the question is counterintuitive: natural resources are an essential factor of production that generate massive economic rents for their owners and extractors, while the scarcity of essential minerals, metals and fossil fuels would seemingly confer great economic advantage on the societies in which they are located. Yet, the existence of a natural resource curse – however qualified and substantiated – has become increasingly supported by the weight of empirical evidence. The laments of political leaders capture the melancholy surrounding the economic history of resource rich countries: Ahmed Zaki Yamaani, the former oil minister of Saudi Arabia, once said of the Kingdom's vast wealth of hydrocarbons, “all in all, I wish we had discovered water”; while Kenneth Kaunda, the long-serving first president of Zambia, suggested his country’s economic failures were due to “the curse of being born with a copper spoon in our mouths.”¹

Speculation about the contribution of natural wealth to the quest for economic prosperity have been part of economics since the emergence of the discipline. The Physiocrats, for example, espoused the centrality of agrarian production in societal and material progress. By contrast, Mercantilists of the same era emphasised the accumulation of wealth derived from nature in the form of precious metals, notably silver, accumulated through a positive balance from trade or the abundance of natural deposits of silver and other precious metals. Adam Smith disagreed. In his analysis, the wealth of a nation derived from productivity-enhancing specialisation with cooperation through markets. He argued that an undue obsession with resources may undermine the development of what he called a “commercial society.”

Intellectual notions about the relationship between natural resources in economic progress do not emerge in a vacuum, but are bound by the emerging economic realities of the periods in which they are formulated. The narrative in this chapter described the intellectual consensus around natural resources shifts in line with four modern economic epochs: the Early Modern Era, the Industrial Revolution, the

¹ The Yamaani quote is from Ross (1999) and the Kuanda quoted in from an article in *Africa Record*, January – February (1978): 34.

post-War period and the aftermath of the oil shocks in the late-1970s (the latter culminating in the emergence of the resource-curse hypothesis).

In the industrial revolutions in north-western Europe in the 18th and 19th centuries technological advances changed the role of natural resources in economic production, as coal, steel and timber became a lifeblood of economic transformation – a shift that shaped intellectual traditions on the subject of these resources' role in economic progress. The post-War period, marked by ever-increasing global trade in commodities and a proliferation of new producers of minerals, fuels and metals from the developing world, again shifting thinking on the subject. In this period, the high-modernist development economists of the 1950s and early 1960s held a generally favourable view of resources, albeit as a stepping-stone towards rapid industrialisation and modernisation, particularly in the context of newfound, post-colonial independence.

Finally, whereas earlier arguments tended to place natural resources within broader theories of economic transformation, the oil-price shocks of the 1970s shifted the focus more specifically to the possibly direct and dominant role resources may play in economic progress – or, more accurately, the failure to achieve such progress. The disappointing economic performance of commodity-rich economies (relative both to expectations and that of comparatively resource-poor economies, notably in East Asia) since the late-1970s provides the historical context for the emergence of what may now be called the resource-curse literature, with its proliferation of economic, institutional and political theories, and frequently contradictory empirical evidence.

1.1. Such strange delusions: natural resources in the Early Modern and Industrial Ages

In intellectual traditions predating the ages of the Industrial Revolution, conceptions of natural resource wealth were synonymous with the relative ease of agricultural production. Generally, these traditions regarded favourable agricultural conditions and agrarian productivity were regarded as obviously conducive to economic and social wellbeing. The Physiocrats, the first *économistes*, who greatly influenced Adam Smith, famously extolled the virtues of agrarian productivity as the cornerstone progress – on occasion to the point of treating them as synonymous. An exception to this tendency is found in the more moralistic view of wealth too easily gained from bountiful natural endowments. Jean Bodin, the

prominent 16th century French political philosopher and jurist, embodied this view, warning that “Men of a fat and fertile soil are most commonly effeminate and cowards; whereas contrariwise a barren country makes men temperate by necessity, and by consequence careful, vigilant, and industrious” (Bodin, 1576).

In the Enlightenment, natural wealth however assumed a broader meaning beyond agriculture. The bullionists who held sway over economic thinking at the height of the Mercantilism saw in national stockpiles of silver and other rare metals the reflection of national wealth. The moral philosophers of the Scottish Enlightenment, notably David Hume and Adam Smith, held a more qualified view of natural wealth, in which the argument against the bullionist obsession with rare metals as a measure of wealth was one of the central lines of their attack on that particular strand of Mercantilist logic. While acknowledging the motivational significance (and frequent futility) of the quest for silver and gold to the Iberian colonial expansion during the Age of Discovery, and the extent to which the promise of bountiful raw materials underwrote successive European nations’ expansion into the New World, Smith was ultimately deeply critical of the irrationality that accompanied the pursuit of such wealth. “The same passion which has suggested to so many people the absurd idea of the philosopher’s stone,” Smith (1776[1981]: 563) argued, “has suggested to others the equally absurd one of immense rich mines of gold and silver.” Referring to Sir Walter Raleigh’s fixation with the mythical city of El Dorado,² Smith argued that so strong was the lure of mineral riches, that “even wise men are not always exempt from such strange delusions.”

Adam Smith’s scepticism over the imperialist quest for mineral riches extended to the profitability of mining. No economic enterprise was “more perfectly ruinous than the search after new silver and gold mines” – indeed, for Smith, mining constituted “the most disadvantageous lottery in the world [in which] the common price of a ticket is the whole fortune of a very rich man” (Smith (1776[1981]: 562). Smith’s most prescient insight on the subject of natural resources may be the more abstract notion that obsessive efforts to accumulate commodities at the expense of others can be a distraction from what are ultimately more productive economic endeavors – an early version of the rent-seeking argument that has been applied with increasing frequency and success to the case of resource-rich countries (as discussed in Chapter 3). Smith also understood that even when economic actors had an *a priori* understanding that “the wealth of a

²The myth of El Dorado, where mineral wealth was so bountiful that the Muisca king covered the entire city (and himself) in gold, is a symbol for elusive social utopianism in *Candide*, a satirical novella by Voltaire.

country consists, not in its gold and silver only, but in its lands, houses, and consumable goods of all different kinds"; once confronted with resource abundance, "the lands, houses, and consumable goods, seem to slip out of their memory; and the strain of their argument frequently supposes that all wealth consists in gold and silver, and that to multiply those metals is the great object of national industry and commerce" (Smith 1776[1981]: 429). Late-20th century scholars would observe a similarly slippery grasp of prudence in the fact of large discoveries and realisations of resource wealth in their theories of "procyclicality" and "dynamic inconsistency" in the political economy of the resource curse.

By the age of the industrial revolutions in Britain, Western Europe and America, the concept of natural wealth had again shifted, drawing increasingly on the direct industrial uses of commodities, especially fossil fuels and cotton (and later steel, copper and rubber). Contemporary observers and subsequent scholarship identified access to proximate natural resources as an unambiguous boon, and possibility a prerequisite, for economic development and industrialisation in this era. The relative ease with which Western European nations accessed supplies of coal, steel, timber and peat – from domestic deposits, as well as peripheral areas (such as the Baltics) and colonies – has been advanced by some scholars as a (or perhaps *the*) critical factor in determining to why the industrial revolution occurred there, rather than in other comparatively advanced societies of the time period. This influential argument for the centrality of abundant coal supplies as an explanation for why the industrial revolution occurred in Britain dates back to the work of William Stanley Jevons (1865).³

At the same time, agricultural abundance, rather than access to industrial resources, remained a popular explanation for economic backwardness. The "bountiful tropics" thesis – the argument that societies stagnated when agricultural conditions were too easy, negating the need for investments in productivity-enhancing technologies – became one of the most pervasive narratives in European accounts of the economic status of other regions. So prevalent was the bountiful tropics thesis by the mid-19th century, that Marx invokes it without much qualification or context in *Das Kapital* (1867) as the sole explanation for the failure of capitalist development in the tropics: "Where nature is too lavish, she keeps him in hand, like a child in leading-strings. She does not impose upon him any necessity to develop himself" (Marx, 1867[1967]: 513).

³ For authoritative accounts of this argument, as well as extensions to the industrialisation and economic ascendance of the United States, see Habakkuk (1962), Wright (1990), and Wright and Czelusta (2004 and 2007).

While abundant natural resources, or at least access to them from proximate locations, almost certainly constituted a necessary condition for early industrial take-off, there has for centuries been an accompanying scepticism over the effects of resource wealth on economic and social progress. There is a thread connecting Bodin's warnings over "men of fat and fertile lands", Adam Smith's disdain for Mercantilist obsessions with the accumulation of precious metals, the bountiful tropics thesis, and indeed the late 20th century literature on the resource curse discussed below. It is the notion that that wealth too easily gained from the earth can just as readily reduce the incentives for toil, innovation and prudence, that provide the key to enduring prosperity.

1.2. Escaping backwardness: natural resources in post-war development economics

The increase in the global trade in commodities in the late-19th century made the proximity-to-resources argument less relevant in debates over the role of resources in economic development. In the United States, trade in agricultural goods increasingly migrated towards formal exchanges, such as the Chicago Board of Trade and the New York Mercantile Exchange, in order to facilitate more efficient price discovery, risk management (including through the trading of options and futures) and information sharing. Gradually, this mode of trade and market exchange became the norm across agricultural and non-agricultural commodities. On the demand side, rapid economic growth and international trade supported the expansion of global commodities trading and production.

The interwar and post-war periods in particular heralded periods of high demand and trade in natural resources, driven by energy- and resource-intensive growth patterns, the rise of the use of the automobile and post-war reconstruction efforts. Persistent breakthroughs in transportation (notably, the use of "super tankers", capable of transporting more than 3 million barrels of oil), technology and infrastructure (both physical and financial) promoted seemingly inexorable growth in international commodities trading, and completely globalised the supply and demand dynamics of most natural resources (World Trade Organisation, 2010).

Of particular importance to the evolution of the literature on resources and economic development is the emergence during this period of a large number of developing countries as global suppliers of primary

products and traded commodities, particularly since the 1950s. Natural resources featured prominently in the grand theories of economic development that emerged after the Second World War. The “modern development economics” of this period, saw the rapid modernisation of poor countries as a distinct challenge and intellectual project, providing a fertile breeding ground for new scholarship on the role of natural resources in economic development.

All the seminal contributors of this period – by the likes of Walt Rostow, Albert Hirschman, Hans Singer, Raul Prebisch, Paul Rosenstein-Rodan, Ragnar Nurkse and Arthur Lewis – addressed the role of the natural resource sector in relation to broader economic development and modernisation. While offering contrasting views of the means and pace through which modernisation was to be achieved, these theories had in common the view that the key to economic development lay in moving away from the backward economic undertaking of extracting primary goods towards modern industry, characterised by higher skills, productivity and real wages. Most of these modern development theories – still under the impression of the role of coal, steel and other industrial resources in the industrialisation of Europe and, subsequently, the United States – regarded abundant resources as a positive catalyst or starting point for economic development.

Walt Rostow’s influential stages-of-growth theory (1960), with its central focus on investment and capital accumulation, viewed primary goods extraction as the most basic – or, in his words, “backward” – modes of economic production. However, resource abundance would be critical to mobilising the requisite savings, investment and capital formation to advance through – and possibly leapfrog – predetermined stages of economic development. Both the positive and normative dimensions of Arthur Lewis’ similarly influential two-sector model of economic development were based on the importance of releasing surplus labour from the agrarian modes of production towards an urban, capitalist one (Lewis, 1954 and 1955). In Lewis’ view, this process could only be accelerated by an abundance of natural resources – indeed, his starting point was to show how poor countries could still industrialise *even when* they were relatively resource poor. Following Rostow, Lewis understood an abundance of natural resources to be a means through which to affect this transition with greater ease.

A more *dirigiste* view of how natural resources should advance the goal of rapid economic development and modernisation was contained in Rosenstein-Rodan’s (1943) “big push” model, further developed by

Nurske (1961). The big push called for state-directed investments funded by resource windfalls into other sectors of the economy that remained underdeveloped in order to achieve “balanced growth”. Rosenstein-Rodan and Nurske argued that in the absence of massive, state-led investment, developing countries would get stuck in a low-equilibrium trap based on specialisation in resource production. As with Rostow and Lewis, models in the big push tradition did not, therefore, regard an abundance of resources as in any way detrimental to process of modernisation, for it merely strengthened the means through which to achieve balanced growth and modernisation and potentially sped up this process.

Hirschman (1958), particularly through his emphasis on the “forward and backward linkages” between economic activities, held a somewhat more nuanced view of the role of the resources sector in economic development. In his view, certain primary sub-sectors, such as agriculture, had relatively few linkages and were therefore not conducive to sustained development; while others, such as steel, were characterised by a myriad of such linkages, which could help spur development and growth. Importantly, Hirschman, who cautioned against heavy-handed state planning and generally favoured gradual economic reform and change, opposed Rosenstein-Rodan and Nurske’s “big push” approach. Hirschman was more comfortable with what he regarded as inevitable periods of “unbalanced growth” and the piecemeal realisation of forward and backward linkages that may stem from the extraction of natural resources.

The majority of first-wave of development economists of the 1950s, therefore, held a largely positive view of natural resources in relation to economic development, albeit as a potential catalyst for modernisation and industrialisation. For this reason, a broad consensus emerged in the 1950s that the comparatively resource-rich developing countries of Africa and Latin America faced better growth prospects and would achieve faster rates of economic convergence with the advanced economies than their counterparts in Asia (Easterly, 2001).

A notable exception to this view was found in the work of Hans Singer and Raul Prebisch, two influential economic advisors to third-world countries and leading advocates of export-led industrialisation and, more specifically, import substitution as a means to achieve it and avoid the entrenchment of the dependent relationship developing countries had with their developed counterparts. Working independently of each other, Prebisch (1949 [1950]) and Singer (1950) observed that developing countries primarily exported natural resources (or “primary goods”). On the basis of this observation, what later

came to be known as the Singer-Prebisch thesis held that the terms of trade for primary-goods exporters would decline relative to those exporting manufactured goods.

The argument was based more on an interpretation of historic price movements than on a detailed theoretical explanation: the most detailed theoretical argument for the Singer-Prebisch thesis was that the demand for manufactured goods was subject to higher income elasticity than that for primary products. Therefore, the authors argued, as global incomes rose, the demand for manufactured goods was expected to increase more rapidly than that for primary products, resulting in a long-run price differential that favoured the former.

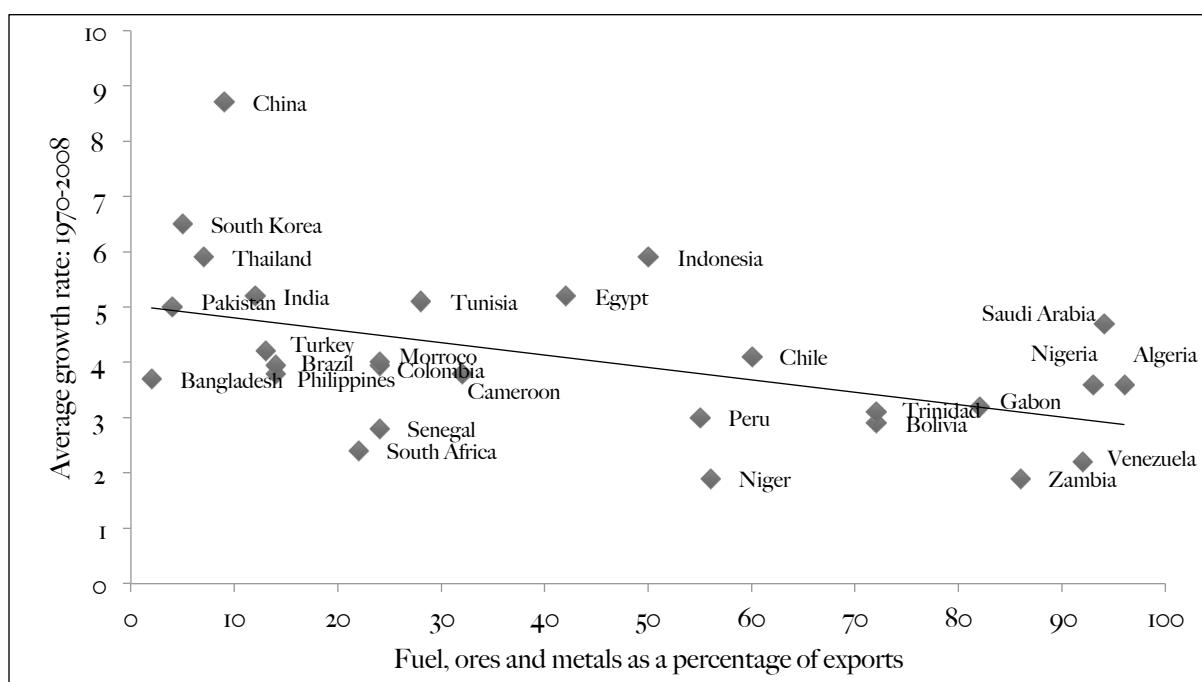
The Singer-Prebisch thesis is built around a testable hypothesis: the anticipated historical decline of commodity prices relative to other goods and services. While the empirical evidence on the long-term trend in global commodity prices is highly dependent on the specification of the sample period, there is little evidence of the secular decline Singer and Prebisch predicted (for discussions of the empirical evidence on historic commodity cycles, see Erten and Ocampo, 2013).⁴ As Frankel observes:

“Studies written after the commodity price increases of the 1970s found an upward trend, but those written after the 1980s found a downward trend, even when both kinds of studies went back to the early 20th century. No doubt when studies using data through 2011 are completed some will again find a positive long run trend.” (Frankel, 2012: 24).

⁴ While the once popular notion of general economic “super cycles” (often referred to as Kondratiev cycles after their pioneer, the Russian economist Nikolai Kondratiev) has been largely discredited, such arguments might remain relevant to commodity prices, where the demand-side for industrial commodities in particular is supported by slow-moving, structural dynamics in the global economy, such as the post-war reconstruction of Europe and the industrialisation of China since the late 1970s – and where the supply response to positive price incentives take many years to reach the market (Erten and Ocampo, 2013).

Despite the fact that historical evidence has, therefore, not been kind to Singer-Prebisch thesis, it remains a noteworthy chapter in the historiography:⁵ it was the first in a long succession of arguments in the second half of the 21st century that supported the idea that resource wealth may be damaging to long-run economic prosperity. The Singer-Prebisch argument regarded natural resources not so much as a valuable geological gift, but rather as a developmental challenge that had to be overcome and actively counteracted through government policies.

Figure 1.1: Developing country growth and resource exports: 1970 – 2008



Sources: Penn World Tables and World Development Indicators

⁵ The enduring interest in an idea that has so clearly been discredited is in part due to its influence on economic policies. The Singer-Prebisch hypothesis was embraced by the United Nations, particularly its Commission for Latin America and the Caribbean, an organisation in which Singer and Prebisch held prominent advisory and leadership positions, respectively. Given the historic context in which the thesis gained prominence – on the cusp of the decolonialisation of large parts of Africa and Asia – its popularity with newly empowered independence leaders is unsurprising. The thesis appealed to nationalist notions of economic sovereignty, reduced dependence on (and exploitation by) a global economic “core” dominated by former colonial powers, and visions of rapid social and economic modernisation through state-directed industrialisation.

As discussed below, this line of reasoning remains popular in much of the resource-curse literature. Sustaining interest in the possible developmental challenges due to resource wealth is the sharp divergence in economic fortunes of developing regions since the 1960s. Contrary to the predictions of the development economists of the 1950s, who viewed natural resources as a stepping stone to capital accumulation and industrialisation, it was a succession of comparatively resource-poor Asian countries, rather than the more resource-rich countries of the Middle East, Latin America and Africa, that emerged as the growth champions of the second half of the 20th century (see Figure 1.1).

Given that this divergence occurred over a long sample period, which included significant up- and downswings in both the global commodity cycle and in the prices of individual commodities, it is clear that a secular decline in the relative price of commodities, as per the Singer-Prebisch thesis, cannot be to blame. Thus, “studies based on the post-war experience have argued that the curse of natural resources is a demonstrable empirical fact, *even after controlling for trends in commodity prices*” (Sachs and Warner, 2001: 828; emphasis in original). The remainder of this chapter discusses the evolution of this large literature on the resource curse in the aftermath of the oil-price shocks of the late 1970s.

1.3. The emergence of Dutch disease

The difficulties encountered by the majority of oil-exporting countries in capturing the benefits of the 1970s oil-price shocks – and particularly adjusting to its aftermath, once prices collapsed in the 1980s – provided the impetus for a flood of new scholarship on the economic problems associated with resource abundance. The most enduringly influential work from this period theorised what subsequently became known as the “Dutch disease”. Corden and Neary (1982) are often credited with writing the seminal paper on the subject, but in fact their contribution was largely one of consolidating an already rapidly expanding theoretical literature, with critical earlier contributions by Van Wijnbergen (1981, 1984a and 1984b), Buijter and Purvis (1981), and Bruno and Sachs (1982).⁶ The Dutch disease theory, which has seen a

⁶ Van Wijnbergen developed many of the original insights in his doctoral thesis at the Massachusetts Institute of Technology, awarded in 1980 (some of the confusion over the credit for the Dutch disease theory relates to delays between the awarding of his PhD and the subsequent publication of articles from it in leading academic journals). The idea was, however, already being discussed in non-academic circles: the term “Dutch disease” was coined in an article in *The Economist* (1977) describing the dynamics that led to the decline of the manufacturing sector in the Netherlands after the discovery of an offshore natural gas field in 1959.

number of important refinements and adaptations, remains largely (and in most versions of the argument, solely) based on purely “economic” dynamics – that is, a theory that explains the underperformance of resource-rich countries in terms of fundamental market disequilibrium or market failure, without assigning a critical role to politics and institutions. There are a number of subtle variations and elaborations within models in the Dutch disease tradition, but the common diagnosis of the disease involves the following symptoms:

- (i) The discovery of a resource endowment results in a large windfall of public and/or private revenues and a surge in total investment and spending in the domestic economy;
- (ii) A resultant shift in the allocation of capital and labour away from the traded-goods sector (where prices are set on the international market) occurs due to rising prices and more attractive returns in the non-tradable commodities, goods and services;
- (iii) Nominal and real frictions between the traded and non-traded sectors prevent them from clearing simultaneously, resulting in a real appreciation of the currency as prices rise in the non-tradable sector (relative to the internationally cleared tradable sector);
- (iv) Ultimately, these dynamics are self-reinforcing (i.e., that are characterised by positive feedback loops). If they continue long enough, a country either destroys its existing tradable manufacturing sector or fails to develop one in the first place.

Even economists who agree with the Dutch disease story as described above have questioned whether this sequence of events necessarily constitutes a disease. Why, for example, can a country not specialise in the production and export of natural resources, while allowing its resource earnings to strengthen the exchange rate and allow for cheap manufacturing imports from abroad, while developing thriving domestic service and non-traded goods sector? Is this not the exploitation of resource-rich countries’ comparative advantage? The Dutch disease literature suggests a number of problems with this scenario.

First, the short-term price volatility due to exogenous shocks (such as weather, conflict and other supply disruptions), medium-term cyclicalities, and long-term uncertainty of commodity prices and production volumes (due to geological factors and changing technologies) all render a reliance on commodity exports to pay for imports destabilising across all time horizons. The specialise-and-trade strategy requires stability and a steady stream of earnings from the export of resources in order to finance its imports. In

practice, however, commodity prices and export earnings can be extremely volatile, causing significant balance-of-payments shocks and painful adjustments.⁷

Second, a number of Dutch disease models attribute positive externalities and specific developmental benefits to the manufacturing or tradable sector. These models typically include the assumption that primary sectors have less scope for productivity growth, and less potential for the exploitation of increasing returns to scale than the manufacturing (traded) sectors (Van Wijnbergen, 1984a and 1984b, Krugman, 1987 and Matsuyama, 1992). Another common element is that the manufacturing sector is more labour intensive (particularly at the early stages of development) than the primary sectors, implying the desirability of manufacturing from promoting full employment. “The Dutch disease can be a real disease – and a source of chronic slow growth,” Sachs and Warner (1997) note, “if there is something special about the sources of growth in manufacturing.”⁸ An abundance of natural resources can, therefore, be a curse if the manufacturing sector is modelled under non-neoclassical assumptions.

1.4. The resource-curse hypothesis: weak- and strong-form and early evidence

Dutch disease models are essentially stories about what happens to an economy’s competitiveness and internal resource allocation under conditions of a commodities boom. That is, of course, one half of the story – typically, the more obviously disconcerting second half follows when the boom turns to bust. While the theoretical work on the dynamics of the Dutch disease continued to expand over the course of the 1980s in response to the dramatic rise in oil prices at end of the preceding decade, the subsequent collapse – during which oil markets remained vastly oversupplied for more than a decade and prices slumped to below \$10 per barrel in the mid-1980s – provided further impetus for scholarship of the long-run relationship between resources and economic development.

⁷ The volatility and uncertainty of natural resource prices and indeed a number of key macroeconomic aggregates in resource-dependent countries are popular explanations for the resource curse in their own right, without integrating volatility and uncertainty into a broader Dutch disease model (Van der Ploeg and Poelhekke, 2009).

⁸ Sachs and Warner (2001) acknowledge that the assumption of higher positive externalities in the manufacturing sector is based mostly on broad observations, rather than on “micro-level evidence” and “Therefore it remains somewhat speculative.” Another non-neoclassical assumption is the implicit or explicit belief that resource producers face credit constraints that prevent them from borrowing during unanticipated drops in resource revenues.

By the early-1990s, the adverse consequences of the poor management of resource booms and busts for economic performance were sufficiently apparent that the resource-curse hypothesis was formulated and increasingly accepted as received wisdom.⁹ In its simplest articulation, the resource curse simply posits formally that a large endowment of natural resources can be detrimental to economic prosperity, particularly in the long run. The strong-form version suggests that an abundance of natural resources results in lower growth than what would have been observed in the absence of such resources, either for a specific country or on average across countries. The weak form holds that although growth might still be positive in resource-abundant economies, it is sub-optimal (for example, lower than that predicted by a standard economic growth model).

The term “resource curse” is most frequently attributed to Richard Auty (1993), although an explicit link between resources and the idea of a “curse” was made five years earlier in a World Bank volume, *Oil Windfalls: Blessing or Curse?* (Gelb, 1988). The latter study analysed the extent to which a number of oil-producing developing countries had squandered an unprecedented positive terms-of-trade shock and the fiscal windfall that accompanied it. Gelb calculated that the countries in his study had consumed around two-thirds of these windfalls, with around half of revenues being invested in domestic public investment projects. Despite this massive increase in investment, “From 1974 to 1981 average growth rates were well below what would have been predicted by a simple neoclassical model, given the size of the investment boom...Growth rates were even further below what would have been predicted by theories of capital- or foreign-exchange-constrained growth.” This led Gelb to conclude: “oil exporters ended the period worse off than they would have been with a far lower, more predictable rate of increase in oil prices or, indeed, with constant real oil prices” (Gelb, 1988: 136).

Gelb’s contribution is seminal in the resource-curse literature, not least because it underlines the importance of the weak form of the resource-curse hypothesis, as articulated above. From a long-term perspective, the question should not simply be whether resource-rich countries register positive growth rates in the aftermath of positive terms-of-trade or revenue shocks; or, whether they grow faster than

⁹ The resource curse literature has been surveyed extensively elsewhere. Torvik (2009) and Frankel (2012) provide extensive accounts of leading theories, empirical evidence and policy proposals around the resource curse. Van der Ploeg’s (2011) survey is more narrowly confined to formal economic models explaining the resource curse, while Ross (1999) and Collier (2010a) assess arguments that focus on institutional and political economy explanations.

comparable countries with fewer resources. Given the massive increases in public investment and consumption that resource-rich countries generally experience following such booms, it is hardly surprising to observe higher growth rates than before the boom.

The deeper question, implied in the weak form of resource curse hypothesis, is whether resource-rich countries enjoy the kind of economic benefits that may reasonably be expected from the spending and public investment financed by resource windfalls; and whether resource-based growth dynamics can be sustained. Testing the weak form of the resource-curse thesis requires a comparison between observed economic outcomes (which may appear positive) and a notional or modelled, but ultimately unobservable, counterfactual. This presents measurement and epistemological challenges. However, as Frankel (2012: 19) concludes: “That resource wealth does not in itself confer good economic performance is a striking enough phenomenon, without exaggerating the negative effects.”

After this period of largely theoretical advances in the literature on the resource curse, empirical support followed alongside a major development in the broader evolution of the macroeconomics of economic growth: namely, the use of “growth regressions”. This research, with seminal contributions from Barro (1991) and Mankiw, Romer and Weil (1992), attempted to identify the determinants of GDP growth in large cross-country samples, by regressing long-run growth on a set of determinants proposed in leading growth theories (such as savings rates, population growth, educational attainment, openness to trade and so forth). Sachs and Warner’s (1995, 1997, 1999 and 2001) contribution was to show that resource wealth – measured as the share of resource in total exports (which, as discussed below, would later prove to be problematic) – was correlated with lower economic growth, controlling for structural, other geographic and institutional attributes.¹⁰ As such, they were the first authors to “confirm the adverse effects of resource abundance on growth on the basis of a worldwide, comparative study of growth.” Sala-i-Martin (1997) provided additional support for this finding by identifying natural resource abundance as one of the ten most robust variables from (literally) millions of alternative growth-regression specifications. These findings had a profound effect on strengthening the intellectual support for the resource-curse thesis, and therefore remains one of the important papers in the literature.

¹⁰ Sachs and Warner are famous for advancing an understanding of a broad range geographic factors as critical to growth, including countries’ latitudinal position (typically measured as distance of the capitol from the tropics, which they argue provides a good proxy for susceptibility to debilitating tropical diseases) and direct access to coastline.

The impact of these results was compounded by the authors' claim that natural resource abundance not only failed to have a positive effect on growth, but in fact that its effect was negative – that is, the statistically significant coefficient on the resources-abundance regressor was negative, rather than just not statistically significant. Unlike Gelb (1988), Sachs and Warner's arguments amount to the strong form of the resource curse thesis: resource abundance is a curse, rather than something akin to the squandered opportunity identified by Gelb. This distinction between the strong- and weak-form versions of the resource curse hypothesis (and the fact that their finding was supporting the former), was explicitly addressed by Sachs and Warner in a subsequent paper: “[If] all that was happening was that the resource rents were consumed rather than invested, or that the investment that was done yielded low returns, then the path of GDP in natural resource abundant economies would be lower than it would have been in the same economies with optimal policies,” Sachs and Warner (1997: 10) noted. “But such economies would not necessarily grow *slower* than other resource-poor economies. In other words, to explain the *negative* association we find...there must be something else going on beyond wasteful policies” (emphasis in the original). While their contribution was an empirical one, Sachs and Warner (1999) briefly discussed possible theoretical explanations for their famous finding by tentatively invoking the Dutch disease theory (to which Sachs had already contributed), although they “remain[ed] open to other explanations”.

The Sachs and Warner work has not escaped controversy around issues of measurement and methodology. The first line of criticism was that the findings might be subject to omitted variable bias. However, having provided regression evidence supporting the resource curse after controlling for popular variables favoured by four other empirical growth studies (including measures of initial income, macroeconomic policy, institutional quality, geography and education levels) in the original paper, an updated version, Sachs and Warner (1997), showed that their original finding survived the inclusion of nine additional regressors under multiple specifications. A second concern was whether the findings would be robust to alternative ways of measuring resource abundance, but the finding also survived under three alternative measures of resource abundance: the share of mineral production in GDP, the fraction of primary exports in total exports, and the amount of land area per person. Finally, critics questioned whether the results were biased by what Sachs and Warner called “an accident from the special experience of the Persian Gulf states” – a charge they also dismissed, “since most of these states drop out of regression samples for lack of data on other control variables” (Sachs and Warner, 2001: 828).

Sachs and Warner would have another important effect on the evolution of the resource curse literature, stemming from their forceful rejection of institutional explanations. In various specifications and extensions of their regressions over years of scholarship, institutional variables were repeatedly found not to be statistically significant, leading Sachs and Warner (2001: 835-836) to conclude that institutional or political “explanations do not pass even a cursory look at the data”. Moreover, they argued, even if econometric support could be found for the effect of natural resources on the formation of certain institutional and political characteristic, attempts to use this as an explanation for the resource curse would be highly questionable in light of broader insights from the cross-country growth regression: “although there is evidence that resource abundance is associated with more authoritarianism, there is unfortunately only weak evidence for an association between non-authoritarian political systems and growth” (Sachs and Warner, 2001).

The force with which Sachs and Warner rejected political and institutional causes of the resource curse would ultimately spawn a large literature attempting to prove otherwise. For at least a decade after the publication of Sachs and Warner’s papers, a near obsession emerged in the resource-curse literature around whether institutions or the Dutch disease was a more important explanation for the resource curse.¹¹ As discussed in Chapter 3, this “Dutch disease versus institutions” dichotomy has only recently softened due to the emergence of theoretical models and empirical evidence underlining important interactions between the two (as well as the more recent literature’s move away from trying to explain the average, cross-country relationship between resources and growth).

1.5. The problem of endogeneity: revisiting the empirical evidence

The resource curse remains a wildly popular idea in development economics and one that continues to attract considerable scholarly interest. However, recent scholarship has taken issue with the standard measurement of key relationships used to study the existence of curse, particularly around the

¹¹ As discussed in Chapter 3, Sachs and Warner’s finding also challenged work that lay outside the confines of economics. Political scientists had long theorised the emergence of “rentier” and “clientelist” states as particular form of state formation and political organisation (particularly in the Middle East), and many of them suggested negative long-run economic implications of such arrangements.

interpretation and potential endogeneity of commonly used measures of resource abundance. A greater appreciation of the epistemological limits around the resource-curse dynamics has emerged alongside an understanding that country- and context-specific manifestations of the resource curse are more interesting and important than an examination of the average, cross-country relationship between resources and growth. However, for some scholars, the measurement issues loom so large that it undermines the very notion of the curse (Bulte, Damania, and Deacon, 2005, Brunnschweiler, 2008, and Brunnschweiler and Bulte, 2008).

In the early literature identifying the resource curse, the most commonly used measure of “resource abundance” was the share of natural resources to either GDP or total exports. However, subsequent scholarship has underlined that, while these measures are good indicators of *resource dependence* – an important, but separate, issue – they are not exogenous indicators of *resource abundance* or *resource wealth* (Brunnschweiler and Bulte, 2008) paper, and Van der Ploeg and Poelhekke, 2009). Countries may have a low share of natural resources to total exports, not so much because they do not have an abundance of resources, but because they export many other products that are the direct consequence of economic growth and development.

To illustrate this point, consider the following thought experiment: assume that Country A started off with a larger resource endowment than Country B in 1970. Country A then succeeded in developing a thriving manufacturing sector over the ensuing four decades, while Country B failed to do so. If we compare the share of resources to total exports of both countries in 2010, the share of resources in Country A’s total exports is likely to have dropped between 1970 and 2010 (as its share of manufacturing exports increased). Meanwhile, the share of resources in Country B’s exports is likely to have remained high, given its inability to build a thriving manufacturing sector. It is therefore likely that Country A’s share of resources to total exports will be lower than that of Country B in 2010.

It would be a logical fallacy to conclude from this that Country B’s higher share of resources to total exports, as measured in 2010, that *led to* lower growth. As Frankel (2010: 15) points out, “Industrialisation may determine commodity exports rather than the other way around. The reverse causality could explain the negative correlation: those countries that fail at manufacturing have a comparative advantage at commodity exports, by default.” The point is that a country can be resource abundant, while still having a

low share of resource exports because the rest of its economy has developed (notable current examples are Canada, Australia, Norway and the United States). Because the share of resources to exports (or GDP) is endogenous to economic growth, it provides a biased indication of the relationship between resource wealth and economic growth.

In an attempt to find an exogenous measure of resource wealth, scholars have used data on proven natural resource reserves (either in terms of total value, or per square kilometer or per capita). These measures, often referred to in the literature as measures of “resource intensity”, should in theory provide a more accurate indication of resource wealth. Using various “resource intensity” measures to capture resource abundance, Brunschweiler and Bulte (2008) conclude the resource curse “may be a red herring”, as their estimations show that “resource abundance positively affects growth and institutional quality,” thus calling the entire resource curse hypothesis into question.

However, these measures of resource intensity are also potentially endogenous to growth (and to other factors, notably the quality of institutions), as they reflect past resource discoveries that required costly investments in exploration and prospecting. Norman (2009) argues that investment in exploration is endogenous to the rule of law, as private firms investing in costly exploration for resources want to know that they will be able to profit from any possible discoveries, rather than face the risk of appropriation once discoveries are made. In *The Plundered Planet*, Paul Collier (2010) similarly links “investments in search” to the quality of institutions and the rule of law.¹² In their critique of the Brunschweiler and Bulte (2008) paper, Van der Ploeg and Poelhekke (2009) argue that the endogeneity of resource intensity measures undermine the former’s findings and that evidence of the resource curse remains compelling, albeit through the generally neglected channel of excessive macroeconomic volatility in resource-rich countries (discussed in Chapter 2).¹³

¹² Collier and Gideris (2007) further note that any indicator that is expressed as a ratio of GDP is by definition endogenous to GDP growth: “Government policies and institutions are very likely to affect the ratio of commodity exports over GDP through the denominator (GDP).” The same could be said of measures that are expressed as a ratio of total exports, which could be affected by the countries trade policies and openness to trade.

¹³ Van der Ploeg and Poelhekke’s (2009) objections to the Brunschweiler and Bulte (2008) paper goes further, as they accuse them of “an unfortunate data mishap, omitted variables bias, weakness of the instruments, violation of exclusion restrictions and misspecification error.”

Ultimately, these endogeneity problems, as well as broader measurement issues, have continued to present difficulties to empirical investigations of the effects of resource wealth on a variety of economic, political and social outcomes – particularly when such investigations are conducted at the average or cross-country level. Efforts to overcome endogeneity problems have more recently turned to innovative econometric techniques (discussed in the remainder of this chapter) that aim to resolve the problem in a statistical manner, rather than engaging in continued efforts to unearth exogenous measures. In a more general sense, the empirical literature has evolved in terms of the econometric treatment of the data since the influential work of Sachs and Warner¹⁴ - and, as discussed below, revived more institutions-centric explanations for the resource curse.

1.6. The revival of institutional arguments

The first wave of empirical work, most emphatically represented by the Sachs and Warner studies, on the average cross-country empirical relationship between resource wealth and economic growth, therefore, strongly rejected the importance of institutional factors. In addition, the most powerful theoretical framework in the early resource-curse literature, namely the Dutch disease, built on purely economic dynamics.

However, the gradual unearthing of the above-mentioned endogeneity problems in the earlier resource-curse literature, coupled with the introduction of econometric techniques that attempted to capture possible interactions between institutions, politics and resource wealth, has resulted in a revival of interest in and support for arguments centered on institutional and political-economy explanations. Indeed, such has been the ascendance of institutional explanations for the resource curse that Frankel's review of the literature included the assertion that, "Of the various possible channels through which natural resources could be a curse to long-run development, the quality of institutions and governance is perhaps the most widely hypothesised" (Frankel, 2010).

¹⁴ The criticisms of Sachs and Warner's worked briefly outlined in this chapter pertain to potential measurement flaws, while still assuming that the general econometric set-up of the growth-regression framework is sound. Of course, there have been important fundamental criticisms of the growth-regression approach as utilised in the 1990s. For more fundamental critiques of the growth-regression approach, see Mankiw, (1995) and Easterley (2005).

The most powerful empirical evidence in the revival of institutional explanations for the resource curse was presented by Mehlum, Moene and Torvik (2006). The authors' aims were boldly stated as investigating "the hypothesis that a poor quality of institutions is the cause of the resource curse and that good enough institutions can eliminate the resource curse entirely." They find strong statistical support for this hypothesis arguing, "the main difference between the success cases and the cases of failure (in managing natural resources) lays in the quality of institutions" (Mehlum *et. al.*, 2006: 1117). In order to underline their direct challenge to Sachs and Warner's forceful rejection of the institutional explanations, Mehlum *et. al.* (2006) use not only the same econometric set-up (with one noteworthy extension, discussed below) and the same dataset as the original studies by Sachs and Warner (1995 and 1997).

Mehlum *et. al.*'s (2006) only major innovation was the inclusion of an interaction term between measures of institutional quality and resource abundance.¹⁵ Whereas the Sachs and Warner studies had attempted to identify the effects of institutional quality and resource dependence (or in their original interpretation, resource abundance¹⁶) on growth *separately*, the inclusion of an interaction terms helps test the hypothesis that resource wealth is conducive to economic growth in the context of strong institutions, and bad for growth in context of poor institutions. Mehlum *et. al.* (2006) found that the interaction term had a positive coefficient that was both economically and statistically significant, and concluded "resource abundance is harmful to growth when the institutional quality is poor, but conducive to growth when institutions are strong." In their view, countries that are simultaneously characterised by weak institutions and resource abundance are, therefore, "doubly cursed".

Mehlum *et. al.* (2006) served a number of purposes in the evolution of the broader literature on natural resources and economic development. In the first instance, it revived in the resource-curse literature exactly the kind of institutions-centric perspective that had recently gained in ascendency in explaining a variety of complex long-term economic patterns, and more specific questions in development

¹⁵ Their measures of institutional quality is an unweighted average of five commonly used indexes: a rule of law index, a bureaucratic quality index, a corruption in government index, a risk of expropriation index, and a government repudiation of contracts index.

¹⁶ Recall that the endogeneity of the measure of resource abundance used by Sachs and Warner means that the findings of both studies should be reinterpreted as a statement about the consequences of resource *dependence* than resource *abundance*.

macroeconomics.¹⁷ Second, evidence that resource abundance has a sharply differentiated impact on economic performance depending on the quality of institutions also initiated a new emphasis on disaggregating the analysis between the “winners” and “losers” in the management of natural resources. Whereas the previous vintage of studies based on evidence from cross-country growth regression attempted to identify the *average* relationship between resource abundance and growth, insights into the potential institutional origins of the resource curse (and success stories), have led scholars down a more rewarding path of differentiation rather than categorical assertions around the impact of resources on economic growth.

Finally, the Mehlum *et. al.* (2006) study underlined the importance of the quality of institutions at the time when resources are discovered (also known as “initial institutions”). Proponents of this argument suggest that better-quality initial institutions explain why countries such as Norway, Australia and Canada were able to harness their resource wealth with apparent success: large-scale discoveries and production were made in the second half of the 20th century, when these countries had already developed highly supportive institutions. Similar arguments have been presented in less obvious historical contexts, such as the mid-19th century California gold rush (Clay and Wright, 2005) and post-independence Botswana (Robinson, Acemoglu and Johnson, 2003). These arguments resonate with broader themes within institutional economics, most obviously with the North’s emphasis on path dependence and the deep historical foundations of differentiated economic performance; and with the qualitative analysis of economic historians (Wright and Czelusta, 2004 and 2007) and political scientists (notably, Terry Lynn Karl, 1997) who were all early proponents of the view that a resource discoveries negatively impact the performance of economies with underdeveloped institutions – or “extractive” and “grabber-friendly” institutions as per Acemoglu and Robinson (2012) and Mehluem *et. al.* (2006). A common theme in this literature is that the combination of poor (extractive or grabber-friendly) initial institutions and resource abundance make it more likely that resource revenues will be directed towards the benefit of a small elite.

As noted earlier, Brunschweiler (2008) and Brunschweiler and Bulte (2008) have argued that the empirical literature on the resource curse (which they dismiss as a “red herring”) suffers from a set of

¹⁷The list of significant contributions in this extraordinarily fertile area of research since the start of the 21st century is a long one. However, the continued expansions of New Institutional Economics (North himself had numerous scholarly contributions on issues of development) into the major questions of development gained considerable impetus with such publications as Acemoglu, Johnson and Robinson (2002), Glaeser, *et. al.* (2004) and Rodrik *et. al.* (2004).

insurmountable endogeneity problems that make the identification of causal relationships impossible. Rejecting both Dutch disease and institutions-centric arguments, they find that resource abundance, constitutions, and institutions determine resource dependence; second, resource dependence does not affect growth; and third, that resource abundance positively affects growth and institutional quality. A number of studies, such as Collier and Gideris (2007), Van der Ploeg and Poelhekke (2009) and Arezki and van der Ploeg (2010), have in turn countered these finding, using instrumental variables not only for institutions, but also for measures of resource abundance and resource dependence. These studies sustain support for the resource curse hypothesis, and particularly emphasise the importance of initial institutions in determining whether or not economies benefit from resources. Collier and Gideris (2007) add that there are important horizon effects, calling for a distinction between short- and long-run relationships between resource abundance and growth, while Arezki and van der Ploeg (2010) argue that in addition to sound institutions, openness to trade, can be a significant mitigating factor in the resource curse dynamic.

Conclusion

The relationship between natural resources and economic prosperity has confounded economists for centuries. The list of the largest producers of natural resources today includes some of the poorest and richest countries in the world. The role of resources in established theories of historic economic prosperity ranges from highly conducive (and even essential) to economic take-off to deeply undermining. Despite the contestation around the precise relationship between resources and economic prosperity, economists' understanding has evolved in a number of illuminating ways. Compared to the uncritical acceptance of the resource curse that accompanied the findings of Sachs and Warner, the hypothesis is today maintained with considerable qualifications. The weak average relationship between resources and economic performance has promoted a more fruitful emphasis on country- and context-specific factors that promote success or failure in harnessing resource wealth. The role and quality of institutions and political-economy factors feature prominently in this discussion.

On the whole, the resource curse hypothesis remains broadly supported, albeit in a modified, conditional restatement in which the quality of institutions at the time of resource discovery is particularly important. The earlier wholesale dismissal of the institutional link in the early resource-curse literature, therefore,

appears misguided. In particular, the conditional resource curse, with its emphasis on initial institutions, has very important policy implications for developing countries with recent resource discoveries, many of which have weak and underdeveloped institutions: weak institutions and resource windfalls are a deadly combination, reinforcing weak institutions and greatly increasing the probability of poor long-run economic performance.

As discussed in greater detail in Chapter 3, institutional arguments in the resource curse literature are no longer presented in direct opposition to more fundamentally economic ones (such as the Dutch disease). Rather, there is increasing support for interactions between resource windfalls, the quality of general institutions, specific institutions relating to the management of resources and the quality of economic policies. Chapter 2 proceeds with a general discussion of the theory of institutions in economics, while Chapter 3 focuses more narrowly on institutional and political-economy challenges around the management of resource windfalls. These chapters form the theoretical backbone for the central argument advanced in this dissertation: that sovereign wealth funds, if embedded in an accompanying rule-based system for fiscal policy, provide a promising – if incremental – institutional solution to widely observed failures in the management of resource windfalls.

Chapter 2

Getting to Denmark:

Theoretical perspectives on the design and evolution of institutions

In *Political Order and Political Decay*, Francis Fukuyama (2014) argues that the challenge that still confronts most societies is that of “getting to Denmark” – that is, “an imagined society that is prosperous, democratic, secure, and well governed, and experiences low levels of corruption”. However, the experience of repeated failures to promote these cornerstones of political order around the world had underlined to the author (some two-and-a-half decades earlier) of the much-maligned “End of History” (Fukuyama, 1989), just how difficult and complex a task institution building is. “We don’t understand how Denmark itself came to be Denmark and therefore don’t comprehend the complexity and difficulty of political development,” Fukuyama (2014: 25) argues.

These epistemological challenges around how the political and economic institutions that promote prosperity are formed are pertinent to the more focused discussion around the role of such institutions in managing natural resources. With respect to the latter, the literature has developed in two distinct directions. First, is that countries with strong meta institutions (such as the democratic governance, the rule of law, low levels of corruption and the separation of powers), unsurprisingly, tend to harness the benefits of resource wealth more effectively than those that lack such institutions. The second, and arguably more fruitful, direction has been to focus on a set of specific economic, institutional and political pathologies commonly suffered by a number of resource-dependent countries. What therefore remains largely unresolved and open for debate is the contribution that targetted institutional reforms can make in addressing specific problems, under conditions of relatively weak meta institutions.

This chapter presents a largely theoretical discussion of the central importance that institutional analysis has come to assume in economics. In light of the questions raised above, the chapter also describes how leading institutional economists have tended to think about the process of institutional change, suggesting that it is not in the tradition of New Institutional Economics to suggest that the process of “getting to Denmark” is likely to a rapid and straightforward one. Quite to the contrary, the New Institutional Economics tradition has long emphasised the deep historic (and even cultural) foundations

of social, political and economic institutions, and understood that the process of institutional change is highly path dependent. This intellectual tradition has also frequently pointed out that transitions to apparently “better” institutions are often curtailed by adverse political incentives, the incompatibility of particular institutions with accompanying elements of the “institutional matrix” and the frequently high cost of institutional change. Finally, these insights have also led the understanding of institutions in economics to a greater emphasis on the functions that good institutions perform, rather than the particular forms they are expected to take (although the chapter will also identify a set of principles for institutional design).

2.1. The rise and enduring influence of New Institutional Economics

It is a testament to the enduring influence and contribution of New Institutional Economics to the study of economics that the assertion that “institutions matter” is rather banal. Indeed, assertions of their central importance and explanatory power have become so strong that Rodrik, Subramanian and Trebbi’s (2004) assertion that “institutions rule” seems more apt. The increasing emphasis on institutions in mainstream economics has also been accompanied by the ascendency of institutionalists perspectives in the social sciences.¹⁸ Institutional economics is a highly inter-disciplinary field, drawing not only on several influential branches of economics, but also on other social sciences and even disciplines outside the social sciences.¹⁹

While, therefore, fairly resounding, the triumph of institutional arguments is recent – as Vernon Smith (2008) notes, for much of the 20th century, the neoclassical economics centered on developing “an institutions-free core”. Undoubtedly, the embrace by New Institutional Economics’ intellectual forefather of the standard tools of neoclassical economics initiated the steady acceptance of institutions into this core. Starting from the analytical framework of neoclassical economics, Coase (1937 and 1960) and Arrow

¹⁸ The renewed interest in institutions across social-scientific disciplines is reflected in the emergence of New Institutionalism in both political science and sociology (see Koelble, 1995).

¹⁹ Within economics these include, most notably but not exclusively, the work of the “early institutionalists”, public choice theory and constitutional economics, contract theory, the economics of information problems, game theory, the theory of the firm and the economics industrial organisation. Outside of economics, the list includes history, political science, law, anthropology, political philosophy and sociology.

(1969) demonstrated the implications of relaxing the neoclassical assumption that transaction costs were non-existent (or at least a trivial obstacle to market-based exchange). These insights promoted the recognition that transaction costs are a central and pervasive fact of economic life, which in the first instance helped explain the existence of observed forms of constraints that lay “outside the market” in Coasian language. Moreover, they showed that transaction costs, particularly those imposed by information problems between prospective market participants, and the pervasive uncertainty underlying cooperative economic exchange in a market system, necessitated the construction of an elaborate institutional infrastructure. Consequently, early scholarship focused as such aspects as the organisational structure of the modern firm, legal practices around contracting, different forms of insurance, mandatory disclosure requirements – all essentially institutional solutions to the need to economise on transaction cost in order to enable market-based modes of exchange.

In using the tools of neoclassical economics to demonstrate the framework’s shortcomings, Coase, Arrow and subsequent authors more directly associated with New Institutional Economics²⁰ (notably Oliver Williamson and Douglass North) were adopting a very different methodological approach than that of earlier institutional traditions in economics. For example, the institutional economics school of the 1920s and 1930s, which included Thorsten Veblen, John Commons and Wesley Mitchell, “adopted [a] posture of methodological hostility to mainstream economics”, arguing instead that institutions were the result of habits, power relations and cultural factor whose origins and functioning lay outside of economic logic (Williamson, 1990). In contrast, one of the binding and defining tenets of New Institutional Economics is that “the determinants of institutions are susceptible to analysis by the tools of economic theory” (Matthews, 1986).²¹

While this methodological approach placed the institutional tradition that emerged in the aftermath of Coase and Arrow firmly within the economic orthodoxy as an increasingly important extension to neoclassical economics, New Institutional Economics took off as a discipline in its own right when Oliver Williamson and Douglass North advanced the study of the origins, functioning and impact of different institutional arrangements in two distinct directions. The starting point in both traditions in the

²⁰The first use of the term “New Institutional Economics” is attributed to Williamson (1975).

²¹ This focus is a critical element differentiation between New Institutional Economics and the treatment of institutions in other social sciences and law.

recognition that institutions assume many different forms, and that this institutional variation held important implications for economic outcomes and the incentives economic actors faced.

New Institutional Economics is primarily concerned with examining the form and function of institutions as sets of social constraints. In North's oft-cited analogy, institutions are the "rules of the game", a set of "humanly devised constraints that shape human interaction" (North, 1990). The rules of the game are requisites for impersonal, market-based exchange, which demands an (often elaborate) amount of certainty and information about the behaviour of other players in the game and external factors that may affect the way the game is played. Once the rules are established, the New Institutional Economics tradition assumes the players in the game react rationally to the constraints and incentives created by the institutional structure. Consequently, the outcomes vary greatly depending on the incentives created by different rules. For Williamson, the overarching question was why certain forms of economic exchange took place through markets, while others were deemed to be more efficiently conducted through institutions (or contracts). Williamson's "economics of governance" studied the nature and implications of different ways of arranging economic activity – such as, public versus private ordering, vertical versus hierarchical structures, and the operation and organisational consequences of different legal systems.

With North's extension of institutional analysis to deep historical questions of why certain economies have developed rules of the game that promote decentralised cooperation and economic growth, while the majority failed, New Institutional Economics moved away from Williamson's more microeconomic lens, to one that placed it in the canon of macroeconomic growth theory and development economics. In North's own words, his contribution was to extend the analysis to why and how alternative sets of institutions devised by humans "shape the direction of economic change towards growth, stagnation, or decline." (North, 1991: 98). For North, mainstream economics' assumption that formal constraints and their enforcement (largely, but not exclusively, by political institutions) were "a given" was a significant shortcoming, as "economic history is overwhelmingly a story of economies that failed to produce a set of economic rules of the game (with enforcement) that induce sustained economic growth" (North, 1991: 98).

Whereas the Williamson strand of New Institutional Economics is, therefore, more concerned with "comparative statics", North was interested in developing a dynamic understanding of the relationship between institutions, history and economic performance that has been described as "evolutionary"

(Hodgson, 1998; and Hirsch and Lounsbury, 1996). Through this more historically founded method of analysis, North was also widening the scope and toolkit of New Institutional Economics. The focus was still firmly on “sets of constraints” on the otherwise arbitrary and uncertain behaviour by economic agents, but North was pushing towards a deeper understanding of the historical origins and evolution of institutions, as well as the ways in which constraints were enforced. Consequently, North used an increasingly broad and abstract vocabulary to define the field and method of enquiry of New Institutional Economics: institutions are “a set of constraints on behaviour in the form of rules and regulations; a set of procedures to detect deviations from the rules and regulations; and, finally, a set of moral, ethical behavioural norms which define the contours that constrain the way in which the rules and regulations are specified and enforcement is carried out” (North, 1984).

2.2. Criticisms of New Institutional Economics: too close a shave with Occam’s razor?

Since establishing itself as part of mainstream economics, New Institutional Economics has been subjected to a number of critiques. Some of these criticisms remain unresolved (and, as discussed below, most probably unresolvable), while others have served to expand and enhance the field and method of enquiry in institutional economics.

2.2.1. Institutional “embeddedness” and the problem of infinite regress

The methodological consistency with neoclassical economics that lead to New Institutional Economics’ gradual assimilation into mainstream economics has also been source of criticism of the approach, particularly from other social sciences, notably sociology. As Hodgson (1998) notes, the starting point of New Institutional Economics is to assume an “institutions-free state of nature”. Market interaction without institutions is assumed to be the natural state of human affairs: as Williamson (1975) himself argues, “in the beginning there were markets.” A case in point is the Coase theorem, the seminal contribution to placing transaction costs at the center of mainstream economic theory. The theorem asserts that if property rights are appropriately defined and transactions costs are negligible, the initial allocation of property rights does not affect the efficiency of the final outcome or distribution of property rights produced by free exchange. While the point of the Coase theorem is to underline that transaction

costs are, in fact, non-negligible and that the initial allocation of property right does, therefore, matter to the final outcome, the important observation for sociological critiques is that Coase's arguments started from the assumption that free exchange is the natural order. It is with this conception of the fundamental purpose of institutions – that they enable the natural economic order of market-based exchange – that sociological critics of New Institutional Economics have taken issue (Hodgson, 1998).

This criticism is in keeping with long-standing objections to the neoclassical methodology, particularly the foundational assumptions variously described as rational choice theory, individualistic rationality, social atomism and methodological individualism. A large body of sociological scholarship views human behaviour, including economic behaviour, as intrinsically and inexorably connected to (or, more strongly, the product of) the social or “structural” context in which it takes place. This is the broad orientation of all sociological enquiry, which ever since Karl Polanyi's (1944) *The Great Transformation* has been cast as the problem of economic “embeddedness” or the “Substantivists versus Formalist” debate.²² Substantivists argue that market-based exchange is not akin to the natural order, but rather a culturally embedded response to the institutions of a market economy. Such critiques of New Institutional Economics are essentially arguing for a return to the tradition of “old” institutional economics. As Hodgson (1998: 180) notes, for early institutional economists, “rationality itself is regarded as reliant upon institutional props...[and] behavioural habit and institutional structure [are] mutually entwined and mutually reinforcing”.

Taken to its logical conclusion, this criticism extends to both positive and normative implications of New Institutional Economics. If human economic actions are dominated by factors than (broadly or approximately) rational utility maximisation – such as custom, superstition and culture – who is to say that institutions can or should emerge to create, enable and expand the scope of the market? Would the pervasive influence of social and cultural factors not prevent the eventual emergence – and even the desirability of – the type of institutions studied and proposed by New Institutional Economics? As Hodgson (1988: 182) argues, “the market itself is an institution. The market involves social norms, customs, instituted exchange relations, and – sometimes consciously organised – information networks that themselves have to be explained.”

²² Within sociology, there are also critiques of “oversocialised and culturally deterministic” views of human and economic behaviour (Granoveter, 1985).

This establishes a well-known epistemological challenge that Hodgson (1998) describes as “infinite regress”. If socially- or culturally-determined institutions and individual decision making are forever bound to each other, there is no way of discerning which one preceded or “caused” the other. We will never know, and in fact *can* never know, which comes first: the establishment of institutions that make market exchange possible (although with rationally optimising responses to these institutions) or the institutions themselves that shape individuals’ decision-making processes and abilities. There is no unequivocal solution to the problem of infinite regress, and no resolution to the Substantivists versus Formalist debate is possible.

Concerns over infinite regress and imbeddedness have done little to curb the influence of New Institutional Economics, as several philosophical defenses have been mounted and the field’s understanding of institutions evolved. First, as with its application to other areas of economics, the method of rational choice in New Institutional Economics is best understood as a heuristic device: a deliberate simplifying rendering of the real world, made in order to arrive at a parsimonious and tractable theory. Ultimately, all social-scientific theories are by definition such simplified versions of a more complex truth – in much the same way that maps are functional, small-scale renderings of a larger reality. Maps are amended when they are revealed to be unfit for purpose and successful navigation requires that more details be added. In this vein, New Institutional Economics’ point of departure in the assumption that institutions emerge from the rationality of economic agents in pursuit of ways to engage in decentralised exchange and cooperation, is little more than a simplifying methodological step.

Rational choice theory has always assumed that human behaviour is *approximately characterised* by rationality; and that repeated mistakes (departures from rationality) is not a sensible way to model economic behaviour. The classic argument for this approach in economics was presented by Milton Friedman’s (1953) famous analogy of billiard player. Friedman suggested that the best way to model the play of an accomplished billiard player is to assume the player is rationally solving the geometric challenge of hitting the balls at the optimal angles in order to get all the balls in the pockets. Of course, the billiard player does not literally solve a set of complex equations while playing, and indeed observed outcomes clearly suggest that billiard player’s actions are not optimal in an absolute sense. However, given that the billiard player’s strategy closely mimics such an optimisation exercise, and there is no repetition of obviously suboptimal behaviour, it is “not at all unreasonable that excellent predictions would be yielded

by the hypothesis that the billiard player made his shots *as if* he knew the complicated mathematical formulas that would give the optimum directions of travel...[and] could make lightning calculations from the formulas, and could then make the balls travel in the direction indicated by the formulas" (Friedman, 1953; emphasis in the original). Of course, simplifying assumptions should be abandoned whenever it becomes apparent that it is fundamentally misrepresenting reality (much as one would add information to a map when its omission renders the map insufficiently detailed to complete a certain journey).²³

This argument is a restatement of the principle of Occam's razor: simpler or more parsimonious theories are always preferred, until simplicity has to be traded for greater explanatory power.²⁴ Recasting the sociological critique of New Institutional Economics on the basis of infinite regress and embeddedness in this light, the question becomes whether the discipline suffers irrevocably from excessive simplification in pursuit of parsimony. Clearly the enduring power and influence of New Institutional Economics suggest that the answer is a resounding "no" to the irrevocability question; although sociological critiques have, arguably, played a significant part in the expansion of the scope and vocabulary of the field. A number of New Institutional Economics' most authoritative figure over time developed a deeper appreciation of the sometimes socially- and culturally-determined nature of institutions. Most obvious perhaps is North's (1986) inclusion in a definition of institutions, "the moral, ethical behavioural norms" that affect the nature of human devised constraints. Later still, North described his own view of institutions as "endogenous" to the forces of history, polities and culture, even permitting the influence of "inherited cultural conditioning" (in contrast to Williamson's view of institutions as "exogenous" to these factors); while emphasising the

²³ Popper (1992, chapter 7) adds another argument in favour of simpler theories, which is that simplification aids testability or "falsification". A simple theory applies to more cases than a more complex one, and is thus more easily falsifiable.

²⁴ For some critics, the simplifying assumptions of New Institutional Economics are not the result of a good-faith attempt at methodological parsimony based on a particular scientific method, but rather an altogether more nefarious ideological project. Chang and Evans (2005) argue that the "false parsimony" of New Institutional Economics "provide(s) powerful ideological support...(for) decision-makers themselves or their most politically powerful constituents". Constructing an elaborate conspiracy, they further argue that the interests and ideologies of these decision-makers and their most politically powerful constituents are advanced through the Bretton Woods institutions, with the help of New Institutional Economics' "thin theory of institutions". Chang and Evans (2005) are not optimistic that a corrective, multi-dimension understanding of institutions will emerge as a matter of orthodoxy, as the "contemporary economic canon enjoys all the necessary conditions for sustaining false parsimony and under current conditions it is unlikely to be unseated by a complex and 'mushy' institutionalist alternative. Even if an institutionalist alternative could unequivocally demonstrate its scientific superiority...practical and ideological costs...would militate against jettisoning the established canon." (Chang and Evans, 2005: 31). Needless to say, this argument fails the falsifiability test (see the previous footnote).

importance of “informal constraints”, such as “norms, conventions, or personal standards of honesty”, as part of the institutional structure (North, 1994: 4). North’s emphasis on the compatibility of specific institutions with the rest of the institutional matrix and path dependence are further evidence of his appreciation of social, ethical and cultural influences on institutions. North put all residual concerns around his possible lack of appreciation of embeddedness to rest when he argued in *Understanding the Process of Economic Change*, published in 2005, that “much of rational choice is not so much individual cogitation as the embeddedness of the thought process in the larger social and institutional context” (North, 2005: 25). Williamson (1996: 230) too would later permit (in direct response to critiques by sociologists) that “transaction cost economics and embeddedness reasoning are evident complementary in many respects.”

The incorporation of a greater appreciation of cultural and social factors into the study of institutions in the field of economics is by no means universal, but it is certainly a theme in the evolution of New Institutional Economics. The important consequence of this observation for the discussion in this chapter is the increasing awareness of these factors in both normative and positive applications of New Institutional Economics. The heightened awareness of cultural and social factors, while still a matter of lesser emphasis for New Institutional Economics compared to the field of sociology, is one of the reasons why the normative literature in particular has shifted more towards a consideration of the functions of institutions, rather than their exact forms. The potential role of political agency, discussed below, is another such factor.

2.2.2. Political agency

While sociologists took issue with a perceived disregard for cultural and social determinants of institutions, a number of prominent political scientists (otherwise sympathetic to the power of institutional arguments) have critiqued New Institutional Economics for lacking an underlying “theory of politics” (Bates, 2014; and Weingast, 1995 and 1997). Bates explains this shortcoming as follows:

“It is politicians who create institutions; they that delegate to them political power. In addition, by manipulating their powers, politicians shape the manner in which institutions behave. Put simply: without a theory of politics, we lack a theory of institutions...Institutions are empowered when politicians wish them so...When the political game is such that ‘winning’ requires that politicians marshal the power of institutions to extract and to redistribute wealth, then institutions will be

predatory. But when political forces align such that politicians are rewarded for the creation of wealth, then institutions will promote and safeguard productive activity. To explain the role and impact of institutions...we must turn to the study of politics." (Bates, 2014: 60).

To illustrate the central importance of political power and incentives in the design and functioning of institutions, Bates compares the agricultural marketing boards (monopsonistic buyers of agricultural products, notably coffee, established by governments) in Uganda and Kenya in the 1970s. These institutions in the respective countries closely resembled each other, but operated in very different ways in practice, according to Bates: in Kenya they were supportive of farmers by providing stable and favourable prices; while in Uganda, the seemingly same institution was highly extractive and predatory at the expense of farmers. According to a Batesian view, the explanation for this difference lies in politics, rather than in the actual design of the institutions, including the enforcement apparatus that accompanies the institution. In Uganda, politicians from the arid and agriculture-poor north of the country held power, and the coffee marketing boards became an instrument to extract resources from the south, which they then spent on transfers and public investment programs in the north. In contrast, in Kenya, political power lay in the hands of politicians from the coffee-growing regions in central Kenya. In exchange for the votes that kept them in office, Kenyan politicians used the institution of the marketing board to enhance the wealth of their constituents (Bates, 2014).

Institutions should not be seen principally in terms of their stated or implied objectives, argues Bates, but rather as instruments of "political action" and patronage. That institutions of this kind lie "outside the market" is precisely the point: "people turn to political action to secure special advantages – rewards they are unable to secure by competing in the marketplace." (Bates, 1981: 4). New Institutional Economics, at least with its initial emphasis on individualistic rationality, paid insufficient attention to the ways in which political power and incentives interacted with institutions in a general sense; and more specifically, the extent to which institutions are often political constructs in the first place, rather than an attempt to enable the natural order of market-based exchange.

This line of criticism has imparted a lasting impact on New Institutional Economics, even if Bates somewhat overstates his case.²⁵ New Institutional Economics has become increasingly mindful of the need to introduce a “theory of politics”, as demanded by Bates into the framework. This development is not inconsistent with the Occamite principle established earlier, but rather an illustration thereof: the inclusion of political agency certainly made new institutional arguments more complex, but the additional layer of analysis was justified by the increase in explanatory power of the theory. Without engaging in an extensive review of the substantial amount of work that has been done to incorporate and model political agency over economic institutions, it is import to highlight at least three leading strands in institutional economics that specifically develops a “theory of politics”: first, North’s influential inter-disciplinary research (notably his frequent collaboration with political scientist, Barry Weingast); second, the literature on Public Choice and Constitutional Economics pioneered by James Buchanan; and, more recently, the work of Daron Acemoglu and James Robinson.²⁶

Consider, first, North’s suggestion that “the whole development of the New Institutional Economics must be not only a theory of property rights and their evolution, but a theory of the political process, a theory of the state, and of the way in which the institutional structure of the state and its individuals specify and enforce property rights” (North, 1986: 233).²⁷ Later, North (1994) would argue that this task had in fact been achieved and that one of the ways in which New Institutional Economics had extended neoclassical theory was by “modelling the political process as a critical factor in the performance of economies”.

Understanding and modelling the political process was also central to the work of James Buchanan, who argued (following what he called the Wicksellian tradition) that his fellow economists “should cease

²⁵ There is a clear limit to how widely the Batesian critique applies, as it is not true that all institutions are created – or even enforced – by politicians. The use of a *lingua franca*, for example, is an institution that is rarely created by politicians and over which they have little control. However, it is certainly true that many institutions are created and enforced by politicians, so Bates’ arguments should be seen in light of these types of institutions.

²⁶ The influence of these scholars is not overstated here: Buchanan and North both received Nobel Prizes in Economics, while Acemoglu was the fifth most-cited economist as of April 2015, according to the RePEc rankings.

²⁷ This focus on politics in North’s later work is a matter of emphasis rather than a dramatic change in his scholarship. Already in *Structure and Change in Economic History*, published in 1981, North discussed the difference between what he called the “contract theory” versus “predatory theory” of the state (North, 1981: 20–27).

proffering policy advice as if they were employed by a benevolent despot, and they should look to the structure within which political decisions are made" (Buchanan, 1987: 243). Buchanan (1975) described the required adjustment to mainstream economics as one of incorporating the "lens of contract" alongside the "lens of choice". It was not only the exercise of choice *within* constraints that mattered (as per the standard analysis of neoclassical economics), but also how those constraints were established – or the choice *between* constraints. Clearly, from the Public Choice tradition in institutional economics, one gets a deep appreciation that the choice of a particular set of constraints (or institutions) may, or indeed may not be, conducive to decentralised cooperation and economic progress. There are a number of theoretical reasons why governments may be able to provide effective and efficient institutional solutions to market failures (resulting, for example, from asymmetric information, moral hazard and adverse selection), including their coordinating abilities, their comparative advantage in violence and coercion, and the cost efficiency through which they achieve credibility around contract enforcement. However, counter to these advantages, Public Choice theory has examined the concept of "government failures," that emerge due to political agents' self-interested response to incentives that are not aligned with collective interests. Public Choice has curtailed the sometimes-unqualified enthusiasm for centralised (public) solutions to decentralised (private) problems (Buchanan, 1984).

The early interest shown by North and Buchanan in issues of political agency in institutional economics has been reinforced by the more recent contributions of leading economists. Acemoglu and Robinson (along with their frequent co-author, Simon Johnson) continued a number of themes from North's New Institutional Economics, not least the deep, historical foundations of institutions. One of the central arguments to emerge from this body of work is the primacy of politics in determining economic institutions and the way they operate – which is exactly the point Bates argued.²⁸ The causality chain in the Acemoglu and Johnson's thesis is as follows: history determines the type of political institutions a country has, which affects the type of economic institutions that are created as well as their use, which in

²⁸ Acemoglu and Robinson (2012) is a grand synthesis of more than a decade's worth of acclaimed scholarship and is intended for a general, popular readership. The arguments contained in it are based on a large body of more technical work, most prominently a series of articles published in the top-ranked journals in economics and political science: Acemoglu and Robinson (2000, 2006 and 2008) and Acemoglu, Johnson and Robinson (2001 and 2002).

turn affects the incentives for different types of economic behaviour.²⁹ There is no ambiguity around the importance they place on political agency:

“It is the political process that determines what economic institutions people live under, and it is the political institutions that determine how this process work...while economic institutions are critical for determining whether a country is poor or prosperous, it is politics and political institutions that determine what economic institutions a country has” (Acemoglu and Robinson, 2012: 42-43).

This is the broad statement in favour of the explanatory primacy of politics, but Acemoglu and Robinson have also developed detailed theories around *why* political institutions, to use their words, are either “inclusive” or “extractive”. Most of this work focuses on the political incentives for resisting transitions towards (better) inclusive institutions, for example: “political elites may block technological and institutional development, because...Innovations often erode political elites’ incumbency advantage, increasing the likelihood that they will be replaced” (Acemoglu and Robinson, 2006: 129). Ironically, so strong is their emphasis on the pervasive influence of politics of institutions, including economic institutions, that the Acemoglu and Robinson thesis risks being politically deterministic (a tendency that has important implications for the third line of criticism of institutional economics, as discussed below).

2.2.3. Determinism and the sequencing of institutional change

A critical theme that has emerged as much from within economics as from outside it, is that the interpretation of the policy implications institutional economics literature, particular those built on findings of the empirical literature, is too prescriptive around particular institutional forms. The central questions raised in this regard are whether the establishment of sound institutions has to be preceded (or at least accompanied) by political reforms; and, more specifically, whether good institutions require certain forms of political organisation (notably, democracy and political contestation). In a famous paper on the subject, Glaeser, La Porta, Lopez-de-Silanes and Shleifer (2004) outline two views on the sequencing of policy, political and institutional reforms:

²⁹ That the story starts with history is a demonstration of the importance of path dependence, which is a dominant theme in New Institutional Economics, since North, Acemoglu, Johnson and Robinson have identified different forms of colonialism (itself the result of, amongst other factor, geography and climate) as the origins of political institutions.

“The first approach emphasises the need to start with democracy and other checks on government as the mechanisms for securing property rights. With such political institutions in place, investment in human and physical capital, and therefore economic growth, are expected to follow. The second approach emphasises the need for human and physical capital accumulation to start the process. It holds that even pro-market dictators can secure property rights as a matter of policy choice, not of political constraints. From the vantage point of poor countries, it sees democracy and other institutional improvements as the consequences of increased education and wealth, not as their causes” (Glaeser *et. al.*, 2004: 271-272).

This distinction arguably permeates every major debate in development macroeconomics, including that surrounding the resource curse. Glaeser *et. al.* (2004) point out that there are significant similarities and agreements between both schools of thought: clearly, both views are consistent with the broad notion that “institutions matter”, and both recognise the important function of institutions in securing property rights in order to incentivise investment. However, they differ with respect to how these goals are to be achieved: the former emphasises the role of institutions in incentivising investment by imposing political constraints on government, whereas the latter places greater faith in the ability of (unconstrained) leaders to implement pro-investment policies. There is considerable support for both arguments, which as Glaeser *et. al.* (2004) point out have historic and “extensive intellectual pedigrees.”³⁰

The controversy pertains not so much to the relationship between these processes in the long run – a horizon over which the assumption of both sides tends to be that inclusive institutions are not only just, but also a more durable and flexible way to ensure economic cooperation, incentivise investment and reduce transaction costs. Democracy and open (or “inclusive”) political systems are widely viewed as desirable exactly because they promote open-ended institutional arrangements and provide informational feedback loops in the design (and incremental change) of the institutional framework. As argued by Rodrik (2000), a strong advocate for flexible and context-specific institutional forms, “participatory and decentralised political systems are the most effective ones we have for processing and aggregating local knowledge. We can think of democracy as a meta-institution for building good institutions”. The debate is rather centered on different views as to the sequencing of policy, political and institutional reforms from low-equilibrium conditions – that is, the debate is really about competing theories of change.

³⁰ Glaeser *et. al.* (2004) argue that institutional-primacy arguments were emphasised by Montesquieu, Adam Smith and the Public Choice and New Institutional Economics literature; while the view that is more supportive of the possibility of enlightened and benevolent authoritarianism to kick-start growth, leading to subsequent political and institutional development, is traced by to the work of political scientists Seymour Martin Lipset (1960) and Adam Przeworski (1985), with empirical support from Barro (1999).

In their book, *Why Nations Fail*, Acemoglu and Robinson (2012) occupy one end of the spectrum with their strongly prescriptive view that economic prosperity *requires* inclusive economic institutions, which cannot emerge in the absence of inclusive political institutions. However, even with this framework in mind, they are careful to avoid (political) institutional determinism. Given the wealth of historic examples (many of which are cited in their book) of countries that enjoyed periods of economic growth and “take-off” under conditions that can hardly be characterised as consistent with inclusive political institutions and open contestation for power,³¹ Acemoglu and Robinson permit that “extractive economic and political institutions are [not] inconsistent with economic growth...Extractive institutions that have achieved at least a minimal degree of political centralisation are often able to generate some amount of growth” (Acemoglu and Robinson, 2012: 431). However, “growth under extractive institutions will not be sustained” – that is, inclusive political and economic institutions is a “requisite” for economic prosperity in the long run.

At this point, it is instructive to return briefly to the relationship between natural resources, institutional quality and economic performance. Recall from Chapter 1 the emphasis on long-run relationships: the question cannot simply be around whether countries with significant natural resources experience higher economic growth rates in response to a commodities boom or, whether they grow faster than comparator countries with fewer resources in such periods. The deeper question, implied in the weak form of resource curse hypothesis, is whether resource-rich countries enjoy the kind of economic benefits that may reasonably be expected from the spending and public investment financed by resource windfalls; and whether resource-based growth dynamics can be sustained. Here, cast against the backdrop of long-term dynamics, questions of institutional quality enter the equation: institutional change is slow moving, and the effect of institutions on economic performance is hard to detect over short time horizons. The question then becomes whether there are defining attributes of resource-dependent economies that prevent or encumber the gradual and progressive realisation of the type of institutions commonly associated with sustained, long-run economic progress. If one permits, further, that examples of a gradual escape from a low-institutional quality equilibrium is possible, also in resource-dependent economies, this

³¹ The example of Chinese growth since the 1970s is the elephant in the room. Acemoglu and Johnson argue that China cannot sustain its recent growth trajectory absent political reforms. Other obvious examples of growth take-offs under non-inclusive political institutions include South Africa, Chile, Singapore, South Korea and Taiwan.

opens up a more optimistic line of enquiry around the search for piecemeal reforms around the management of resource wealth and revenues that promote broader institutional development.

Finally, criticisms of an overly prescriptive and deterministic understanding of institutions in economics frequently result from the statistical treatment and measurement of institutions in the empirical literature. This empirical literature emerged well after the theoretical ascendancy of New Institutional Economics, as the desire to test the field's perceived hypotheses in large cross-country samples resulted in the development of statistical measures of institutional quality (or "governance indicators"), as used for example by Knack and Keefer (1995), and later expanded on by the World Bank (Kaufmann, Kraay and Mastruzzi, 2004). These measures are problematic for a number of reasons. However, at the most basic level, a fundamental objection can be raised about whether the deep, historical and largely abstract notions at the heart of New Institutional Economics can be satisfactorily captured by a handful of quantitative indicators that, moreover, permit little quantitative variation, both across countries and over time (Aron, 2013).

It seems incongruous that an intellectual tradition arguing for the deep appreciation of historical path dependence, the compatibility of the institutional matrix, and the need to understand particular institutions within the context of cultural norms and various forms of political enforcement is accused of determinism and overly prescriptive ideas around the sequencing of institutional change and reform. A theme of this chapter is New Institutional Economics' sensitivity to the importance of context, history and politics; and, moreover, that the evolution of the field has moved it even further in this direction, in part due to the criticisms outlined above. If the theory of New Institutional Economics argued these points in a somewhat abstract sense, the more recent literature has also been influenced by real-world events. In particular, the failure of various waves of institutional reforms in developing and post-Soviet economies since the 1980s underlined the difficulties of "getting to Denmark", as per Fukuyama.³²

³² Oft-cited examples include the difficulties with "shock therapy" around the introduction of market-based economic institutions in the former Soviet Union and Eastern European satellites in the early 1990s, the unhappy aftermath of which increasingly favours arguments for incremental, context-specific institutional reforms. Rodrik (2000) adds older examples, such as the Asian financial crisis (financial liberalisation in the absence of tried and tested regulatory institutions) and Latin American market-based reforms in the 1980s (which he argues paid insufficient attention to social insurance and safety nets). Scholars have also suggested that the apparent failure of the IMF's Structural Adjustment Programmes in Africa during the 1980s underline the folly of rapid, context-obtuse institutional reform (Stein, 1994; and Bates, 2014).

2.3. Form and function: perspectives on institutional design

A corollary of the multi-dimensional understanding of institutions described above is the absence of shelf-ready prescriptions or blueprints for the design of institutions. Rodrik (2000) argues “a strategy of institution building must not over-emphasise best-practice ‘blueprints’ at the expense of local experimentation...desirable institutional arrangements vary...not only across countries, but also within countries over time.” This context- and historically-grounded conception of institutions does not render institutional economics silent on the commonalities of good institutions, but has rather led to an emphasis on the *functions* performed by such institutions, rather than an obsession with their precise *form*. The conflation of form and function is a common criticism of popular measures of institutional quality. Chang (2006) critiques the World Bank’s widely used governance/institutional-quality indexes for bundling together institutional forms (democracy, independence of the judiciary, the absence of state ownership) and functions (the enforcement of property rights and contracts, the maintenance of price stability, the restraint on executive political power and corruption). This section briefly outlines common functions performed by economic institutions, while the final section will discuss broader principles for institutional design that are compatible with Rodrik’s call for local experimentation and variation.³³

2.3.1. Establishing and enforcing property rights

The establishment and enforcement of property rights are essential market-creating or -enabling institutions: decentralised economic exchange requires, at the very minimum, security of property. North and Thomas (1973) identified the establishment of secure and stable property rights as the pivotal factor in the rise of the West and the foundation of modern economic prosperity – the practical importance (and moral case for) private property have long been a cornerstone of liberal economic thought. Smith (1776[1981]) regarded the right to property not as a natural right, but rather an acquired one that legitimated the state: “Till there be property there can be no government, the very end of which is to secure wealth.” For Smith, the protection of property rights mattered as much to preventing “pillage and plunder” by the rich of the poor, as the other way around. “Laws and government,” he argued, allowed the

³³ For more in-depth discussions of these functions, see Rodrik, 2000; Glaeser *et. al.*, 2004; and Kasper, Streit and Boettke, 2012).

rich to “preserve to themselves the inequality of the goods which would otherwise be soon destroyed by the attacks of the poor, who if not hindered by the government would soon reduce the others to an equality with themselves by open violence” (Smith, 1762-63[1982]: 208). In a comment on China from *The Wealth of Nations*, repeated here at length for its striking similarity to the arguments of North or Acemoglu and Robinson, Smith argued that the arbitrary confiscation of property circumscribed the extent of transactions in the Chinese economy and, consequently, contributed to its stagnation:

“China seems to have been long stationary, and had probably long ago acquired that full complement of riches which is consistent with the nature of its laws and institutions. But this complement may be much inferior to what, with other laws and institutions, the nature of its soil, climate, and situation might admit of...though the rich or the owners of large capitals enjoy a good deal of security, the poor or the owners of small capitals enjoy scarce any, but are liable, under the pretence of justice, to be pillaged and plundered at any time by the inferior mandarines, the quantity of stock employed in all the different branches of business transacted within it, can never be equal to what the nature and extent of that business might admit (Smith, 1776[1981]: 112).

Recent scholarship has questioned whether New Institutional Economics’ traditional emphasis on the desirability of *private* property rights is required, particularly if the focus is more on the *function* of institutions rather than their form. Again, questions of sequencing, compatibility and piecemeal institutional change looms large: Rodrik (2000), for example, argues private property rights clearly establish strong incentives for investment, risk taking and entrepreneurship in the context of the rule of law and other supportive institutions. However, absent these (and other) supportive institutions, there may be “second-best institutions”, other than private property rights, for securing “control rights over assets” (Rodrik, 2000). Both Rodrik (2004) and North (2005) draw attention to the success achieved by Township and Village Enterprises (TVEs) in China (firms in which ownership is typically held by local governments) in incentivising investments by private entrepreneurs. “In a system where courts cannot be relied upon to protect property rights, letting the government hold residual rights in the enterprise may have been a second-best mechanism for avoiding expropriation,” Rodrik (2004: 13) argues, “Private entrepreneurs felt secure not because the government was prevented from expropriating them, but because, sharing in the profits, it had no interest to expropriate them.”

For both authors, the contrast between the positive function played by Chinese TVEs in providing positive incentives for investment and the meaningless function of *de jure* private property rights in the context of the *de facto* absence of the rule of law in post-communist Russia underlines the primacy of

institutional functions over form. The depiction of Chinese TVEs as a “*second-best* mechanism” suggests that a system of private property, buttressed by the rule of law, is ultimately preferred in the long run. The importance of supportive institutions and overall coherence of particular institutions with other elements of the institutional matrix have long been important themes in New Institutional Economics. Rodrik’s notion of second-best institutions is not only an important articulation of the primacy of institutional functions over forms, but also of the need to consider compatibility with the existing institutional matrix and the sequencing of institutional reforms (themes discussed in greater detail below).

The scarcity (and in the case of many natural resources, finite supply) of economic resources often triggers distributional struggles and conflict for their control, particularly when property rights are not well defined and enforced. Institutions can contribute to managing and preventing such conflicts by preventing the reality or perception that the distributional struggle is systematically tilted in favour of “winners” at the expense of “losers”. Even when property rights are well defined and societies are characterised by the rule of law, complementary institutions with the specific function of assisting in the management and prevention of conflict are frequently required (fiscal federalism and decentralisation are prime examples). Institutions that perform the function of conflict management are particularly important in countries characterised by acute ethnic fragmentation and sharp inequalities in income and wealth. As Rodrik (2000) notes, conflict or even the threat of conflict can “hamper social cooperation and prevent the undertaking of mutually beneficial projects.” For economists, institutions that perform the function of conflict management are also important for the efficient and productive allocation of the factors of production. Social conflict is damaging to economic prosperity, “both because it diverts resources from economically productive activities and because it discourages such activities by the uncertainty it generates” (Rodrik, 2000).

2.3.2. Constraining the arbitrary exercise of political power

A well-understood tension underlying various theories of the state is that any entity powerful enough to create a system of property rights (and indeed other institutions) is simultaneously powerful enough to violate them – elsewhere referred to as the “paradox of power” or the “paradox of government” (Weingast, 1995). The state typically enjoys a monopoly (or at least a significant comparative advantage) in the exercise and threat of violence and coercive power. On the one hand, this is why the state can credibly

commit to enforcing property rights; while, on the other, requiring institutional constraints on the use of political power that can result in the confiscation of property. Historically, robust institutions to constrain state and political power include constitutions and the rule of law, the separation of powers between various arms of government, political contestation, federalism, mechanisms that enforce transparency and accountability around government actions, and the transfer of powers otherwise vested in the state to independent authorities (for example, the conduct of monetary policy, financial supervision and the management of public pensions). These institutional functions clearly resonate with Western democratic traditions that emerged most prominently from the Enlightenment (but date back at least as far as Aristotle).³⁴

Here too, however, alternative institutional arrangements can conceivably perform similar functions in constraining the arbitrary use of political power – after all, Fukuyama’s “end of history” has not arrived³⁵ – and the Chinese example stands out as the case that needs to be explained. Fukuyama (2012) argues that while China never developed the rule of law – that is, “an independent legal institution that would limit the discretion of the government” – the Chinese model, which he argues has essentially been maintained for 2,000 years, “substituted for formal checks on power a bureaucracy bound by rules and customs, which made its behaviour reasonably predictable.” However, the absence of checks on power has created (and will arguably continue to create) a fundamental risk, with occasionally devastating consequences, which Fukuyama calls the bad Emperor problem: “while unchecked power in the hands of a benevolent and wise ruler has many advantages, how do you guarantee a continuing supply of good Emperors?”

The experience under the last truly “bad emperor”, Chairman Mao, was sufficiently atrocious to institute reductions in centralised power under the imperial system in favour of the nine members of the Standing Committee of the Politburo of the Communist Party (who serve fixed terms). However, the rules governing the Standing Committee are not public knowledge, are not embedded in a constitution or

³⁴ In Chapter XVI of *Politics*, Aristotle asserts, in opposition to Plato’s notion of the philosopher king who is above the law: “It is more proper that law should govern than any one of the citizens: upon the same principle, if it is advantageous to place the supreme power in some particular persons, they should be appointed to be only guardians, and the servants of the laws.” (Aristotle, 1853).

³⁵ In *The Origins of Political Order* Fukuyama tones down the “end of history” narrative, but still maintains the modern political order requires three institutional characteristics: a strong and capable state, the state’s subordination to a rule of law, and government accountability to all citizens. The tension described here is apparent from Fukuyama’s first two characteristics.

enforced by a judicial system, but rather “simply internal rules of the (Communist) Party, which actually have to be inferred from the Party’s behaviour”. Hence, the bad Emperor problem remains: while system lacking formal constraints on the arbitrary exercise of political power can deliver positive results under very specific conditions, their inability to get rid of bad leaders – and, importantly curb their discretionary powers while in office – remains a significant shortcoming over the long run.

Once again, the point here is not that the full-fledged adoption of the rule of law and Western standards of transparency, accountability and political contestation are absolute prerequisites for economic progress, particularly from low-equilibrium points of departure. A number of historical episodes of economic growth and modernisation under the tutelage of relatively unconstrained autocrats have resulted in an unscientific romanticism around the merits of benevolent dictatorships (Birdsall and Fukuyama, 2011).

Yet, three counter arguments may be presented. First, as Easterly (2011) in particular has shown, the argument that autocracy and unconstrained executive power is somehow positive for growth is statistically weak, subject to various cognitive biases, and ultimately unfalsifiable. Second, the argument in favour of the rule of law and Western standards of transparency, accountability and democracy as desirable mechanisms for constraining political power generally rests of their durability and long-run resilience, rather than short-run impact. Third, the claim is rarely made the rule of law, accountability, transparency and the rule *insurers* against bad outcomes – rather, the argument is that these meta institutions provide built-in means of responding to the world outcomes than autocracies generally lack. Ultimately, an emphasis on institutional functions underlines the importance of establishing mechanisms for political constraint. Rules, however contextually determined and nuanced, are an example of such mechanisms, and there are examples where rules have been successfully implemented in non-democratic environments.

2.3.3. Incentive alignment

An emphasis on the incentive structures established by institutions is a central theme in New Institutional Economics: “Institutions provide the incentive structure of an economy; as that structure evolves, it shapes the direction of economic change towards growth, stagnation, or decline” North (1991: 97). In the context of decentralised economic organisation, which relies on a myriad of principal-agent relationships, as

economic exchange moves from self-reliant modes of existence towards one characterised by specialisation, trade and cooperation, the study of agency relationships is a specific application of the tools of analysis of transaction costs, asymmetric information and incentive alignment. Given imperfect information between cooperating agents, “it takes resources to define and enforce exchange agreements...in the context of individual wealth-maximising behaviour and asymmetric information about the valuable attributes of what is being exchanged (or the performance of agents), transaction costs are a critical determinant of economic performance” (North, 1991: 98).

A number of factors can bring about agency problems and raise the cost of maintaining cooperative principal-agent relationships. The agent may have objectives that differ significantly from that of the principal, which become problematic if the pursuit of the agent’s objectives undermines that of the principal. The contribution of institutional economics to the study of agency relationships has emphasised the importance of clearly defined contracts and other institutional “commitment technologies” that change the incentives confronting agents, so that it becomes in the agent’s best interest to act in a way that is consistent with the achievement of the principal’s objectives. In game-theoretic terms, successful institutions provide positive incentives for cooperation (and negative incentives for defection), thereby lowering the cost of decentralised exchange.

The principal-agent framework is also a helpful and frequently used lens through which to analyse the role and functioning of government and its various institutions. Buchanan’s “lens of contract” outlined earlier is particularly relevant here, as all contractual arrangements, whether between employer and employee or the state and the citizen, contain important elements of agency (Ross, 1973). Contracts around the conduct of government function as a means to align incentives when they are imbedded in a system of rule of law, when the terms (for example, the achievement of policy goals) are clearly defined, and the supporting institutional infrastructure demands or at least promotes transparency.

2.3.4. Promoting (macroeconomic) stability

The idea that markets do not always stabilise automatically – or, more to the point, that welfare gains can be achieved by efforts to speed up what might otherwise be a protracted return to equilibrium – is now widely accepted by almost all major intellectual and methodological traditions in the study of the business

cycle (Romer and Romer, 2002). Policies and institutions aim to promote stability across at least three major dimensions: real economic activity, nominal variables, and the banking and financial system. While much of attention the literature falls on the positive role of counter-cyclical policy, notably monetary and fiscal policy (and the institutional underpinnings of such policies, as per Rodrik, 2004), it is clear that macroeconomic instability is also the result of institutional weaknesses – particularly at the extremes, for example, during sovereign debt defaults and episodes of hyperinflation. An exclusive focus on the technical aspects of monetary and fiscal policy in their role in stabilising the economy constrains the discussion to a purely technocratic and analytical exercise. However, observed policy actions and frameworks can also be the *proximate* cause of instability, while institutions are the *ultimate* cause or “deep determinants” (Satyanath and Subramanian, 2004). Recent empirical studies have found strong support for institutions as the ultimate cause of both real (Rodrik, 1999; and Acemoglu, Johnson and Robinson, 2003) and nominal instability (Satyanath and Subramanian, 2004).

A prominent theme in the literature on the economics of the business cycle is that monetary and fiscal policies (and indeed stabilising institutions) do not only frequently fail to provide counter-cyclical forces, but also that they are in fact *procyclical*: that is, they exacerbate the natural fluctuations in the real economy. This is particularly true in developing countries, suggesting that technocratic miscalculations and misapplications of policy tools are only part of the story, and that institutional weaknesses also warrant close scrutiny. As discussed in Chapter 3, this is a particularly significant problem in resource-rich developing countries (Alesina, Campante and Tabellini, 2008; Van der Ploeg and Poelhekke, 2009; and Arezki, Hamilton and Kazimov, 2011).

The study of inflationary biases that emanate from political influences on monetary policy provided the catalyst for the most important institutional innovations in central banking, notably the move towards central bank policy independence and the adoption of inflation-targeting policy frameworks. A large part of the procyclicality of fiscal policy is still attributed to the political business cycle in the literature following the theoretical formalisation of Nordhaus (1975). The adoption of rule-based fiscal institutions has been more staunchly resisted in the area of fiscal policy than in monetary policy, but offer a promising, if partial, solution to the observed tendency towards procyclicality – not least in highly volatile resource-dependent economies (Ossowski, Villafuerte, Medas and Thomas, 2008 and Schmidt-Hebbel, 2012).

2.4. Principles for the design of sound institutions

This chapter has outlined the growing scepticism about categorical claims regarding the desirability of specific institutional configurations. The argument against a narrow view of appropriate institutional forms rests on three inter-related pillars. First, we do not know enough about origins of and incentives for institutional change to make strong and realistic prescriptions. Second, that an emphasis on specific institutional forms can naively ignore political agency, and that the political use of institutions (that appear similar in form) is more important than their form. Third, that the support for specific institutional forms can be similarly ignorant of history and context, which bring to the fore questions about the compatibility of particular institutional forms with other elements of the institutional matrix and the most effective sequencing and pace of institutional reform. The consequent tendency to advance institutional functions over specific forms does not, however, render the literature completely silent on normative principles for institutional design, which are summarised briefly here.

2.4.1. Cost efficiency

The overarching function of institutions is to reduce the costs that accompany decentralised market-based exchange due to information problems, uncertainty and various transaction costs. Logically, the institutions established to reduce those costs should not be more expensive to society. The cost-efficiency constraint applies across a number of dimensions: the cost of creating institutions (including adjustment costs), changing them in a dynamic setting, and the costs associated with the enforcement of institutions. New Institutional Economics has focused on the prevalence of significant adjustment costs and path dependence to explain why apparently poor institutions persist.³⁶ This insight underlines the keen appreciation of the deep historical origins of institutions in New Institutional Economics: path dependence describes how the historical reinforcement of a given set of institutional arrangements raises the cost of changing them. The cost of switching to an ostensibly better set of institutions, even if society

³⁶ A classic example of path dependence and adjustment costs is David's (1985) analysis of persistence of the QWERTY keyboard, despite knowledge of obviously better alternatives. David argues that a switch to more ergonomically efficient keyboards would involve costs that are too high – for example, in terms of retraining typists and changing the production process for keyboards – to justify an adjustment. David (1985) coined the phrase “path dependence” to describe the pervasive influence of the past on the present and future structure of the institutional matrix.

is able to positively identify them, may be prohibitively expensive. The cost of adjustment is also a frequently invoked argument for gradualism: a piecemeal process of institutional change may in such costs, or at least spreads the burden of carrying them over successive generations, while allowing other elements of the institutional matrix to adjust at a commensurate pace.

Another theme pertaining to the costs associated with institutions is that the credibility of enforcement is inversely related to cost: again, commitment technologies are important to ensure that economic agents do not second-guess institutions and their enforcement. One of the institutional arguments for contingent rules over the exercise of discretion is that such rules are a means towards achieving credibility and reducing the cost of enforcement.

2.4.2. Receptiveness

This chapter has repeatedly underlined the importance of context in the design and functioning of institutions. As noted above, it is a positive insight from New Institutional Economics that institutions change gradually due to the powerful effects of path dependence; but also a normative argument that piecemeal, gradualist reform is desirable, given not only path dependence and adjustment costs, but also the intricacy and inter-woven nature of institutional matrix. However, it also follows from these positive and normative arguments that institutions *do* and *should* change, when both endogenous and exogenous events affect the functions they are required to perform. As discussed earlier, this dynamic understanding of institutions is due in particular to Douglass North.

Institutions can become obsolete if they do not adapt to changing contexts and changes to other elements within the institutional matrix. The New Institutional Economics literature suggests that institutions that are receptive to such changes have built-in mechanisms for receiving feedback and evaluation. The receptiveness of institutions touches on a range of structural political and economic features of a country – for example, the extent of judicial and legislative oversight (the separation of powers), the culture and public expectations with respect to the transparency of government institutions, and openness to global trade and competition. However, even within open societies, some institutions are better than others at promoting feedback and evaluation – that is, receptiveness is also a matter of design.

2.4.3. Stability and durability

One of the fundamental tensions in institutional economics is that while institutions should be receptive to dynamic change in the manner described above, they should also not constantly change – after all, the purpose of institutions is generally to bring a degree of predictability into otherwise higher uncertain economic exchange. As Hodgson (2006) observes, “the durability of institutions stems from the fact that they can usefully create stable expectations of the behaviour of others...Being relatively stable, institutions have equilibrium-like qualities, even if their equilibria can be disturbed.” Following the analogy of institutions as the “rules of the game”, the quality of the game will suffer if players were uncertain about the rules. Ever-changing institutions can be a source of instability, uncertainty and unpredictability in economic life, rather than a solution to it.

Political economic considerations provide additional reasons why durability is commonly associated with good institutions: they are often designed to outlive the time horizon or term of policymakers or politicians. Political timeframes are notoriously short, adding tremendous uncertainty and unpredictability to economic life in the absence of more durable, institutionalised rules of the game. Even in more benign policy contexts, rule-based policy frameworks can provide stability and continuity by avoiding cults of personality.³⁷ For Buchanan and other economists in the tradition of “constitutional economics” (which was described early as part of institutional economics, if not New Institutional Economics), there was a critically important distinction to be made between political-economy at the constitutional level (the area of focus for Buchanan and others in the field of constitutional economics) and in-period economic and political decisions (Buchanan, 1987). The former was concerned with the analysis of the rules and (political) limits that outlive, and indeed frame, in-period decisions. Sovereign wealth funds (and the rules-based fiscal framework that govern them) are understood and analysed in this dissertation as an attempt to move, through a set of institutional reforms, a variety of choices around the

³⁷ Contrast the arrival of Janet Yellen as chairman of Federal Reserve with that of Ben Bernanke before her. Bernanke succeeded Alan Greenspan, whose reputation for economic insight assumed cult-like levels, who eschewed rule-based policy frameworks. Consequently, Bernanke had to overcome the cult of personality that accompanied Greenspan’s chairmanship, and his arrival at the Fed resulted in widespread uncertainty over the policies of the “Bernanke Fed”. During his term, Bernanke introduced a much more rule-based policy framework, based on inflation targets and systematic expectations management that was less reliant on the personalities implementing them. Consequently, the arrival of Yellen as chairman was largely a non-event compared to Bernanke’s succession of Greenspan.

management of resource revenues that have historically been situated at the level of in-period politics to that of politics at the constitutional level.

2.4.4. Coherence

New Institutional Economics underscores the critical importance of situating specific institutions within the broader context of what North called the “institutional matrix” or the “institutional framework”. Institutions and the organisations responsible for enforcing them cannot be analysed and assessed in isolation, as they invariably form part of an “institutional matrix [that] consists of an *interdependent* web of institutions and consequent political and economic organisations” (North, 1991: 109, emphasis added). Hall and Soskice (2001: 17) emphasise that the effectiveness of the institutional matrix depends on “institutional complementarity” – the extent to which “the presence (or efficiency) of one [institution] increases the returns from (or efficiency of) the other.” Similarly, Rodrik (2002) argued that “different elements of a society’s institutional configuration tend to be mutually reinforcing” and that the design and functioning of any particular institution has “repercussions for other parts of the institutional landscape.”

From an institutional-design perspective, this point underlines the importance of considering whether a specific institutional change is productively paired with other elements within the (pre-existing) institutional matrix. This has both positive and negative implications. Positively, certain institutional forms that would appear inefficient or ineffective in isolation, can deliver surprising results given the nature of the institutional matrix in which it is situated. Negatively, certain institutional forms that have worked well in a number of contexts, can fail in an unsuitable and unsupportive institutional matrix. Rodrik’s (2004) previously mentioned example of the (apparently) contrasting effectiveness of Chinese communal property rights and private property rights in post-Soviet Russia can be explained by considering the institutional matrix. An apparently poor institution “worked” in the Chinese context, while an apparently good institution failed in Russia given the weakness of supporting institutions in the matrix. The complexity of the institutional matrix is another reason for advocating gradualism with respect to process of institutional change.

2.4.5. Incentive compatibility

Decentralised forms of economic organisation invariably necessitate delegated interactions and principal-agent relationships. Well-designed institutions and contracts establish incentives for agents to act in way that serves the interests of the principal, a feature that economists refer to as incentive alignment or incentive compatibility. Politics looms large over attempts to establish institutions that align incentives in public principal-agent relationships. Consider Bates' (1981 and 2014) previously cited belief that most institutions are in the final analysis a political construct; and consequently, a political instrument. In contexts where existing institutions are tool for political patronage and security of office, it can be exceedingly difficult to align political incentives in favour of institutional reform.

Recognition of the difficulty of aligning political incentives has been another source of support for gradualism in the process of institutional reform, notably from Rodrik (2008) and Acemoglu and Robinson (2013a). Rodrik, in particular, is sympathetic to the idea of sub-optimal (or in his words, "heterodox" and "second-best") institutions, if these can be demonstrated to provide better incentive compatibility. Ultimately, good institutions take incentive alignment seriously and attempt to incorporate internal mechanisms to achieve this. At the very least, good institutions should not create a set of incentives that are clearly at odds with each other and the function the institutions is tasked with performing.

Conclusion

Chapter 1 presented a number of observations about the increasing support for institutions-centric explanations for the observed variation in economic prosperity of resource-rich economies. In this respect, the resource-curse literature reflects the broad ascendancy of institutional analysis in economics in general and development economics specifically. Chapter 3 deals in greater detail with a number of the leading insights from this literature regarding the institutional and political-economy channels through which resources affect economic performance. The role of this chapter was to situate the contribution and influence of institutional economics, particularly New Institutional Economics, in the context of the

broader discipline of economics; and offer a theoretical framework for analysing the form and functions of institutions.

This framework will be employed in this dissertation to conduct both positive and normative assessment of sovereign wealth funds and their accompanying fiscal rules as an institutional response to the resource curse. However, one overarching theme from this chapter bears emphasis: namely, the slow-moving nature of institutions and the extent to which arguments for the primacy of institutions in economics tend to pertain to long-run relationships. This is particularly important for any argument linking institutions to the resource curse, because – as argued in the preceding chapter – the latter is also best understood as a set of arguments around long-term economic relationships.

An important practical implication of this long-term, institutional perspective is that it calls into question the wisdom of many policy prescriptions for the resource-dependent developing countries. Subsequent chapters, notably Chapter 4, will return to the tension between gradualism and rapid transformation in policy debates around resource-dependent economies, particularly as it applies to potential contribution of sovereign wealth funds. Clearly, the institutional economics, as presented in the chapter, tends to favour gradualism. In contrast, a powerful intellectual tradition that started with Rosenstein-Rodan's big-push model in the 1950s, suggests that governments in resource-dependent poor countries should use commodity windfalls to promote rapid economic transformation. Leading development economists such as Paul Collier (see, for example, Collier, 2010 and 2012) and Jeffrey Sachs (see Sachs and Warner, 1999 and Sachs, 2005) are the intellectual heirs of Rostenstein and Rodan in arguing that, along with foreign aid, resource revenue windfalls are a means through which to achieve rapid economic transformation, diversification and development. This tradition typically argues for the strong hand of the state in the escape from a number of perceived "development traps", with resource revenues (and/or aid) providing otherwise lacking capital through which to achieve it.³⁸

³⁸ The use of the trap analogy in development economics is widespread. In *The Bottom Billion*, Collier (2007) identifies four poverty traps, of which the "natural-resource trap" is one (alongside conflict, bad governance and landlocked traps). Economists and other social scientists often refer without much reflection or substantiation to the importance of escaping poverty traps through bold (typically state-led) action, although it is not always clear if this guarantees the subsequent avoidance of the "middle-income trap", about which there is much concern in the development literature (Agénor and Canuto, 2012).

The institutional argument in favour of sovereign wealth funds presented in this dissertation takes a different view of resource-based economic development. This view suggests that big-push models in the spirit of Rosenstein-Rodan, Sachs and Collier, particularly as they assign such an aggressively activist role for the state in investing resource revenues underplay, if not entirely ignore, the institutional and political-economy constraints on efficient and sustainable public investment financed by resource revenues. Moreover, as the following chapter suggests, there is a wealth of research to suggest that resource windfalls impede rather than promote positive institutional change.

The contribution of sovereign wealth funds proposed in this dissertation regards these institutional and political economy constraints as fundamental to resource-dependent economies. Consequently, the institutional perspective on sovereign wealth funds calls for them to be embedded in a set of rules and supports a more long-term, gradualist view of how resource revenues should be used in the process of economic development. The establishment of a rule-based sovereign wealth fund model for managing resource revenues is nothing more (and nothing less) than part of process of piecemeal reform and institutional change that acknowledges, first, that existing institutions are difficult and costly to change; second, that specific institutions are part of broader institutional matrix with which they need to be compatible; and, finally, that history suggests that resource-abundance has had a negative impact on institutional development.

Chapter 3

To behave to like Swedes:

Institutional and political problems of resource-dependent economies

Scandinavian countries frequently appear as distant, limiting cases in discussions of social and economic progress. As noted in the previous chapter, Francis Fukuyama views the quest for institutional stability as an effort to “get to Denmark”, while countries with natural resources are often desperate to imitate the “Norwegian model”. For Mohamed Reza Pahlavi, the Last Shah of Iran, the utopian ideal was Sweden. Buoyed by swelling oil revenues, the Shah initiated a series of sweeping social and economic modernisation programs, with evocative names such as the White Revolution and the Great Civilisation. Soon, the Shah promised, Iranian living standards would match those of Western Europe.

While the Shah’s plans certainly lacked nothing in terms of ambition and scale, the contents was a mass of contradictions (including, for example, parallel efforts at privatisation and nationalisation; creeping authoritarianism together with the enfranchisement of women, the establishment of a social safety net and a secular public education system) and lacked even the pretense of constitutional authority or political and social consultation. The Shah swept these concerns aside arguing, “when Iranians learn to behave like Swedes, I will behave like the King of Sweden.”³⁹

The Shah’s paternalism is depressingly characteristic of many modernising monarchs and benevolent dictators; while his grand schemes for spending oil revenues reflect pathologies suffered by a great number of resource-rich countries: autocratic government, wasteful “investment” of resource windfalls, and misguided efforts to rapidly transform resource-dominated economies into diversified, modern ones. Above all, the Shah’s remarks about the differences between Iran and Sweden bring to light a much-debated issue in development economics: the timing, sequencing and interactions of political, institutional and policy reforms, particularly in the context of challenging initial conditions. Recall that, as outlined at the end of Chapter 2, scholars have identified the quality of institutions at the time of resource discovery (initial institutions) as a robust predictor of countries’ ability to successfully manage commodity wealth.

³⁹ This quote appeared in an article by Claire Sterling (1961) and was cited in *Political Order in Changing Societies* by Samuel Huntington (1968).

Coupled with evidence that natural resources tend to erode the quality of institutions, especially when they are already weak, the prospects for positive institutional reform appear even bleaker for economies that discover resources in the context of poor institutional quality (and even worse still for countries with poor institutions, coupled with a long history of resource extraction).

A simple reading from the empirical literature of the past decade on the relationship between institutions and natural resources suggests that, unless countries “behave like Swedes” – and, moreover, miraculously start to do so the moment they discover resources – they are most likely doomed to failure. In light of the discussion in the previous chapter, economists from New Institutional Economics tradition would not predict much success in the overnight embrace of the rule of law, security of contracts, and accountable and transparent public institutions by countries with poor initial institutional conditions. The intricacy of the institutional matrix and the path-dependent nature of institutions has led to the positive observation that institutions change incrementally over the course of history, and supported the normative conclusion that piecemeal reforms of existing institutions is more likely to succeed than abrupt ones.

Therefore, the policy implications of underlining the importance of institutions writ large – that is, the macro or meta institutions of a society (the rule of law, security of contracts, the accountability, transparency and efficiency of public institutions, the extent of democracy and the degree of corruption) – in the resource-curse phenomenon is rather limited. The more rewarding – and intellectually challenging – question is whether targetted institutional reforms can be proposed that, first, address specific political and economic problems associated with resource wealth; and, second, have a reasonable chance of being implemented and sustained in the context of relatively poor general institutions (particularly when coupled with resource windfalls, which may exacerbate or sustain weak meta institutions). Acemoglu and Robinson phrased the challenge as follows:

“the reform of [macro] institutions will be very hard because...it is typically not a coincidence that societies have unaccountable political systems, lack the rule of law and have low capacity states all at the same time...A good place to start in reforming institutions is perhaps not the macro institutions of the whole society, but the nexus of institutions that surrounds natural resources...[which constitute] much more fruitful lines of policy reform than blaming the resource curse on just weak “rule of law” or lack of “checks and balances” – even though both statements are likely true” (Acemoglu and Robinson, 2013b).

The need for greater specificity in understanding the role of institutions in resource-rich countries has been highlighted by a number of scholars. Arguing that the literature on the “political economy of the resource curse...is still in its infancy,” Torvik (2009), for example, notes: “We still have a quite limited knowledge along which dimensions the resource-abundant winners and losers differ, and about what the mechanisms behind these differences are.” It is contended in this dissertation that rule-based sovereign wealth funds are exactly the kind of targeted institutional reform that can address a number of the common specific political and economic problems of resource-dependent countries.

A more speculative contention is that this type of institutional change, which can be incremental, is a potentially hopeful direction even in the context of relatively weak institutions. A related claim is that the adoption of a rule-based sovereign wealth fund model can arrest the further deterioration of institutional quality that has been found to accompany resource discoveries in the context of poor general institutions. This chapter discusses the literature on the specific institutional and political-economic problems of resource-based economies, in order to understand which issues targeted reforms and institutional interventions need to address.

The literature on the institutions and political economy of resource-rich economies is vast and addresses every conceivable link in the resource “value chain”: from the point of exploration to decisions around the spending and investment of revenues. Collier (2007) popularised the concept of a resource value chain in his book, *The Bottom Billion*: the chain begins with exploration (and incentives and policies that promote or discourage exploration), followed by the taxation of resource extraction and sales, the public disclosure of the taxation regime, the management of volatile revenues, and the investment of these revenues.⁴⁰ In this section, the emphasis is on the institutional and political economy problems that result in particular from the last two links in this chain.

⁴⁰ This framework has since become a reference for other a multitude of organisations working on natural resource governance, including the Natural Resource Governance Institute (formerly Revenue Watch Institute), the World Bank and the Extractive Industries Transparency Initiative.

3.1. Rent seeking

Since their emergence in the 1970s, theories of rent-seeking behaviour have become hugely influential in development economics, following the contributions of Tullock (1967) and Krueger (1974). Rent seeking describes efforts to manipulate the political and regulatory environment in order to capture “economic rents” – that is, income paid to factors of production in excess of their opportunity cost. The analysis of the effects of rent-seeking behaviour on economic activity has emphasised that it allocates economic resources away from productive activities (value creation) towards an unproductive scramble for rents surrounding existing economic value (rent seeking). Central to the concept and implications of rent seeking are waste and inefficiency – economic agents devote economic resources to efforts to grab a share of the existing wealth, rather than trying to create new wealth. The government and the state play an important role in this process as frequent creators of rents through pervasive regulation, awarding of monopoly rights and public work contracts.

It is a well-documented fact that the resource sector potentially generates enormous rents and is therefore prone to pervasive rent-seeking behaviour (Gelb, 1988, Collier, 2012 and Frankel, 2012). The government typically plays a major part in the creation and distribution of these resource rents, as it typically has the power to award contracts for exploration and concessions for extraction, and impose taxes on resource production and profits. An important implication of the rent-seeking perspective on resource economics is that, while traditional rent seeking models can explain why these countries have underperformed their own potential (that is, the weak form of the resource curse thesis, as discussed in Chapter 1), it cannot explain why they underperform resource-poor countries (as per the strong-form version of hypothesis). Traditional rent-seeking models explain sub-optimality (waste and inefficiency), but not outright negative economic performance.

Influential research by Tornell and Lane (1999) and Torvik (2002) incorporated negative feedback mechanisms in their models in order to account for such negative performance. Tornell and Lane (1999) is the most celebrated application of the rent-seeking argument to issues of resource economies. They introduced the idea of a “feeding frenzy” around the capturing of rents emanating from the resource economy, which they call the “voracity effect”. A resource boom results in more income being available for redistribution between a set of competitive and powerful domestic interest groups. In their game-

theoretic set-up, as each group demands higher transfers, a tax increase is required because capital is reallocated from the formal sector to the less productive informal sector, where it is safe from taxation. The higher tax rate required to offset higher transfers, reduces the return on capital, which in their model can outweigh the direct effect of increased productivity and therefore lower growth. In Torvik (2002), a resource boom results in a shift of entrepreneurial talent away from high-productivity modern firms toward unproductive rent seeking – thereby introducing elements of the Dutch disease tradition, albeit with a political-economy or institutional underpinning.

Hodler (2006) provides another significant contribution by linking a number of strands within the institutional literature: institutional quality is a key determinant of success in combating the curse, and is influenced by the degree of ethnic fractionalisation, via the process of rent seeking. Rent seeking – and, more specifically, the related idea that governments can use the rents and revenues resources generate to effectively pay off interest groups – has also featured prominently in a number of theories linking resources to the (lack of) government accountability and the (short) length of political time horizons in the context of resource wealth.

3.2. Fiscal financing, accountability and forms of government

Robinson, Torvik and Verdier (2006) produced one of the most comprehensive theses on the interactions between abundant resource revenues, political accountability and the origins of institutions. Their argument and empirical evidence suggests that governments that do not have to introduce socially tolerable and consistent systems of taxation, but can rather finance themselves through resource revenues, have reduced incentives to be accountable and responsive to their citizens. Consequently, they do not have a vested interest in the development of a thriving market-based, non-resource economy that is otherwise required to establish a taxable economic base and secure the fiscal sustainability of the state. By contrast, governments and ruling elites in non-resource countries have an incentive to promote the development of such a market-based economy, as it generates a multitude of corporate and individual taxpayers, providing a steady and stable source of fiscal revenue (in exchange for accountable governance and the provision of public goods).

In the Robinson *et. al.* (2006) model, the existence of resources and their related rents increases the utility of holding political power for longer. As a result, political horizons across a range of policy issues are sub-optimally short (from a social welfare perspective), as most political resources are directed to the single purpose of retaining power. One manifestation of this is a bloated public sector, which establishes a vested interest in maintaining the *status quo* and is “paid off” through rents emanating from the resource sector. Unsurprisingly, a number of prominent studies have found strong evidence that resource abundance is associated with higher levels of corruption; even less surprising is the conclusion that resource abundance is more likely to be associated with high levels of corruption in countries with poor institutions (Mauro, 1995; Ades and Di Tella, 1999; Bhattacharyya and Hodler, 2009).

Sarr and Swanson (2013) and Sarr, Bulte, Meissner and Swanson (2011) extend the analysis of the links between dictatorship and resources, by introducing the role of lending. In their model, a dictator confronts a choice between “staying” and “looting”. Whereas staying requires public investment so as to enhance the productive capacity of the economy, the latter entrenches “the sort of corruption that renders resource-rich countries subject to the (resource) curse” (Sarr and Swanson, 2013). The model focuses specifically on the enabling role of external financing in establishing incentives for looting and finds that “excessive resource-based lending by external financial institutions can induce political instability and looting”, as access to external liquidity directly increases the opportunity cost to staying and investing in the economy (Sarr and Swanson, 2013).

Robinson *et. al.* (2006) and Auty’s (2007) theories of “rent cycling” are powerful tools for explaining not only the existence of narrow patronage systems associated with a political elite, but resonate with models of the forms of governments that emerge (in the language of political science, state formation) in the long run in resource-rich countries. Economic historians (Wright and Czelusta, 2004 and 2007; and Engerman and Sokoloff, 2000) have suggested that non-extractive societies developed institutions and foundations around the state built on individualism, decentralisation, accountable democracy, egalitarianism and capitalism. Extractive societies, on the other hand, failed to develop along these lines, because centralised states and political elites had access to easy financing through a control of rents. This work also ties in with a significant theme in an older political science literature of resource-abundant and -dependent states, which has theorised the emergence of durable “rentier states” that assume a clientelist relationship with their citizens (Beblawi and Luciani, 1987; Ross, 2001; and Wantchekon, 2002). So-called

“petrostates” are a specific, and acute, manifestation of such forms of government (Mahdavy, 1970; and Karl, 1997). In this sense, the resource-curse literature has started the important task of describing the political-economy foundations of observed institutional outcomes (or certain types of state formation) – rather than jump straight to the deep, slow-moving institutional structures.

3.3. White elephants: the misallocation of public investment

The rent-seeking and broader political-economy literature on the resource curse helps explain the prevalence of poor public investments financed by resource-related public revenue windfalls. Torvik (2009) suggests that one of the biggest intellectual puzzles surrounding resource-rich economies is why the massive domestic investments have not resulted in greater growth pay-offs. Gelb (1988) calculated that around half of the windfall gains from the oil shocks in the 1970s were invested in domestic projects. As both these studies observe, any of the leading growth models in economics would have predicted strong growth on the back of such significant public investments.

There are a number of plausible arguments for why the anticipated growth failed to materialise, many of which draw on the previously discussed rent-seeking literature, as well as other insights from the broader Public Choice literature.⁴¹ In his study of the Nigerian government’s response to positive terms-of-trade shocks between 1972 and 1988, Gavin (1993) finds a “tendency for governments to invest in projects with high prestige or political payoff, but with little economic rationale.” Similarly, Robinson and Torvik argue that resource-rich countries are more prone to investing in “white elephants” – that is, public investment projects with negative social surplus: “The higher the rents from holding office, the more economically inefficient investment projects can be and still be politically efficient” (Robinson and Torvik, 2005).

⁴¹ Of course, there are more technically economic reasons for this, particularly those relating to the volatility of resource revenues, which results in damaging “stop-start” public investment cycles, procyclicality and sharply diminishing marginal returns to public investments during boom periods. These issues are discussed below, with a particular emphasis on the possible interactions between these economic outcomes and political-economy factors.

3.4. Resources and conflict

An extreme manifestation of the political pathologies of the resource curse is found in countries with civil wars and a proclivity for violent conflict. Various studies – most notably by Paul Collier and Anne Hoeffler – have found that a strong link between civil wars and natural resources, and provided some theoretical explanations for this link. Collier and Hoeffler (1998 and 2004) examine a range of issues related to the relationship between resource abundance and political unrest, conflict and war (which are all unambiguously bad for growth). Their theoretical work suggests that resource-rich countries face a higher risk of conflict for two reasons. First, resources provide easy financing for weapons and soldiers. Secondly, because resources often have a “winner-takes-all” quality with large pay-offs for the winner and limited needs for future cooperation to extract rents, resources tend to trigger violent struggles for control. Based on their analysis of the data, Collier and Hoeffler (2004) conclude that “the extent of primary commodity exports is the largest single influence on the risk of conflict.”⁴²

3.5. Excessive volatility and procyclical policy

One of the leading explanations for the resource curse revolves around the extraordinary volatility of most commodity prices and the extent to which sharp and unpredictable fluctuations in value of their primary export products affect other macroeconomic aggregates in resource-dependent countries. So compelling and voluminous is this sub-set of the literature, that it can be considered, as Frankel (2012) does, to be an explanation for the resource curse in its own right. However, an insightful debate has developed in this literature around whether the underlying reasons for excessive volatility and procyclicality are due to market failures (specifically, some credit-market imperfection or constraint) or, as is now more commonly

⁴² Conflict scholars have contested the strength of this conclusion, while economists have questioned Collier and Hoeffler’s findings on econometric grounds. Humphreys (2005) offered a general critique, suggesting that the Collier and Hoeffler argument is too simplistic. Brunnschweiler and Bulte (2008) argue that the measures of resource dependence used are endogenous to conflict, and that instrumenting for resource dependence removes its statistical significance in explaining conflict. Laurie (2005) argues that the quality of data used in Collier and Hoeffler’s studies is questionable.

proposed, government failure (due to political-economy factors).⁴³ Therefore, arguments around the observed excessive volatility and procyclicality of resource-rich countries are treated here as part of the political-economy literature.

It is a stylised fact that commodity prices are more volatile than that of manufactured goods (Frankel, 2010; Jacks, O'Rourke and Williamson, 2011; and Hamilton, 2009). It has also been documented that many resource-dependent countries experience more generalised macroeconomic volatility; and moreover, have a strong tendency towards procyclicality (this point is widely made, but are central to the argument in Hausmann and Rigobon, 2003; and Van der Ploeg and Poelhekke, 2009). Finally, it has been shown repeatedly that such volatility “is detrimental to long-run economic growth and development, controlling for initial income per capita, population growth, human capital, investment, openness and natural resource dependence (Ramey and Ramey, 1995). Van der Ploeg and Poelhekke (2009) have argued that the direct and indirect channels through which the volatility of natural resources negatively affect growth have been generally neglected in the literature – particularly the indirect channel through which resource exports “make already volatile countries more volatile and thus indirectly worsen growth prospects...Ignoring the volatility channel may lead one to erroneously conclude that there is no effect of resources on growth.”

The extreme level of volatility in commodity prices is powerfully illustrated by an anecdote about research conducted by James Hamilton on the statistical properties of time series of the oil price. Hamilton (2009) applied various possible statistical models to these time series, using different sample periods, and concluded that the oil price was best approximated by a random walk. This meant that starting from a price of \$115 per barrel⁴⁴ in 2008 (the time of his writing), the best-guess estimate of where the real oil price would be four years hence, was exactly the same price (\$115) – the price series was a random walk, so there was equal probably the real oil price would be higher or lower than the starting price. However, Hamilton noted, given the volatility and unpredictability of a random walk, it was also plausible that the price would be as high as \$391 or as low as \$34 per barrel. The range of this prediction, particularly his lower-bound number, seemed outlandish at the time, given the sharp and nearly unrelenting run-up in

⁴³ Recall also that part of the Dutch disease argument includes volatility and procyclicality. In these models, the real exchange rate, public and private consumption and investment, and wages in the non-traded sector *all* increase procyclically.

⁴⁴ Hamilton (2009) used the price for West-Texas Intermediate (WTI) Crude oil.

prices between late-2001 and 2008, which saw prices rise from around \$30 per barrel to over \$145 shortly before Hamilton wrote his paper. Conventional wisdom at the time suggested oil prices were going nowhere but up over the coming years (the commodities analysts of various Wall Street firms started talking about “\$200+ oil”). Ultimately, the real oil price registered at almost exactly the same levels in mid-2012 – the end of Hamilton’s “forecast” horizon – having dropped from \$145 per barrel in June 2008 to \$31 by the end of the same year.

Clearly, the challenges of macroeconomic policymaking in countries that rely almost exclusively on oil exports for foreign exchange earnings and oil taxes and royalties for fiscal revenues are staggering, given this level of exogenously determined volatility. Arezki, Gylfason and Sy (2012) calculate that for Nigeria (often the poster child for oil/resource dependence, but by no means unique in this regard), starting from a base value of \$100 per barrel, the difference between a price of \$50 and one of \$150 is equivalent to a difference of 50% of GDP. It may be asking too much of macroeconomic policy to effectively stabilise the economy in the face of such volatility. Given the extreme volatility and uncertainty around resource prices and revenues, even the best-intentioned policymakers in resource-rich and, perhaps particularly resource-dependent, countries face a massive and often overwhelming information problem: it can be nearly impossible to identify whether a commodity-driven shock (whether positive or negative) is permanent or temporary, let alone how long shocks of the latter variety will last and how severe they will be.

However, there is plenty of evidence to suggest that not only is macroeconomic policy in resource-rich developing countries unable to provide counter-cyclical stabilisation, but in fact, there is a tendency for policy to make things worse. Kaminsky, Reinhart and Vegh (2004) examination of procyclicality across a range of indicators, including fiscal policy, monetary conditions and capital flows found that “macroeconomic policies in developing countries seem to mostly reinforce the business cycle, turning sunny days into scorching infernos and rainy days into torrential downpours.” Frankel (2012) also emphasises the compounding effect of policy on volatility in resource-rich countries, arguing that government interventions “tend to exacerbate booms and busts instead of moderating them”.

Nese (2011) examines the cyclicity of five fiscal measures in 28 oil-producing countries developing countries during 1990-2009. The results suggest that the five measures - government expenditure, consumption, investment, non-oil revenue, and non-oil primary balance - are all strongly procyclical in the

full sample. The procyclicality of fiscal spending is driven in large part by two major items in the budget: public investment projects and the civil service wage bill. Talvi and Vegh (2005) examine the evidence for a large number of developing and developed countries, and find the resource-dependent developing countries, in particular, exhibit a “very low propensity to save out of what turned out to be a temporary shock...due mainly to the public sector’s spending spree.” Medas and Zakharova (2009) find evidence that oil windfalls are often spent on higher public sector wages and tend to increase the number of people employed by the government, as well as indications that this increase is difficult to reverse when resource prices collapse.

A number of studies draw attention to the fact procyclicality tends to manifest across an even broader array of macroeconomic variables in resource-rich countries (Hausmann and Rigobon, 2003; and Van der Ploeg and Poelhekke, 2009). This literature finds that the exchange rate, capital flows, household spending, monetary conditions, bank lending and credit extension and investment are all typically procyclical in resource-rich countries, and often more so than in comparator countries. Frankel (2012) finds that, not only do developing countries on the whole tend to have more pronounced economic cycles than advanced countries, but also that this is especially true of developing countries that are dependent on exports of oil, minerals, and other primary commodities.

Why are resource-rich and –dependent countries prone to macroeconomic volatility, and why do macroeconomic policies that should be counter-cyclical end up being procyclical? As noted earlier, the literature is divided into two broad camps, which essentially reflects neo-Keynesian and Public Choice foundations. The first category of explanations emphasise the existence of market failures, particularly credit-market imperfection or –constraint that encumbers the countercyclicality of (most fiscal) policy, by making it easier for government and other economic agents in resource-rich countries to lend during resource booms than to borrow during slumps (Gavin and Perotti, 1997; and Kaminski, Reinhart and Vegh, 2004). Other authors have emphasised structural shortcomings or “missing markets” as factors that contribute the volatility and procyclicality of resource economies. Hausmann and Rigobon (2003) and van der Ploeg and Poelhekke (2009) argue that a lack of financial development makes risk management costly or impossible in volatile resource-rich countries (which as a corollary also leads to higher risk aversion amongst economic agents, reducing growth).

The second set of explanations emphasises government failures due to political-economy factors. The argument is that governments in resource-dependent should be able to anticipate their excessive exposure to exogenous volatility, that market imperfections will make it costly or impossible to borrow in hard times, and that the lack of financial-sector development makes risk-management prohibitively expensive for many economic agents. A rational response would, therefore, be to “self-insure”, building up buffers during boom periods. Alesina *et. al.* (2008) argue that in order to answer why such forms of self-insurance are rare in developing countries, “one needs to consider the political arena” and that “procyclical and myopic fiscal policy stems from a political agency problem.” The impact of political-economy constraints (that are binding in the context of weak institutions) on volatility is implied in Tornell and Lane’s (1999) famous voracity model: the absence of strong and credible legal-political institutions allows a multitude of powerful interest groups to compete for rents through the fiscal process, so that a positive terms-of-trade shock generates a disproportionate increase in fiscal redistribution – with available resources rising during boom periods, it follows that government spending will be prone to procyclicality.

Talvi and Vegh (2005) find empirical evidence to support the veracity effect to the extent that large fluctuations in fiscal revenues lead to procyclical fiscal policies. Alesina *et. al.* (2008) develop a more elaborate model in which voters are able to observe the state of the economy (that is, identify a resource boom), but not how much of government revenues are appropriated as rents by the state apparatus. Due to corruption and a lack of government credibility, voters do not trust the government to save rents or invest them in productive assets, and therefore demand tax cuts and higher transfers. They describe this as “starving the Leviathan”, which is a “second-best solution to an agency problem in an environment of corruption and imperfect information” (Alesina *et. al.*, 2008). In the empirical section of their paper, they find support the hypothesis that fiscal policy is more procyclical in countries where corruption is more widespread, particularly (and, in some specifications, only) in corrupt democracies, where corruption is combined with “reelection constraints”. Frankel also emphasises the compounding effect of policy on volatility in resource-rich countries:

“That developing countries tend to experience larger cyclical fluctuations than industrialised countries is only partly attributable to commodities. It is also in part due to the role of factors that ‘should’ moderate the cycle, but in practice seldom operate that way: procyclical capital flows, procyclical monetary and fiscal policy, and the related Dutch Disease. If anything, they tend to exacerbate booms and busts instead of moderating them. The hope that improved policies or

institutions might reduce this procyclicality makes this one of the most potentially fruitful avenues of research in emerging market macroeconomics" (Frankel, 2012: 2).

Negative incentives in the political economy of resource-rich countries are central to all models that develop an implied or explicit link between institutional quality and cyclical (of fiscal policy or more generally): political pressures to spend resource revenues are high during boom period, while the variability of the tax base generates procyclical fiscal expenditure. The low propensity to save in boom periods further results in contractionary fiscal policy in bad times, since there are less fiscal buffers available for smoothing the business cycle, thereby accentuating fiscal procyclicality.

Conclusion

A more granular perspective on the institutional and political economy problems in the management of resource revenues identified in the literature is useful for a number of purposes. First, it enables a more fruitful discussion of piecemeal change of the cluster of institutions located specifically around the management of resource revenues, rather than macro or meta institutions. Whereas the latter expects countries to "behave like Swedes", to paraphrase the Last Shah of Iran, the focus of the former is a more hopeful line of enquiry in pursuit of institutional interventions that help reduce the negative impact of resource revenue windfalls on general institutional quality. For economies with poor initial institutions, this at least opens the possibility of achievable, piecemeal reforms; while for countries starting from a point of relative institutional strength (at the meta level), targetted institutions directed at resource revenue management can guard against a deterioration in institutional quality due to the resource windfall.

Second, the more granular perspective on the specific institutions of resource revenue management is part of a generally insightful recent effort in the resource-curse literature to a move away from understanding the average relationship between resources and economic performance towards a more country-specific approach. This has brought into sharper focus why certain countries appear capable of harnessing their resource in a positive way, while others fall victim to the resource curse. The quality of macro institutions is obviously an important factor, but even within the group of economies with sound meta institutions, there are relative successes (Alaska and Norway) and failures (Alberta in the 1980 and early 1990s);

likewise, there are selected instances in which resource windfalls have been managed with a surprising degree of prudence in the context of weak general institutions (Timor Leste and Abu Dhabi).

Third, the arguments outlined in this chapter underline the extent to which the sharp dichotomy between purely economic and Dutch-disease type explanations and more institutional and political-economy based ones has softened. The recent vintage of leading models theorises a series of deep interactions between political structures, institutions and macroeconomic policies in resource-rich countries. Consequently, the leading models in this tradition – built on theories of rent seeking, links between forms of revenue generation and state formation, inefficient capital allocation, resources and conflict, and excessive volatility and procyclical policies – all integrate institutional and political features and incentives with the “institutions-free core” of the first vintage of resource-curse models.

This dissertation proposes that sovereign wealth funds can best be understood as a targetted institutional innovation that seeks to address a number of the most pervasive causes of the resource curse, particularly those that are founded in the political economy of managing resource revenues. Judged from the perspective of New Institutional Economics, as discussed in the previous chapter, there is a priori support for an emphasis on specific institutional arrangements (rather than a focus on meta institutions) As argued in Chapter 2, institutional economics has long emphasised the gradual, progressive and contextual nature of institutional change.

SECTION II

SOVEREIGN WEALTH FUNDS AS A TARGETTED INSTITUTIONAL INTERVENTION IN RESOURCE REVENUE MANAGEMENT

Chapter 4

Guardians of the future against the claims of the present:

Sovereign wealth funds as an institutional response to the resource curse

In his survey on the resource curse, Frankel (2012) asserts that “there is no reason why resource-rich countries need fall prey to the curse” and identifies no less than ten common policy and institutional responses that “merit consideration” (an additional six interventions where deemed to have been failures) in addressing problems associated with various links in the resource value chain.⁴⁵ Of particular relevance to this dissertation are three relatively recent items on Frankel’s list that deal directly with the fiscal and institutional challenges of managing large, volatile and temporary resource revenue windfalls. First, the avoidance of excessive spending in boom times through clearly defined counter-cyclical rules to govern the allocation of resource revenues; second, the establishment of commodity funds that are transparently and professionally run, with rules to govern the payout rate and with insulation of the managers from political pressure; and third, the mandating of an external agent to provide transparency and freeze accounts in the event of a coup.

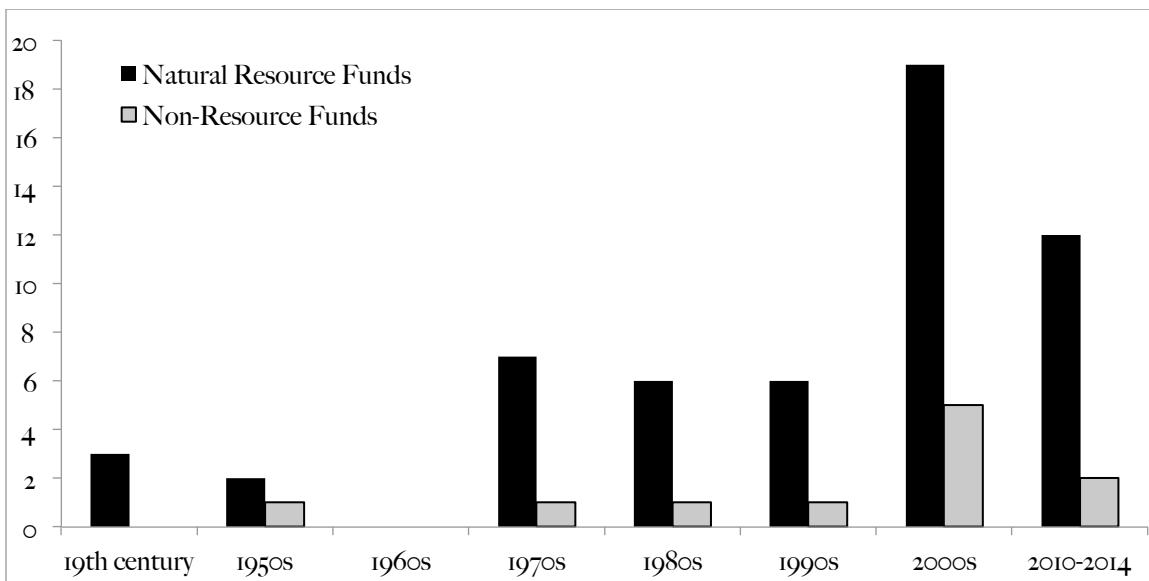
Combined, these three interventions reflect the growing acceptance that rule-based sovereign wealth funds⁴⁶ can play a crucial role in the prudent management of resource revenues. Progress has not been equal across all three areas: there is a far greater number of sovereign wealth funds than there are independent authorities managing them, while even fewer of them are managed within what could credibly be described as a rule-based counter-cyclical fiscal framework. Nevertheless, the combination of these three policy and institutional interventions today constitute “best practice” with respect to the management of resource revenues. In a growing number of cases resource-based sovereign wealth funds have emerged as the national (and sometimes sub-national) equivalent of endowed institutions, such as universities and charitable foundations, whose trustees James Tobin (1974) described as “the guardians of the future against the claims of the present”, with the task to “preserve equity among generations.”

⁴⁵ As discussed previously, the idea of a resource value chain has been promoted by Collier (2007).

⁴⁶ Frankel mentions “commodity funds”, which is a subset of sovereign wealth funds, as discussed below. Commodity funds (or natural resource funds) account for the majority of sovereign wealth funds, both in number and assets under management; and for the bulk of the growth in new funds since 2000, as per Figure 4.1.

The increasing appeal of sovereign wealth funds is reflected not only in the growth in assets under their collective management, a number for which credible estimates vary between \$6.5 trillion and \$8.3 trillion⁴⁷, but also in the proliferation in new funds, as shown in Figure 4.1. This increase in new sovereign wealth funds appears unlikely to end soon, with a geographically, politically and economically disparate group of countries – including Israel, Lebanon, Colombia, Peru, Mongolia, Guyana, Niger, Uganda, Namibia, Zambia and Tanzania – considering the establishment of funds to manage anticipated future resource revenue windfalls.⁴⁸

Figure 4.1: Number of new sovereign wealth funds by decade



Sources: estimates based on SWF Institute data, Das *et. al.* (2009) and fund documentation.

This chapter discusses the historic emergence and leading functions of sovereign wealth funds. What is striking about this discussion is the extent to which these functions emerge as a response the economic and institutional causes of the resource curse, discussed in the preceding chapters. The chapter also

⁴⁷ The exact measurement of sovereign wealth fund assets is complicated by delays in reporting, the assessment of mark-to-market gains and losses, a lack of transparency and disclosure amongst a number of the world's largest funds – and, not least, by uncertainty and inconsistencies regarding definitions and whether or not certain investors should be categorised as sovereign wealth funds.

⁴⁸ A number of sub-national jurisdictions, such as Saskatchewan and the North West Territories in Canada, and American states, such West Virginia and Pennsylvania, may be added to this list.

attempts to clarify a number of often misleading discussions around the definition and categorisation of sovereign wealth funds. It concludes with an assessment of criticisms that have been levelled against the sovereign wealth fund model; and identifies a broad framework of analysis for the critical policy and institutional choices that surround this model.

4.1. Defining and categorising sovereign wealth funds

While academic and regulatory interest in sovereign wealth is a relatively recent phenomenon, the funds themselves are not. The roots of one of the world's largest sovereign wealth funds, the Kuwait Investment Authority, for example, trace back to 1953 when its predecessor institutions were established under the British Protectorate to stabilise and invest its oil revenues. While the Kuwait Investment Authority is widely regarded as the first sovereign wealth fund (Kimmitt, 2008, Balin, 2009, and Jory, Perry and Hemphill, 2010), the true origins of the model date back to the permanent funds established in various American states, notably Texas and New Mexico, in the late-19th century to invest the proceeds generated on public land, notably from oil and gas production, to finance public spending needs, such as education, deferred maintenance on public investment projects and the general budget.

The proliferation of interest in sovereign wealth funds has had the unfortunate consequence of imprecision in the use of the term itself.⁴⁹ Sovereign wealth funds are a highly diverse set of institutions that defy simple categorisation; and consequently, definitions of sovereign wealth funds tend to be highly contextual. Broad definitions are typically suitable to general debates around issues of state investment; while narrower definitions are required when more specific issues are analysed. For example, the literature that focuses on the regulatory and geopolitical implications of sovereign investors – much of which is concerned with the rise of “state capitalism” (Summers, 2007; Wolf, 2007; and Kimmitt, 2008) – has tended to adopt rather broad definitions, permitting the inclusion of a multitude of state-owned investment vehicles, such as public pension funds, state-owned enterprises and development banks. On the other hand, discussions that focus on narrower questions – such as how sovereign wealth funds should shape their investment models to meet savings and inter-generational objectives and liabilities – have adopted

⁴⁹The first use of the term “sovereign wealth fund” was in Rozanov (2005).

more granular definitions that draw subtle distinctions between the various sovereign wealth fund models in operation.

The question of appropriate definitions is not an exclusively academic one, given the regulatory and political concerns that have been raised about the rise of state capitalism and state-owned investors. Sovereign wealth funds have been identified in this regard as potential instruments through which to advance a series of contentious national objectives, thus raising a range of risks around national security, industrial espionage and investments in “strategic” assets and sectors (Summers, 2007; Cox, 2007 and Truman, 2010). Summers (2007) argued that the state ownership of sovereign wealth funds “shake the capitalist logic” due to the possible “pursuit of objectives other than maximising risk-adjusted returns”, while Kimmit likened in their impact to that of “public footprints in private markets”. While the state-owned nature of these funds has been perceived as a threat in its own right, the obscurity of many sovereign investors with respect to size of their asset under management, their portfolio composition, and their objectives and investment practices has compounded the concerns of recipient countries (Truman, 2010).

The threat of a regulatory backlash from investment-recipient countries (which essentially disappeared in the wake of the global financial crisis that started in 2008) resulted in the formation of an International Working Group of Sovereign Wealth Funds. This body subsequently established a set of Generally Accepted Principles and Practices, commonly referred to as the “Santiago Principles” after the Chilean capital where they were adopted, which implied commitment to focus on serving macroeconomic purposes, pursuing purely commercial investment objectives, and advancing accountability, transparency and disclosure (International Working Group on Sovereign Wealth Funds, 2008).⁵⁰ However, a less appreciated consequence of the establishment of this group was its contribution to the definition and categorisation of sovereign wealth funds. In the first instance, it required a degree of self-association with the concept of a “sovereign wealth fund” in order to participate in the group. Second, a number of funds

⁵⁰ This structure was subsequently remodelled as the International Forum of Sovereign Wealth Funds when it assumed an autonomous governance structure and facilitated regular meetings between these funds.

that did not join the group took additional steps to assure national governments that are not (or do not regard themselves to be) sovereign wealth funds.⁵¹

Finally, the Santiago Principles also contained an actual definition of the term “sovereign wealth fund”. However, as per the discussion above, the adopted definition is unsatisfactorily broad for any qualified discussion around sovereign wealth funds, which are defined as “special-purpose investment funds or arrangements that are owned by the general government” (International Working Group on Sovereign Wealth Funds, 2008). Clearly, this definition draws no distinction between sovereign wealth funds and a myriad other types of investment institutions under government ownership – for example, social security fund, development banks and even state-owned enterprises. Even the added qualification that sovereign wealth funds are “created by the general government for macroeconomic purposes [and] manage or administer assets to achieve financial objectives, and employ a set of investment strategies that include investing in foreign financial assets” fails to fully distinguish sovereign wealth funds from other public investment institutions, such as public pension reserves and central banks’ foreign exchange reserves.

⁵¹The Canada Pension Plan, for example, has gone to great lengths to distance itself from sovereign wealth funds. In December 2007 it issued a statement noting “Neither the Canada Pension Plan nor the CPP Investment Board, which manages the assets of the CPP, meet the definition of a Sovereign Fund,” adding: “At stake for the CPP Investment Board would be its ability to compete for global investments if it is incorrectly categorised as a sovereign fund” (Canadian Pension Plan, 2007). Despite these efforts, the CPP is still commonly included in discussions around sovereign wealth funds.

Table 4.1: A typology of sovereign investors

Sovereign investor type	Sources of capital	Main functions	Typical investment models	Examples
Classic sovereign wealth funds	Resource revenues Excess foreign exchange reserves Privatisation proceeds	Saving and growing capital for future fiscal needs (savings funds) Generating sustainable investment income (income funds) Macroeconomic/fiscal stability (stabilisation funds)	Saving and income funds: diversified portfolios with long-term horizons Stabilisation funds: liquid, fixed-income denominated portfolios	Norwegian Pension Fund Global, Abu Dhabi Investment Authority Revenue stabilisation funds of Chile, Mexico and Algeria
Central banks	Foreign exchange reserves	Exchange-rate management/intervention	Liquid, fixed-income denominated portfolios Limited diversification into liquid equities and alternative assets	National central banks Some equity exposure: Swiss National Bank and Hong Kong Monetary Authority
Public pension reserve funds	Earmarked fiscal provisions and/or surplus contributions	Dedicated asset pools without short-term liabilities, promoting long-term solvency of national pension and social security systems (anticipation of rising entitlements)	Diversified portfolios with long-term horizons and ability to capture various long-term risk premiums	Australia Future Fund, National Pension Fund Korea, Government Pension Investment Fund (Japan), Canadian Public Pension
Development banks, funds and agencies	Government transfers, resource revenues, debt- and equity-financing using own balance sheet	Investing in projects and sectors with high expected social and economic returns, particularly in context of financing gaps Degree of commercial vs. developmental orientation differs	Large variation in assets and portfolios, with assets that may include debt, public and private equity, infrastructure, land and PPPs	Development banks and agencies Sovereign development funds: Mubadala (UAE), Temasek (Singapore), Khazanah (Malaysia)

In order to sharpen the definition, Table 4.1 situates sovereign wealth funds within a broader sovereign-investor landscape consisting of the following type of institutions:

- **Classic sovereign wealth funds:** stabilisation and savings funds, established through the transfer of natural resource revenues, excess foreign exchange reserves or privatisation windfalls. Note that there are further sub-categories of funds within this grouping, as explained in greater detail below.
- **Central banks managing foreign exchange reserves:** monetary authorities hold foreign exchange reserves in highly liquid fixed-income securities and cash. While the distinction between sovereign wealth funds and central bank reserves appears obvious, it has been blurred in recent years by the accumulation in a number of countries of massive reserve holdings that far exceed those needed for conventional policy purposes. Consequently, a number of central banks – such as the Swiss National Bank, the Hong Kong Monetary Authority and the Dutch central bank – have embarked on the diversification of their reserves into equities and other riskier assets, *without* the additional institutional change of giving these assets to a separate sovereign wealth fund. Therefore, some “investment tranches” managed by central banks have become de facto sovereign wealth funds (Das, Lu, Mulder and Sy, 2009).
- **Pension-reserve funds:** concerns over future public liabilities in countries facing long-run fiscal pressures due to deteriorating demographics have resulted in the establishment of pension-reserve funds. The logic behind these funds is that their absence of current liabilities (they are pure reserve funds, without actual liabilities) enables them to assume greater investment risk in exchange for higher average returns. Consequently, they hold more diversified, risk-exposed portfolios than the underlying pension funds that they help pre-fund (Blundell-Wignall, Hu and Yerno, 2008). Again, the distinction between pension-reserve funds and sovereign wealth funds appears fairly clear, but is in practice complicated by the desire of certain pension-reserve funds (such as the Canadian Pension Plan) to actively disassociate themselves from sovereign wealth funds, while others (notably the Australian Government Future Fund and the New Zealand Superannuation Fund) are self-described sovereign wealth funds.⁵²
- **Development banks, funds and agencies:** there is a large and varied group of sovereign investors whose primary function is to invest in projects and sectors with high expected social and economic returns, particularly in context of private-sector financing gaps. While institutions in the classic sovereign wealth fund model – whether of the saving- or stabilisation-fund variety – have invested exclusively (as in the case of Norway, Abu Dhabi, Botswana and Chile) or largely (as in the case of Kuwait and Alberta) in foreign assets, there is a growing tendency to include a domestic-and/or developmental-investment mandate within the ambit of a national sovereign wealth fund. The emergence of so-called “sovereign development funds” again blurs the definitional lines around sovereign wealth funds, as discussed in greater detail below.

⁵² The Norwegian sovereign wealth fund, the Norway Pension Fund – Global, may be included in this list; however, the link to the funding of future public pension liabilities has not been formally or legally defined (despite the fund's name). The Norwegian fund is, therefore, better categorised as a classic sovereign wealth fund, of the investment-income variety (as it makes an annual transfer, based on its real return, to the budget).

As is evident from the categorisation presented in Table 4.1., once differentiated from other types of sovereign investors, sovereign wealth funds themselves can be categorised according to a number of interrelated criteria, including: (i) investment mandates and styles, based on the length of investment horizons, target returns, degree of portfolio liquidity and portfolio of diversification, and defined or implied risk tolerance; (ii) funding sources, for example, oil revenues, fiscal surpluses, privatisation proceeds or foreign-exchange reserves; and (iii) functions, including macroeconomic stabilisation, intergenerational transfers and savings, income generation and revenue diversification, and domestic investment and diversification.

There is an intriguing parallel between the issues raised by difficult task of defining and categorising sovereign wealth funds and the distinction in the literature on institutional economics between the form and function of institutions. As discussed in Chapter 2, the latter literature has increasingly emphasised the importance of institutional functions over forms. In keeping with this tradition, the following section discusses the most important functions performed by sovereign wealth funds. A full list of funds that meet the criteria to be considered sovereign wealth funds, based on the functions discussed below, is provided in the Appendix to this chapter.

4.2. The functions of sovereign wealth funds

The heterogeneity of sovereign wealth funds is reflected in the wide range of economic and political contexts in which they operate: sovereign wealth funds exist in some of the world's richest (Norway, Canada and the United States) and poorest (East Timor, Nigeria, São Tomé and Príncipe and Papua New Guinea) countries. Not surprisingly, sovereign wealth funds perform a wide-ranging set of functions, often in combination. It is useful to differentiate between primary and ancillary functions – the former are typically articulated in the formal mandates and objectives of the fund, while the latter are often of a more implicit nature.

4.2.1. Primary functions

The three most important functions of sovereign wealth funds relate to their role in: (i) to *stabilise* macroeconomic outcomes, (ii) to serve as an investment vehicle for accumulated public *savings*; and (iii) to generate and diversify of fiscal income and national wealth (particularly in the case of resource-dependent countries). These three primary functions map into the three type of classic sovereign wealth funds: stabilisation funds, savings funds and investment-income funds. While the stabilisation function is most commonly associated with sovereign wealth funds in countries with volatile resource revenues, the saving, income generation functions cut across both resource- and reserves-based funds (but have a particularly meaning in the context of depleting natural resource wealth).

4.2.1.a. Macroeconomic and fiscal stabilisation

The stabilisation function is particularly important in resource-rich countries, and even more so in those that are also highly dependent on volatile resources for economic prosperity and government revenue. Resource-dependent economies face economic uncertainties on a number of fronts – commodity prices are highly volatile, while production levels and the value of resource reserves are near impossible to predict over the medium- to long term. Stabilisation funds are a critical part of the policy apparatus for combatting general macroeconomic spillovers from these underlying sources of volatility, as well as more specific purposes such as stabilising fiscal revenue, foreign-exchange earnings and public investment.

The stabilisation function is in most cases performed by dedicated stabilisation funds, which hold safe and liquid assets that can be used for intervention purposes when unanticipated shocks hit resource-dependent economies. Examples of such short-term stabilisation funds include the Economic and Social Stabilisation Fund in Chile, the Oil Stabilisation Fund in Colombia, the Oil Revenues Stabilisation Fund of Mexico, the Algerian Revenue Regulation Fund, and the Stabilisation Fund managed by the Nigerian Sovereign Investment Authority.

Long-term investment-income funds (or, as they are called in the United States, “permanent funds”), which have more diversified portfolios that include more illiquid and risky assets, can also contribute to the stabilisation of fiscal revenues if their annual investment income is significant compared to other

public revenue sources. Examples where this is the case include Norway, Kuwait, Botswana and Wyoming – where investment income is a significant and stabilising source of fiscal revenue (without being linked to an explicit stabilisation fund). Through either a liquid stabilisation or an investment-income fund, sovereign wealth funds reduce the volatility of fiscal revenues by generating a stable alternative revenue stream that can also be countercyclical if the investment income is (at least partially) uncorrelated or even negatively correlated with the underlying resource revenue.

Note that the function of macroeconomic stabilisation also played an important role in the accumulation of excess foreign exchange reserve holdings that led to the establishment of reserves-based sovereign investment in a number of Asian countries in the aftermath of the Asian financial crisis of 1997–98. Reserve accumulation has been described as a form of self-insurance against debt, banking and balance-of-payments crises, and the widespread economic instability that followed the crisis (Aizenman and Lee, 2006). While accumulated foreign-exchange reserves held for these purposes have typically remained under the control of national central banks, a portion of “excess” reserves have been transferred to dedicated sovereign wealth funds with a more long-term saving function (see below).

4.2.2.b. Long-term investment of public savings

Sovereign wealth funds are increasingly popular vehicles through which to achieve the kind of aims evoked by James Tobin’s (1974) quote in the introduction to this chapter: acting as “the guardians of the future against the claims of the present”. Savings funds facilitate a degree of intergenerational equity in the allocation of the benefits from national assets, preserving the claims of future generations to these assets from those of the present. This assumes special significance in the context of resource economies, as the finite and uncertain nature of resource wealth creates unique challenges in which the sovereign wealth fund transforms finite assets from depleting natural resources into permanent wealth in the form of a portfolio of financial assets.⁵³

⁵³ Economists have theorised these issues for centuries, from Jevons’ (1865) *The Coal Question*, which raised the prospect of British imperial decline due to dwindling coal supply to Hotelling’s (1931) for the efficient rate of resource extraction, to Solow (1974) and Hartwick’s (1977) examination of issues of inter-generational justice and efficiency in the extraction of finite resources and the investment of their proceeds.

Sovereign wealth funds in both resource- and reserve-rich countries perform the function of investing accumulated public savings through diversified portfolios with long-term investment horizons and higher expected average returns. The motivations underlying the public savings that feed sovereign wealth funds in resource- and reserves-rich countries are, however, rather different. By transforming a depleting natural resource into a potentially permanent one in the form of an endowment of financial assets, a country can ensure that the level of public spending observed during the period of resource extraction can be sustained – or even increased – in its aftermath. Several commodity-based sovereign wealth funds, including those in Norway, Kuwait, Chile, Botswana, Alberta and Alaska, have the stated objective of preserving resource wealth for future generations. Finally, concerns over the ability to prudently and productively spend and invest potentially massive resource windfalls (even when stabilised in the manner described above) has been part of the motivation behind the establishment of long-term savings funds in countries such as Abu Dhabi, Kuwait, Qatar, Botswana and East Timor, as well as developed and industrialised economies, such as Norway (see discussion below of the Dutch disease).

The savings function has also gained increasing prominence in economies that accumulated excess foreign exchange reserves. These assets were initially held almost exclusively in low-yielding, liquid assets, until after roughly a decade of rapid reserve accumulation resulted in increased awareness of the opportunity costs of holding of low-yielding assets.⁵⁴ This opportunity cost of holding hundreds of billions of dollars in low-yield assets, coupled with the need to provision for anticipated future liabilities associated with demographic shifts, prompted the transfer of a share of accumulated reserve assets into more diversified portfolios with longer investment horizons and greater risk tolerance, in pursuit of higher returns (most notably in a number of East Asian countries, where dedicated sovereign wealth funds, such as the China Investment Corporation and the Korea Investment Corporation, were established to manage a share of the reserves).

A striking similarity in the operational and institutional arrangements for the management of sovereign assets of both a reserves- and resources-based nature has therefore emerged. These similarities pertain to the objectives behind the establishment of different pools of sovereign wealth, the investment strategies

⁵⁴ Academics have attributed the accumulation of reserves to two primary motivations: “mercantilism” and “self-insurance”. The former relates to the desire to maintain a favourable exchange rate in order to stimulate export growth and suppress the demand for imports; while the latter arises from the need to hold foreign assets in order to handle and prevent balance-of-payment, foreign-debt and currencies crises (Aizenman and Lee, 2005).

adopted in pursuit of those objectives, and the separate institutional arrangements required for the effective management of these distinct pools. The stabilisation funds of resource-rich countries are comparable to the conventional foreign exchange reserve portfolios managed by central banks, while the savings and investment-income funds of resource-rich countries are the counterparts of the long-term investment funds established with excess reserves in a number of countries. The former are essentially buffer funds – insuring against external shocks (reserves-based funds) and revenue volatility (resource-based funds), respectively – and therefore hold highly liquid, low-yielding assets. The latter are established to generate higher long-run average real returns and consequently hold more diversified portfolios with significant risk exposure.

Table 4.2: Comparing resource- and reserves-based sovereign wealth management

	Reserves-based sovereign wealth	Resource-based sovereign wealth
LIQUID PORTFOLIO		
Primary motivation	Precautionary savings against shocks (debt, trade, financial crises)	Stabilisation of volatile revenues and commodity-price shocks
Management authority	Central bank	Ministry of Finance
Typical portfolio structure	Highly liquid, short-dated sovereign bonds and cash	Highly liquid, short-dated sovereign bonds and cash
Investment horizon	Short (0-12 months)	Short (0-12 months)
LONG-TERM PORTFOLIO		
Primary motivation	Higher return on excess reserve assets	Establishing an alternative source of wealth and fiscal income
Management authority	Dedicated investment authority (or dedicated unit in central bank if investment model is not too complex)	Dedicated investment authority (or dedicated unit in central bank if investment model is not too complex)
Portfolio structure	Diversified portfolio, with significant exposure to risk assets	Diversified portfolio, with significant exposure to risk assets
Investment horizon	Medium to long-term (1-10+ years)	Medium to long-term (1-10+ years)

To the extent that the management of these longer term and more risk-orientated portfolios – whether financed by resource revenues or excess foreign exchange reserves – required different governance arrangements, operational structures and investment expertise, a number of countries created new, stand-alone institutions in the form of sovereign wealth funds. This often involved transferring assets away from their traditional locations in the treasury (in the case of resource revenues) and central banks (in the case of foreign exchange reserves). The Korea Investment Corporation and the China Investment Corporation, created in 2005 and 2007 respectively, are notable examples of the latter; while the National Oil Fund of Kazakhstan, the Pension Reserve Fund of Chile and the Kuwait Investment Authority are examples of the former. Table 4.2 summarises the similarities in the economics, operations and institutional arrangements of managing resource- and reserves-based sovereign wealth.

4.2.2.c. Income generation and wealth transformation

Resource-based sovereign wealth funds are often part of a process of transforming one source of wealth – natural resources – into another with more attractive properties – financial assets. Portfolio theory suggests that wealth, assets and should be diversified to increase risk-adjusted returns (alternatively, to reduce the expected risk of the portfolio for a given level of return). If applied at the national level, this provides a rationale for the establishment of a sovereign wealth fund, which is an institutional mechanism through which (at least part of) natural wealth is transformed into financial wealth.

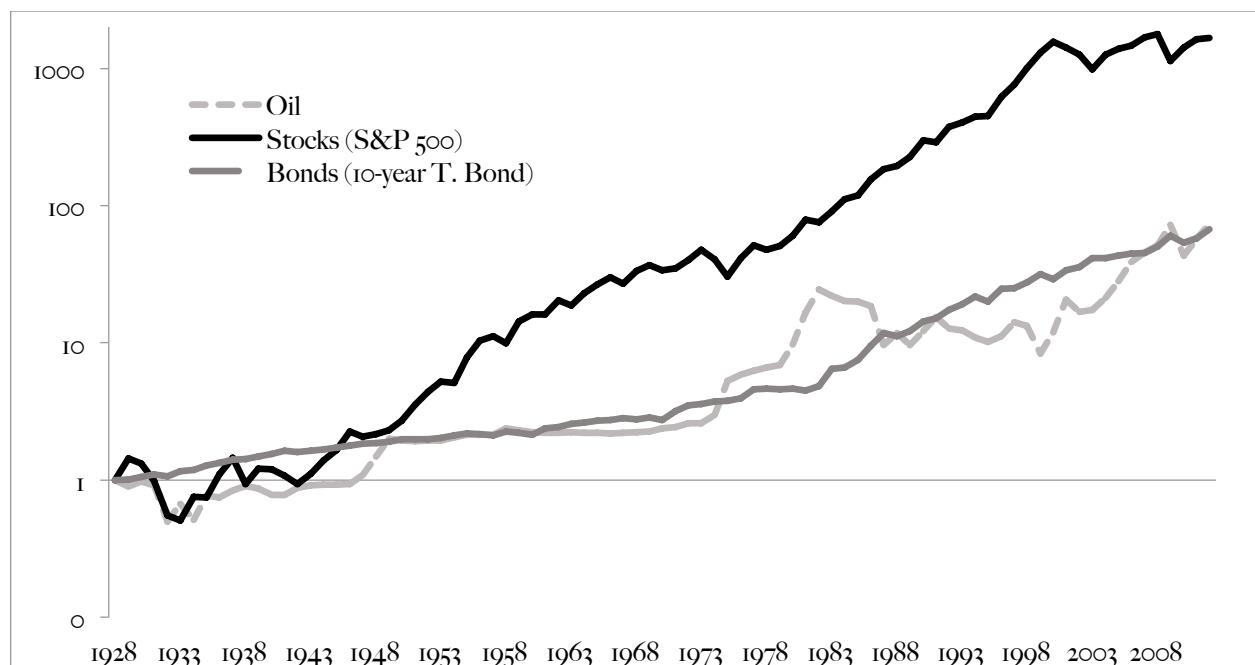
In the context of resource dependence, this transformative function of sovereign wealth funds assumes even greater urgency. Investment-income type sovereign wealth funds provide a supplementary – and, potentially, uncorrelated – source of public income to finance both capital and recurrent fiscal expenditures. The desire to transform the income source from commodities to financial assets arises for a number of reasons: the afore-mentioned volatility of resource-based revenues; a concern that resource revenues may be declining and therefore need to be replaced by a (potentially permanent) financial endowment; and, a belief that financial assets may have a higher risk-adjusted return than natural assets.

In a speech titled “From oil to equities,” Knut Kjaer, the former head of the Norwegian sovereign wealth fund, made the case that the continued transformation of oil wealth into financial wealth was the prudent thing to do for the sake of future generations, based on both return and risk considerations. It is clear that

the inter-related concerns over inter-generational equity, risk and return all a part in the establishment of the Norwegian sovereign wealth fund, and the articulation of its role is transforming the country's sources of wealth and income:

"the transition from oil in the ground to a broad portfolio of international equities contributes both to increasing the expected return on government wealth and reducing the associated risk...(the fund is) an instrument for diversifying government wealth and transforming income from temporary petroleum resources into a permanent flow of investment income...(it is for the) benefit of future generations that Norway succeeds in continuing the transformation/diversification of wealth into foreign financial assets (Kjaer, 2006)."

Figure 4.2: The cumulative total returns of financial assets and oil, 1928-2008



Source: Kjaer (2006); adapted using data from Bloomberg. The chart shows the cumulative total (nominal) returns on \$1 invested in financial assets and oil, respectively, starting in January 1928. Note that the vertical axis is horizontal.

In making the case for the transformation of wealth from oil to equities, note the calculation of cumulative total returns (in nominal terms) on \$1 invested in stocks (proxied here by the S & P 500), bonds (proxied by US 10-year Treasury bonds) and oil. Clearly judged purely on the basis of returns, financial risk assets

(stocks) have outperformed oil. Oil has demonstrated a similar cumulative total return to that of US Treasury bonds, however at a much higher volatility, evident in Figure 4.2. However, Kjaer argued further that if one considers the Value-at-Risk of Norway's total oil wealth (yet-to-be-extracted oil under the ground) relative to that of its financial assets (in the sovereign wealth fund), the risk-based argument for wealth transformation is similarly compelling. Arguing that if risk is measured as the standard deviation of the returns for the years 1900 to 2005, "the risk associated with the remaining portion of petroleum wealth is more than seven times higher than for the (sovereign wealth) fund," the risk associated with oil-price volatility has, historically, been "more than twice as high as that associated with a well-diversified portfolio of international equities" (Kjaer, 2006).

4.2.2. Ancillary functions

A number of implicit functions of sovereign wealth funds emerge as extensions or underlying motivations for the primary functions discussed above – for example, the primary function of a sovereign wealth fund may be to save a share of resource revenues, but the reasons for savings may be related to a secondary function (such as avoiding the unsustainability or misallocation of investment financed from temporary resource boom). Other ancillary functions are entirely independent from – and possibly in conflict with – the primary functions outlined above, notably the increasingly popular role sovereign wealth funds are expected to play in the domestic economy. It is particularly striking in light of the discussion of the resource-curse literature in Section 1 that many of the functions associated with resource-based sovereign wealth funds directly or indirectly address the most important causes of resource-related economic afflictions.

4.2.2.a. Domestic economic development: infrastructure and economic diversification

Particularly amongst the sovereign wealth funds in developing countries, there is a growing tendency to give these funds a mandate for investing at least part of their capital in domestic assets that are expected to generate broader social and economic benefits. These investments run the gamut of public goods, but there has been a specific emphasis on physical infrastructure. The motivations for investments in domestic infrastructure include an apparent shortage in well-functioning physical infrastructure, evidence of a

financing gap in the supply of infrastructure-related capital, a belief that infrastructure investments can generate high *financial* returns in the context of capital-scarcity over a sufficiently long investment horizon, which a sovereign wealth fund has (at least in theory), and the argument that functional infrastructure is a prerequisite for economic growth and development, and therefore has a variety of social and economic returns outside of financial-return considerations.⁵⁵

Another dimension of the developmental function some sovereign wealth funds are tasked with is that of direct investment in certain industries and sectors that policymakers believe will promote economic diversification.⁵⁶ Amongst resource-rich countries, some sovereign wealth funds with domestic investment mandates invest in downstream industries related to the primary resource, such as refining and petro-chemical engineering, in order to capture a greater national share of the resources value chain – notably, Mubadala in Abu Dhabi and Samruk-Kazyna in Kazakhstan. Sovereign wealth funds in both resource- and reserves-rich countries have also been given mandates to invest in completely unrelated sectors, such as tourism, biotech, entertainment and particularly financial services – notably Mumtalakat Holdings in Bahrain, Temasek Holdings in Singapore, and Khazanah Nasional in Malaysia.

Examples of sovereign development funds that combine domestic infrastructure development, the financing of other public goods, and diversification functions, include Bahrain's Mumtalakat Holdings, Vietnam's State Capital Investment Corporation, Abu Dhabi's Mubadala, Saudi Arabia's Public Investment Fund and France's Fonds Stratégique d'Investissement. Singapore's Temasek Holdings could also be seen as a sovereign development fund, although it has graduated towards a more long-term wealth management approach that increasingly favours commercial objectives over developmental ones. Sovereign wealth funds with developmental functions differ in terms of their ranking of commercial and developmental objectives underlying such investments. Some are expected (at least *de jure*) to apply strict commercial criteria to domestic investments, based on their expected risk-return characteristics; while others explicitly take non-commercial objectives into account, and are willing to forgo financial returns in order to pursue these additional objectives.

⁵⁵ These observations are very much in keeping with so-called “post-2015 development agenda” and the emphasis on “financing for development” by the likes of the World Bank and the United Nations.

⁵⁶ As noted below, many sovereign wealth funds in resource-rich countries contribute in an indirect way to diversification by preventing or combatting Dutch disease and an appreciation of the real exchange rate, which undermines the competitiveness of their tradable goods sector.

So pronounced has been the increased interest in domestic and developmental investment models, that sovereign development fund should arguably now take a position alongside sovereign saving, investment-income and stabilisation funds as the most important types of sovereign wealth funds. Similarly, domestic development may be elevated to a primary function of sovereign wealth funds. However, as argued in the remainder of this chapter, the governance and operational implications that accompany a domestic development function are sufficiently different from that of classic sovereign wealth fund models, that it is useful to treat them as somewhat separate entities.

4.2.2.b. Preventing the Dutch disease and maintaining export competitiveness

Sovereign wealth funds in both resource- and reserves-rich countries have been intrinsically linked with efforts to maintain export competitiveness through the exchange rate channel. As discussed in previous chapters, Dutch disease remains one of the most popular explanations for the resource curse. By investing (part of) the proceeds from the extraction of natural resources in foreign assets, sovereign wealth funds help avoid an appreciation of the real exchange rate during boom periods in the commodity-price or – production cycle. Dutch disease effects are particularly acute in countries with limited absorptive capacity, due to an inflexible and unskilled labour market, infrastructure bottlenecks and a lack of trade openness. A number of countries – including Norway, Botswana and Chile – have made reference to the role of their sovereign wealth funds in avoiding the Dutch disease; and have, consequently, prohibited domestic investments by their sovereign wealth funds. While the function of the sovereign wealth fund in this respect is purely “economic”, the management of political-economy dynamics, adverse political incentives and public-sector capacity constraints also play a critical role in the case for establishing a sovereign wealth fund.

4.2.2.c. Preventing waste, corruption and poor public investments

Political-economy factors are pivotal to the case for establishing a sovereign wealth fund. Evidence suggest that the quality of public investment deteriorates during periods of (often unexpected) sharp increases in public revenue, spending and investment, particularly in resource-rich countries (Gelb, 1988). By establishing a clear, rules-based framework for the management of resource revenues, sovereign wealth

funds can reduce the rent seeking associated with the revenue windfalls (Tornell and Lane, 1999; Torvik, 2002; and Robinson *et. al.*, 2006). Beyond these political dimensions, there is strong evidence that public investment is subject to significant declining marginal returns in the short run, particularly in the context of both economic and institutional capacity constraints (Pritchett, 2000; Berg, Portillo, Yang and Zanna, 2013; and Presbitero, 2016). Finally, long-term public investments may be incomplete or their recurrent costs unfinanced if the revenue and export boom is reversed due to a decline in commodity prices or production.

These issues are particularly pertinent to countries with poor institutions at the start of the revenue boom, as these are general also countries that have not yet built the requisite political and public investment processes to ensure that the windfalls are spent and invested in a sustainable, inclusive and growth-enhancing manner. While sovereign wealth funds are no panacea to deep-rooted political and institutional problems, they can lengthen the horizon over which revenue windfalls are spent and invested in the domestic economy, thereby potentially improving the political incentives and avoiding the sharply declining returns on public investment in the short run. That is, sovereign wealth funds are an institutional “commitment technology” that allows the revenues from a resource boom to be spent and invested more gradually, as absorptive capacity constraints are lifted over time.

4.3. Debates around the suitability sovereign wealth funds for poor countries

The classic sovereign wealth fund model – which combines resource-based funding, with stabilisation, savings and income-generations functions – has been criticised by a number of scholars who argued that this model is inappropriate for countries characterised by capital scarcity and large infrastructure investment needs (Van der Ploeg, 2008, Collier, Van der Ploeg and Vernables, 2010 and Venables, 2010). Collier, for example, has argued that “the conventional model of a sovereign wealth fund” is inappropriate for poor countries, as “in a capital-scarce country it is unwarranted to accumulate long-term foreign investments” and that “the core objective should evidently be to finance domestic infrastructure” (Collier, 2012). Similarly, Collier *et. al.* (2010) have argued that “an international sovereign wealth fund is not appropriate for a capital-scarce country [as it] is too conservative in that it precludes any near-term increases in consumption.”

This criticism is informed by the view that the sovereign wealth fund model is based on the permanent income hypothesis, a powerful theory developed by Milton Friedman (1957), which forms the basis of modern consumption theory. Collier argues instead for an immediate surge in spending and investment in the aftermath of resource-revenue boom – beyond the level consistent with permanent-income type smoothing – even if that means a lower level of spending in the long run.⁵⁷ Collier and his co-authors' argue that citizens of a country with a large resource discovery will be wealthier in the future, and that therefore it makes sense to spend the resource windfall upfront, so as to move the country towards its higher level of income and consumption:

“...the value to the society of consumption in the near term is considerably higher than consumption in the distant future when the economy has become fully developed...It is therefore appropriate for a developing country to use some of its resource revenues to raise consumption up towards the level of the distant future, rather than to use them to raise the level of consumption in that distant future (Collier *et. al.*, 2010: 2).

Collier (2010 and 2012) and Santiso (2008) provide enthusiastic support for sovereign development funds over investment income funds for capital-scarce countries with abundant resources, while Collier in particular promotes the idea of using such funds to investment in domestic infrastructure: not only will investment raise the country's growth potential, but the returns on these investments are high, given the capital scarcity (low capital-labour ratio) in these countries.

This criticism is a significant challenge to the rising academic and policy support for – and increasing real-world embrace of – the “conventional” sovereign wealth fund model, not least because of Collier's standing in the fields of African economic development and resource economics. However, this challenge to the sovereign wealth fund model appears to wish away many of the pervasive themes in the resource-curse literature, as discussed in first part of this dissertation, notably the institutional and political constraints to efficient large-scale public investment financed by resource-revenue windfalls (which may also be temporary and subject to sharp reversals); the Dutch disease and inherent procyclicality of resource-rich economies.

⁵⁷ Ironically, Collier is one of the leading forces behind the *Natural Resource Charter*, a list of “best practices” for the management of natural resources. Precept 8 (Principle 3) of the charter states: “Effective utilisation of resource revenues requires that domestic expenditure and investment be built up gradually and be smoothed to take account of revenue volatility.”

A second objection is that Collier *et. al.* (2010) attack a straw-man version of the sovereign wealth fund model. The adoption of a sovereign wealth fund does not preclude an increases in consumption or force governments into save all resource revenue (as Collier and his co-authors suggest), without any access to investment income in return. Finally, Collier's argument relies on two would-be inevitabilities that have rarely been observed in the history of resource-rich poor countries: that future generation will be much richer than current ones; and that the return on domestic investments is by definition higher than that on international assets.

4.3.1. Imprecise claims about savings rates in the sovereign wealth fund model

Collier *et. al.* (2010) contend that the conventional sovereign wealth fund model proposes “that *all revenue should go into the sovereign wealth fund*” and that this savings rule is “too conservative in that it precludes *any near-term increases in consumption*” (emphasis added). In practice, this is never the case. In most cases, domestic investment can still rise to a level consistent with that seen in high-growth developing countries in recent years, regardless of whether the country has a long-term investment income fund or not.

Botswana is a case in point: despite having a large sovereign wealth fund (investment income from which is the second largest contributor to government revenue, after diamonds), only 10% of its estimated asset accumulation between 1983 and 2015 was in the form of financial assets, versus around 43% in physical infrastructure and 46% in human capital (African Development Bank, 2016). Similar analysis can be conducted for a range of countries with sovereign wealth funds, ranging from Norway to Timor Leste, all of whom either experienced significant growth in public investment or maintained already-high levels.

The point of the conventional sovereign wealth fund model is that resource-rich countries tend to experience periodic revenue booms – which are of an unpredictable magnitude or duration – that generate rents in excess of what can be efficiently invested, given a range of economic, administrative and institutional constraints that are can only be progressively lifted (Berg *et. al.*, 2013; and Presbitero, 2016).

By suggesting that the presence of a sovereign wealth fund moves all resource-revenue related public spending and investment into the future, Collier *et. al.* (2010) are attacking a straw man. In practice, governments with sovereign wealth funds typically transfer only a portion of their resource revenue windfalls to the fund. As discussed in Chapters 6 and 9, governments typically specify a savings rule in the form of certain percentage of revenues (for example, 30% of oil-related royalties) or hurdle-price for oil (for example, \$75 per barrel), suggesting that a significant share of resource revenue remains available for public spending and investment.

4.3.2. Domestic returns are often much lower than predicted

The expectation that the return on domestic investment is higher than that on foreign investments is an important part of the argument for channeling resource revenues to domestic public investment. This is a common theoretical result in growth models with declining marginal returns to capital and a cornerstone of the “convergence” argument derived from them; as well as the idea that capital should flow to countries with low capital stocks or low capital-labour ratios (in search of higher marginal returns). However, it has been demonstrated with depressing regularity that neither convergence in economic growth nor the flow of capital from developed to developing countries are in any way inevitable: Pritchett’s (1997) famous investigation of the evidence on convergence concluded that the reality was one of “divergence, big time”; while the Lucas Paradox, in which capital flows “upstream” from emerging to advanced economies remains relevant (Lucas, 1990).

Clearly, there are a host of complex factors, beyond the capital-labour ratio, that affects the rate of return on infrastructure investments in poor countries, including institutional factors. There is near universal recognition that the quality of institutions has a very significant bearing on the effectiveness of infrastructure investment on growth, as summarised by Esfahani and Ramirez:

“Institutional capabilities that lend credibility and effectiveness to government policy play particularly important roles in the development process through infrastructure growth. The effects indicate that countries can gain a great deal by improving investment and performance in infrastructure sectors. But, the exercise also implies that achieving better outcomes requires institutional and organisational reforms that are more fundamental than simply designing infrastructure projects and spending money on them (Esfahani and Ramirez, 2003: 471).

Given the insights from the resource-curse literature on the interactions between resources and the development of institutions, the assumption of high rates of return on infrastructure in resource-rich poor countries appears tenuous – particularly when the combined with an unambiguous appeal for a rapid scale-up in such forms of investment.

4.3.3. The impact of institutional, political-economy and public-choice factors

Part of the appeal of sovereign wealth funds lies in the fact that, if properly structured and governed, they reduce the “voracity effect” and a race-for-rents that accompanies a windfall revenue boom. Sovereign wealth funds are potentially powerful institutional commitment devices, establishing a framework of rules and guidelines for the difficult task of managing volatile and finite resource revenues. As noted in Section 1, the political and institutional challenges around resource-revenue management is “probably the most active research field on theories of the resource curse currently, and will probably continue to be so for a while, simply because there are so many political-economy characteristics of resource-rich countries that still cry out for an explanation” (Torvik, 2009).

The public choice literature suggests that government officials face a variety of adverse incentives in arriving at these decisions. Even absent negative incentives, centralised policymakers face significant information problems in successfully identifying which infrastructure projects can be efficiently completed within the uncertain timeframe established by a resource-revenue boom. This is consistent with Mehlum *et. al.*'s (2006) conclusion that good institutions are crucial to the successful investment of resource revenues; as well as the empirical and theoretical work by Gelb (1988), Robinson and Torvik's (2005) and Robinson *et. al.*'s (2006). While institutional economics, therefore, emphasises informational and incentive constraints on the ability to manage large-scale public investments, the argument against sovereign wealth funds – and for rapid ramping up of public spending financed by resource-revenue windfalls – surprisingly oblivious to the risk of Dutch disease, which arises as a result of institutions-free economic dynamics.

4.3.4. The Dutch disease

The preceding point made the case for gradualism in domestic investment in light of anticipated institutional limits and adverse political incentives, but the purely economic argument based on Dutch disease can be added to the case for a gradual scaling up of investment financed by a resource boom. In some sense, the fact that Collier is the leading authority associated with the criticism of sovereign wealth funds is highly surprising, given his personal scholarship on Dutch disease (and indeed all the above-mentioned problems with the spending and investment of resource revenues) – Collier and Goderis (2007), for example, found “that a substantial part of [the resource curse] is explained by high public and private consumption, low or inefficient total investment, and an overvalued exchange rate.” This amounts to very strong support from Collier for the Dutch disease hypothesis – and, moreover, for the role of inefficient spending and investment in causing it.

4.3.5. Lack of rules and fiscal anchors

Collier’s criticism of conventional sovereign wealth funds has also been directed at the International Monetary Fund, given its support for the model. Responding directly to Collier’s promotion of the sovereign development fund model has a more appropriate alternative for resource-rich poor countries, the Fund’s Fiscal Affairs Department has suggested that “development funds tend to fragment the budget process and policy decision-making, weaken the control of fiscal aggregates, as well as reduce the credibility and even the quality of the regular budget. Rather than looking for quick fixes, public financial management weaknesses need to be tackled holistically” (Baunsgaard, Poplawski-Ribeiro, Villafuerte and Richmond, 2012). Referencing Collier’s (2011) contribution, the authors argue further that “the recent literature has emphasised the merits of using resource wealth to invest in physical assets with high yields in terms of non-resource productivity and growth (and non-resource fiscal revenue),” before adding: “Such a formulation, while theoretically sensible, is problematic from a practical perspective since it does not provide a meaningful anchor for fiscal policy” (Baunsgaard *et. al.* 2012). The use of a sovereign wealth fund as a commitment device for spending and investing resource revenues – alongside other rule-based elements of the institutional matrix, notably a rule-based fiscal framework – establishes a more credible anchor for fiscal policy.

4.3.6. The non-inevitability of growth and rising incomes

Collier acknowledges that his recommendation of raising current consumption and investment of resource revenues will likely lower average spending of these revenues over time. This is acceptable, he argues, because the citizens of resource-rich poor countries will be richer in future, so that there will be no welfare losses. There is, of course, nothing in the economic history of resource economies, which in fact includes large-scale investments in domestic infrastructure of kind Collier proposes, to suggest that this is in any way inevitable or even likely. The appeal to the supposed inevitability of rising incomes and future wealth is a way to dismiss concerns over intergenerational equity and sustainability once resources are depleted. If future wealth and prosperity is no longer regarded as a deterministic inevitability, intergenerational equity is yet another argument in favour of the conventional sovereign wealth fund model.

4.4. Critical elements of the institutional framework of sovereign wealth funds

This chapter has described the emergence of sovereign wealth funds, situated them with a broader landscape of public investment institutions, and categorised them based on a number of criteria, including funding source, investment styles and most importantly, a range of common functions. The most important functions performed by sovereign wealth funds appear as a direct response to the common afflictions suffered by resource economies, as per the resource curse literature discussed in Section 1. The remainder of this dissertation is concerned with the establishment of policy and institutional framework that enables sovereign wealth funds to perform these functions. The following elements constitute the critical building blocks of such a framework:

4.4.1. Savings rules

All resource-based sovereign wealth funds need a mechanism through which to receive a portion of resource revenues in order to perform their stated functions. These mechanisms can be informal and discretionary, but in the interests of public accountability, predictability and credible commitments are often rule based. Most savings mechanisms in operation today amongst resource-based sovereign wealth funds are based on very simple rules, such as a fixed percentage of resource revenues, a deviation from the past moving average of resource revenues, or as windfall revenues that arise when a commodity price

exceeds a certain “hurdle price” (for example, \$75 per barrel for oil). If the country has a number of different sovereign wealth funds with stabilisation, savings or development functions (or a sovereign wealth fund with different sub-funds or divisions), further rules may be required to allocate funds between the different funds. Section 3 of this dissertation will analyse a number of common savings rules, and make the case for a more dynamic rule that integrates savings, spending and stabilisation objectives in a single coherent and contingent rule-based framework.

4.4.2. Spending rules

Decisions around how to use the sovereign wealth fund’s resources pertain to both its capital (or principal) and its investment income. Following the well-known “permanent fund” approach, several sovereign wealth funds, such as those in Norway and several American states, spend only the real returns generated on the fund’s capital, while the latter is preserved in real terms into perpetuity or to meet or insure against a major future spending needs. An alternative is to reinvest the fund’s investment income in order to achieve a more aggressive build-up of assets managed by the sovereign wealth fund (perhaps before switching to a permanent fund approach, once the fund has reached a target level of assets under management). Both the sovereign wealth fund’s capital and its investment income can be linked, implicitly or explicitly, to specific public spending needs on, for example, infrastructure, education, health and pensions.

4.4.3. Rule-based investment policies

The specification of a sovereign wealth fund’s investment policy should reflect its stated functions, the government’s needs and preferences, and the capacity, expertise and unique attributes of the institution. The functions and implied (or explicit) liabilities of the sovereign wealth fund determine a number of characteristics: the fund’s ability to gain exposure to different asset classes or risk factors, its investment horizon, target return and risk limits. Further, the investment strategy also encompasses operational and implementation decisions around the active versus passive, and internal versus external fund management. For either public disclosure purposes, or for the clarity of the internal decision-making process, sovereign wealth funds’ investment policies and strategies should ideally be consolidated in an Investment Policy Statement and be governed by a set of rules.

4.4.4. The institutional framework

The management of sovereign wealth funds often require coordination between various parts of government and the public sectors, including government ministries (for finance, natural resources and economic planning), the central bank, independent investment authorities, the parliament and public auditors. Three key elements of any sovereign wealth fund's institutional framework are:

- **The governance of savings and spending rules and decisions:** as discussed earlier, the flow of funds in and out of sovereign wealth funds can be discretionary or rule based. The institutional dimension to these policies relate to who decides on these transfers under a discretionary arrangement; and, under a rule-based system, who has the authority to set and potentially change the rules.
- **Position in the public sector and operational independence:** who is responsible for the day-to-day operations and policy implementation of the sovereign wealth fund? Common arrangements are for the operational aspects of the fund to sit in the central bank, the ministry of finance or in a dedicated investment authority (often depending on the operational complexity of the investment process). Generally, these decisions are made based on the nature of the fund's investment strategy, and the concerns and sensitivity around the possibility of political interference. To the extent that sovereign wealth funds of the saving and investment-income variety have long-term investment horizons and are expected to maximise investment returns, an institutional model characterised by operational independence is both popular and desirable.
- **Internal governance:** the sovereign wealth fund's internal governance structures – the rules and procedures that determine the powers and responsibilities of different groups in the organisation – are also critically important. The success of the organisation in performing the functions expected of it depends on clarity around the powers and responsibilities of the board versus the executive, the role and composition of the investment committee, and clear reporting lines with the organisation. Of particular importance are an articulation of responsibilities and rules for the various elements of the investment process.

Conclusion

This chapter has emphasised significant variation within the broad sovereign investor landscape and within the narrow grouping of sovereign wealth funds. It provided a typology of the different kinds of sovereign investors and sovereign wealth funds, with a specific emphasis on the variety of functions they

perform and how these are determined. The chapter also considered how the articulation of sovereign wealth funds' functions influences their policy and governance frameworks. It is clear that there is significant scope for tailoring sovereign wealth funds' functions, policies around savings, spending and investments, and intra-governmental and internal governance arrangements to meet local requirements, based on the economic (and political) realities of the countries in question.

Criticisms of sovereign wealth funds tend to underestimate or mischaracterise this degree of flexibility; as well as the extent to which resource-based sovereign wealth funds are designed to directly and indirectly address common afflictions associated with the resource curse. The remainder of this dissertation addresses the critical elements of the policy and institutional framework for resource-based sovereign wealth funds, as identified at the end of this chapter. Before doing so, however, the following chapter considers the striking similarities the model of the independent central bank and the sovereign wealth fund model proposed here – and identifies the lessons and implications that can be drawn from the policy and institutional breakthroughs in modern monetary policy for sovereign wealth funds.

Appendix to Chapter 4: Sovereign wealth funds

Government	Fund Authority	Inception	Source of Funding
Texas	Texas Permanent School Fund	1854	Oil and Public Land
Texas	Permanent University Fund	1876	Public Lands
New Mexico	Land Grant Permanent Fund	1898	Minerals and Public Land
Kuwait	Kuwait Investment Authority	1953	Oil
Kiribati	Revenue Equalisation Reserve Fund	1956	Phosphates
Saudi Arabia	Public Investment Fund	1971	Oil
New Mexico	Severance Tax Permanent Fund	1973	Oil and Minerals
Wyoming	Permanent Wyoming Mineral Trust Fund	1974	Minerals
Abu Dhabi	Abu Dhabi Investment Authority	1976	Oil
Alaska	Alaska Permanent Fund	1976	Oil
Alberta	Alberta Heritage Savings Trust Fund	1976	Oil
Montana	Montana Permanent Coal Trust Fund	1978	Minerals
Oman	State General Reserve Fund	1980	Oil
Brunei	Brunei Investment Agency	1983	Oil
Abu Dhabi	International Petroleum Investment Co.	1984	Oil
Alabama	Alabama Trust Fund	1985	Oil and Gas
Louisiana	Louisiana Education Quality Trust Fund	1986	Oil
Malaysia	National Trust Fund	1988	Oil
Norway	Government Pension Fund - Global	1990	Oil
Botswana	Pula Fund	1996	Diamonds
Gabon	Sovereign Fund of the Gabonese Republic	1998	Oil
Venezuela	Macroeconomic Stabilisation Fund	1998	Oil
Azerbaijan	State Oil Fund	1999	Oil
Iran	National Development Fund	1999	Oil
Algeria	Revenue Regulation Fund	2000	Oil
Kazakhstan	Kazakhstan National Fund	2000	Oil
Mexico	Oil Revenues Stabilisation Fund	2000	Oil
Trinidad and Tobago	Heritage and Stabilisation Fund	2000	Oil
Abu Dhabi	Mubadala Development Company	2002	Oil
Equatorial Guinea	Fund for Future Generations	2002	Oil
Qatar	Qatar Investment Authority	2003	Oil
Russia	National Welfare Fund	2004	Oil
Sao Tome and Principe	National Oil Account	2004	Oil

Ras Al Khaimah	RAK Investment Authority	2005	Oil
Venezuela	National Development Fund	2005	Oil
Timor Leste	Timor-Leste Petroleum Fund	2005	Oil and Gas
Chile	Pension Reserve Fund	2006	Minerals
Bahrain	Mumtalakat Holding Company	2006	Oil
Dubai	Investment Corporation of Dubai	2006	Oil
Libya	Libyan Investment Authority	2006	Oil
Mauritania	National Fund for Hydrocarbon Reserves	2006	Oil
Malaysia	Terengganu State Sovereign Fund	2006	Oil and Gas
Chile	Social and Economic Stabilisation Fund	2007	Minerals
Papua New Guinea	Papua New Guinea Sovereign Wealth Fund	2011	Oil and Gas
Mongolia	Fiscal Stability Fund	2011	Oil and Minerals
Ghana	Ghana Heritage Fund	2011	Oil
Ghana	Ghana Stabilisation Fund	2011	Oil
Nigeria	Nigerian Sovereign Investment Authority	2011	Oil
North Dakota	North Dakota Legacy Fund	2011	Oil
Australia	Western Australian Future Fund	2012	Minerals
Angola	Angola Sovereign Fund	2012	Oil
Kazakhstan	National Investment Corporation	2012	Oil

Non-resource based funds

Singapore	Temasek Holdings	1975	Fiscal Surplus
Singapore	Government Investment Corporation	1981	Foreign Exchange Reserves
Malaysia	Khazanah Nasional	1993	Various Public Revenues
Australia	Future Fund	2004	Fiscal Surplus
South Korea	Korea Investment Corporation	2005	Foreign Exchange Reserves
Vietnam	State Capital Investment Corporation	2006	Various Public Revenues
China	China Investment Corporation	2007	Foreign Exchange Reserves
Brazil	Sovereign Fund of Brazil	2008	Various Public Revenues

Chapter 5

To be boring:

Institutional lessons from the “Modern Monetary Consensus” for sovereign wealth funds

Mervyn King, the esteemed British central banker and monetary economist, once famously said the Bank of England’s ambition is “to be boring” (King, 2012). While the extraordinary steps taken by central banks in the aftermath of the international financial crisis have been anything but boring, King’s statement concisely captures the central tenets of a broad consensus around the appropriate institutional arrangements and policy frameworks of monetary policy. This consensus renders monetary policy so predictable, rule-based and transparent that news of the latest meeting should be greeted by a collective shrug of the shoulders and a relegation to the back pages of daily newspapers. “Macroeconomic policy has, for most of our lifetime, been rather too exciting for comfort,” King noted, adding that “our belief is that boring is best”.

This chapter argues that the benefits of predictability, even boredom, are not unique to monetary policy, but that the logic that resulted in the modern monetary consensus can inform the design of other economic institutions and policy frameworks, notably those tasked with macroeconomic stabilisation – and, in this specific case, sovereign wealth funds. As argued in this section, a number of the world’s best-governed sovereign wealth funds, for example those in Norway, Chile, Botswana and the United States, reflect this basic insight. However, an arguably still stronger and seductive tendency remains in which sovereign wealth funds are viewed, on both positive and normative grounds, in exactly the opposite way: as mystical “power brokers” of the 21st century global capital markets.⁵⁸

The fledgling academic literature on sovereign wealth funds has already underlined the critical importance of institutional arrangements (or “governance”) – notably spending and savings rules and mechanisms for transparency and accountability – to the effectiveness of sovereign wealth funds (Bacon

⁵⁸ “Power brokers” is the phrase used to describe sovereign wealth funds in a well-publicised report by McKinsey & Company (Farrell, 2007). An in-depth feature in *Euromoney*, described how the secrecy of many of the world’s largest sovereign wealth funds has single-handedly established an aura of mystique around them: “The strategies and dimensions of Gulf sovereign wealth funds are an arcane subject made more mysterious by the lack – apart from Abu Dhabi’s fund – of published annual reports” (Wright, 2012).

and Tordo, 2006; Humphreys and Sandbu, 2007; Monk, 2009; Das *et. al.*, 2009; Ang, 2010 and Frankel, 2010). One of the leading scholars of sovereign wealth funds underlined why these aspects rank above more glamorous issues around investment:

“One can underperform a reasonable benchmark by 2-5% per annum and the SWF will still operate as a mechanism for transferring wealth into the future. Naturally, this underperformance hurts, but spending all the money now is the far greater loss with detrimental economic consequences. In the worst case, poorly functioning governance structures...affect the legitimacy of a sovereign wealth fund.” (Ang, 2010).

It is important to underline that the discussion of sovereign wealth funds’ governance and institutional arrangements in this section (and in Ang’s understanding in the quote above) pertains not only narrowly to what may be called the “internal governance” of the fund – for example, the distribution of powers and responsibilities between its Board of Directors and its executive, and the fund’s investment rules and policies. An obvious addition layer of analysis is that of “external governance” – for example, its independence from and accountability to government, the legal status of the fund (and its management authority), and its public disclosure and reporting policies. The institutional arrangements for the internal and external governance of sovereign wealth funds are discussed in detail in Chapter 10 (while Chapter 11 discusses a range of institutional aspects that fall within internal governance).

A critical additional layer for commodity based sovereign wealth funds is the operation and governance of the transfers (or the fiscal rule, as per Section 3): the flow of funds into and out of the sovereign wealth fund, and whether these are discretionary, ad hoc or rule based. Fiscal rules are discussed in Chapters 6 through 9. These analyses could be extended further to consider the coherence of the fiscal rule and the external and internal governance structures with broader institutional characteristics and policies (for example, the strength of the rule of law, and limits on borrowing that may offset and undermine the accumulation of assets in the sovereign wealth fund). As argued in this chapter, the modern monetary consensus similarly rests on a multi-dimensional understanding of institutional arrangements.

5.1. The basic problem: principal-agent relationships

Sovereign wealth funds are typically part of an elaborate system of delegated authority, the likes of which are widely studied in the economics of principal-agent relationships. A principal-agent relationship arises when one party (the principal) delegates authority or responsibility for achieving certain outcomes to a second party (the agent). Such agency relationships are pervasive in modern societies characterised by specialisation and cooperation; however, they can introduce significant costs, particularly when the principal lacks the means to ensure that the agent behaves in a manner consistent with the advancement of the principal's objectives. As one of the leading authorities on agency economics observed: "Examples of agency are universal. Essentially all contractual arrangements, as between employer and employee or the state and the governed, for example, contain important elements of agency" (Ross, 1973).

A number of factors can bring agency problems to bear and raise the cost associated with the principal-agent relationship and cooperative economic arrangements. The agent may have objectives that differ significantly from that of the principal. This is particularly problematic if the pursuit of the agent's objectives undermines that of the principal. The economics literature, particularly the New Institutional tradition, has emphasised the importance of clearly defined contracts and other mechanisms that change the incentives of agents, so that it becomes in the agent's best interest to act in a manner consistent with the principal's objectives. In monetary policy, the adoption of an explicit, rule-based inflation-targeting regime, possibly complemented by clearly defined contracts for central bankers, is an example of a set of institutional arrangements that incentivise the agent (the central bank) to act in the interest of the principal (society). Inflation targeting focuses the central bank's attention on the maintenance of low and stable inflation, over other policy objectives, and constructs a detailed institutional infrastructure promoting transparency and open communication regarding both the goals and the strategy pursued by the central bank (the agent) on behalf of the principal (society). In this sense, inflation targeting clarifies and reinforces the, often implicit, contractual relationship underlying modern monetary policy (Svensson, 1997).

Agency problems also arise when principals are unable to clearly specify what their goals are or how the progress towards the achievement of its goal(s) may be measured or observed. Clearly, this compromises the process through which the principal may wish to ensure or incentivise that the agent acts in his best

interest. It also complicates the monitoring of the agent's performance and track record, which is important in the context of accountability, particularly in a democracy. The literature has emphasised the importance of making the principal's objectives as clear and precise as possible. In public policy context, this has resulted in the case for and widespread adoption of explicit policy target, which policymakers are tasked with achieving. Clearly defined numeric inflation targets are an example of this trend in the context of monetary policy (Walsh, 1995).

A final concern in the principal-agent tradition is that the behaviour of the agent can be difficult, expensive and sometimes impossible to monitor. Again, this complicates the monitoring process between the principal and agent. The literature has therefore emphasised the importance of transparency on the part of the agent in general, and in more applied settings on clear and practical mechanisms for promoting transparency (and, again, accountability in a democratic setting). In modern monetary economies, this is reflected in strong emphasis on transparency on the part of monetary authority (Dincer and Eichengreen, 2014).

In conclusion, the principal-agent framework is a powerful theoretical lens through which to analyse the incentive structures and institutional arrangements underlying devolved authority and decentralised decision making. The tools and solutions of principal-agent analysis have extensive applications in matters of public policy, with notable success in modern central banking.⁵⁹ Moreover, principal-agent concerns also permeate the field of finance and investment, given the myriad of agency relationships that arise from the extraordinarily high degree of specialisation, cooperation and decentralisation in modern finance. The tools and solutions of principal-agent analysis are therefore particularly useful in the study of sovereign wealth funds. These funds are at the intersection of a number of fields in which principal-agent analysis is widely applied: general situations of devolved authority, decentralised public and macroeconomic policymaking, and highly specialised modern finance and investment. This chapter will frequently return to the question of how particular institutional arrangements can contribute to the resolution of agency problems related to sovereign wealth funds, and the extent to which the modern monetary consensus addresses these issues.

⁵⁹ Principal-agent analysis is, unsurprisingly, a mainstay of the fields of Public Choice, New Institutional Economics and Monetary Economics.

5.2. Lessons from modern monetary institutions for sovereign wealth funds

Since the misadventures of the 1970s, a remarkable intellectual and practical consensus has been achieved around the appropriate institutional foundations and policy frameworks of modern monetary policy. This consensus reflects a synthesis in the historical disagreements between Monetarist and Keynesian schools of thought (Romer, 1993; Taylor, 1997 and de Long, 2000). Above all, modern monetary policy recognises the appeal of institutional independence in the implementation of monetary policy. From this, it follows that such operational independence has to be accompanied by explicit institutional mechanisms for addressing ensuing agency problems. Consequently, the most important innovations in monetary policy since the 1970s - a period that has been accompanied by a remarkable intellectual and practical convergence towards a consensus around the scope and conduct of monetary policy, as well positive macroeconomic outcomes⁶⁰ – are institutional in nature. These include the specification of clear goals and targets for monetary, the establishment of mechanisms to ensure operational independence for the monetary authority, the embrace of rule-based policy frameworks to enhance consistency and transparency, and greater emphasis on transparency in the conduct of monetary policy.

A detailed literature has emerged on each element of the consensus and surveys of this body of work feature subtle variations in emphasis. However, hardly any monetary economist or central banker today would quibble with the following six elements of the modern monetary consensus:

- (i) The primacy of *price stability as the long-run objective of monetary policy*, coupled with an understanding of the contribution monetary policy can make to reducing output fluctuations;
- (ii) The desirability of *central bank independence* in monetary policy, understood as “instrument” or “operational” independence, while retaining goal dependence;
- (iii) The expression of the central bank’s objectives in terms of *explicit policy targets* (or nominal anchors);

⁶⁰ Some observers are concerned that the hard-won battles that led to instrument independence and rule-based policymaking have already been forgotten (Taylor, 2010). Alternatively, one could argue that the fact that neither deflation nor rapidly rising inflation has occurred – and that inflation and inflation expectations have remained anchored around most central banks’ implicit or explicit targets, despite the biggest financial crisis since the Great Depression and unprecedented monetary and fiscal easing, is a further indication of remarkable advances in monetary policy.

- (iv) The use of *contingent rules*, which incorporate forward-looking information on the expected state of the economy, to achieve policy objectives and targets;
- (v) The importance of *institutionalising the credibility* of the central bank;
- (vi) The need for *accountability* in the monetary policy framework of instrument independent central banks, with a resulting focus on *transparency*.

This list is very close to that compiled by Mishkin (2000), but makes the two uncontroversial additions of contingent rules and credibility.⁶¹ The omission of these two elements by Mishkin is simply a matter of organisation. The author does stress the importance of credibility, but under the discussion of nominal anchors (as have other synthesising contributions, such as Blinder, 2000; Friedman, 2002 and Goodfriend, 2007). Similarly, the case for rules – with a critically important understanding of the desirability of their contingent nature – is no longer controversial, as evidenced by the detailed discussion of rule-based monetary policy in other synthesising articles on modern central banking (Bernanke, 1994; Cecchetti, 1998 and Woodford, 2002). While there is still some debate in monetary economics around the relative weight applied to “rules versus discretion”, this traditional distinction has been considerably softened by an emphasis on contingent (or “state-dependent” or “feedback”) rules. Mishkin himself has acknowledged the consensus around the desirability of contingent rules, linking it to the idea that central banks operate under principles of “constrained discretion” (Mishkin and White, 2014). The remainder of this chapter will assess the applicability of these six elements of the modern monetary consensus to the design of policy rules and institutional arrangements for central banks.

5.2.1. Policy objectives and institutional mandates

A binding theme in the modern monetary consensus is the emergence of a broad agreement around the appropriate goals of monetary policy. Greater clarity around both the power and limits of monetary policy informed other institutional aspects of the consensus. The consensus reflects the understanding that monetary policy cannot affect (and therefore cannot target) real variables in the long run; and that the most significant contribution of monetary policy is the achievement of price stability (understood as low and stable inflation). The modern consensus also recognises that monetary policy can contribute to

⁶¹ Mishkin adds that a “central bank should also have the goal of financial stability,” which is a valid and uncontroversial addition in the context of the role of central banks in generally, but falls outside the core focus on monetary policy (although the role of monetary policy in financial stability has reemerged as a more point of debate in the aftermath of the 2008 global financial crisis).

reducing fluctuations in real variables (output and unemployment) in the short run and therefore can be used in part to stabilise short-run output fluctuations, albeit in a rule-based counter-cyclical manner (for reasons discussed below). This understanding was achieved long after Milton Friedman (1968) famously warned that “the danger of assigning to monetary policy a larger role than it can achieve [is] preventing it from making the contribution it is capable of making.” But Friedman’s insight would prove remarkably prescient in understanding, first, that monetary policy is a powerful tool; and second, that misdirecting that power compromises its effectiveness.

Advocates of sovereign wealth funds and of a particular set of institutional arrangements for these funds cannot (yet) rely on a comparable broad-based consensus. However, as is the case in monetary policy, debates around the objectives of institutions tasked with managing resource revenues, can rely on decades’ worth of empirical evidence and practical experience. As discussed in Chapter 4, the emergence of sovereign wealth funds can be understood as a response to long-observed problems in resource-rich countries. As discussed in Section 1, the findings of the resource-curse literature are varied, but a stylised list of problems in resource-dependent economies can inform the scope of sovereign wealth funds:

- **Volatility and pro-cyclicality:** the exceptionally volatility of commodity prices is well documented (Jacks *et. al.*, 2011; and Hamilton, 2009). Consequently, countries dependent on resources for fiscal revenue and export earnings, are exposed to greater volatility in their fiscal policy, balance of payments and business cycles; and have a documented tendency towards pro-cyclical fiscal policy.
- **Dutch disease:** resource booms can result in a (temporary) loss of export competitiveness due to an appreciation of the real exchange rate and an demonstrably inefficient allocation of capital and other factors of production.
- **Weak institutions and political economy challenges:** that there is a negative correlation between resource abundance and institutional quality is not controversial (Mehlum *et. al.* 2006 and Robinson *et. al.* 2006). As discussed in Chapter 3, the association of resource windfalls with rent-seeking behaviour, public investment in “white elephants”, and unaccountable government and fiscal practices is well documented.
- **Intergenerational equity and the sustainability of public spending:** sovereign wealth funds are a mechanism through which to achieve a degree of intergenerational equity in the allocation of revenues derived from exhaustible or finite natural resources. The concern here is both moral (is it fair that the proceeds from finite resources are allocated to a particular generation alone?) and practical (can the level of public spending enable by a resource boom be maintained both across the commodity cycle or more long-term once resources are depleted).

An understanding of how these problems map into a clear institutional mandate for sovereign wealth funds is not (yet) as widely accepted today as the price-stability objective is for modern central banks with regard to monetary policy. However, the experience of monetary policy suggests a number of valuable philosophical insights. The first is the appreciation from Friedman (1968) that the undeniable contribution of public policies are undermined by exaggerated expectations. It is in the best interest of both the principal and the agent that there is a realistic view of both the power and limitations of certain policies and policy instruments. This understanding takes into account the technical constraints and epistemological limitations of policymakers: Friedman (1968) warned that the promise of attempted “fine tuning” of the business cycle by monetary policymakers had an “evocative” ring to it, which unfortunately bore “little resemblance to what is possible in practice”. Similarly, there is no shortage of grandiose proposals for the tasks sovereign wealth funds should set themselves, many of which bear little consideration of feasibility.⁶²

If the objective of a sovereign wealth fund is to transform volatile and finite revenues from natural resources into a permanent and stable stream of income, saddling the institution with a variety of other mandates – popular additions include financing infrastructure and other public goods and services (such as healthcare and education) – risks undermining the achievement of this narrow, but immensely valuable, task. With a defined focus on the objectives of stabilisation and income-generation, a sovereign wealth fund contributes to social welfare in a number of important ways: it reduces the volatility of government revenues (and fiscal policy more generally), removes a number of the adverse incentives associated with revenue windfalls that result in poor governance and politics, and it lengthens the horizon over which the benefits of natural resources are enjoyed.

In practice, there is a tendency to assign a wide range of policy goals to sovereign wealth funds, alongside those of stabilisation and income generation. As discussed in Chapter 4, many sovereign wealth funds have been tasked with allocating a share of their portfolio to domestic investments with anticipated “social” or “economic” returns rather than purely financial ones. Great care needs to be taken in ranking the relative importance of different mandates, making sure different objectives are very clearly differentiated and articulated, and ensuring that the achievement of ancillary objectives do not compromise the primary objectives of an institution.

⁶² These problems here include, but are not limited to, greatly exaggerated expectations of the sophistication of sovereign wealth fund’s investment models and strategies.

5.2.2. Operational independence

Greater clarity over the appropriate objectives and contribution of monetary policy set in motion institutional innovations that aimed to remove obstacles to their achievement. The most fundamental of these is the near universal acceptance of the benefits of operational independence in monetary policy. The case for operational independence rests on insights about the political difficulties of avoiding various inflationary biases when the monetary authorities are simultaneously tasked with achieving other policy objectives, particularly when they face incentives to stimulate output and employment in the short run. These biases arise under assumptions of perfectly benign intentions on the part of policymakers.

Kydland and Prescott (1977) identified a dynamic inconsistency that arises from the divergent long- and short-run effects of monetary policy on the real economy, which means policymakers are confronted with an exploitable short-run Philips curve and long-term monetary neutrality. Rational public expectations recognise that the monetary authorities have an incentive to exploit the short-run trade-off between inflation and output once low and stable inflation has been achieved. In a dynamic setting, however, this raises long-run inflation expectations and observed inflation above the socially optimal level (and raises the cost of achieving price stability). More immediately intuitive examples of inflationary biases are based on assumptions of outright malevolence on the part of government, such as inconsistent behaviour across the political business cycle (Nordhaus, 1975) and the generation of an inflation tax due to the pursuit of seigniorage revenue (Alesina and Summers, 1993).

The case for the operational independence of monetary authorities is based on the belief that independence enables a more credible commitment to prudent behaviour that resists these biases. The operationally independent central bank is conceived of as a technocratic institution, capable of resisting the public and political pressures that results in higher than optimal inflation: with a primary objective narrowly defined as the achievement and maintenance of price stability, independent authorities are not as likely to be tempted to unduly exploit short-term trade-off and help ensure that public expectations of inflation remain anchored.

Similarly, the operational independence of the authority managing the sovereign wealth funds builds on belief that the investment of resource revenues may be subject to similar biases unless it is insulated from the political process. Empirical evidence has demonstrated that political intervention in the investment processes of public funds compromises investment performance (Carmichael and Palacios, 2003; Mitchell and Hsin, 1997; Useem and Mitchell, 2000). More specifically, empirical investigations of sovereign wealth fund investment behaviour have identified that politically motivated domestic investments and direct political representation in their management structures lower returns (Chhaochharia and Laeven, 2009; Dyck and Morse, 2011; and Bernstein, Lerner and Shoar, 2013). Concerns over the effects of political influence on sovereign wealth funds' investment decisions have been raised in a more theoretical sense by other scholars (Ang, 2010 and Das *et. al.* 2009). Bernstein *et. al.* (2013) contains a number of important findings and observations. The authors suggest that "the more closely sovereign wealth funds are exposed to political influences, the more they might show major distortions from long-run return maximisation", while "political involvement can either lead to misguided policy attempts to prop up inefficient firms or industries or [lead sovereign wealth funds to] engage in investment activities in industries, sectors or geographies that are 'hot'".

Political biases manifest in a number of ways in the investment process of sovereign wealth funds (and other public investment institutions). First, from a theoretical perspective it is easy to understand how lower returns are generated by the misalignment between the short horizons of politicians and the longer horizons that sovereign wealth funds should assume in order to generate higher average returns. Models of distortions and misaligned incentives caused by the sub-optimally short horizons of politicians have many applications, building on the work of Nordhaus (1975). The adverse effect of short political horizons on long-term investment in resource-rich economies has been studied extensively (Gelb *et. al.*, 2002). Institutional arrangements that incentivise and ensure long-term horizons are, therefore, valuable.

In the specific area of portfolio management, a large body of research has demonstrated that while various rule-based investment policies and strategies, such as dynamic portfolio rebalancing, raise expected long-run returns, most investors have shorter *de jure* or *de facto* time horizons than those required for these approaches to pay off, thus limiting investors' ability to exploit these opportunities (De Long *et. al.*, 1990; Shleifer and Vishny, 1990). For sovereign wealth funds, political and public pressures can drive undue

short termism, absent appropriate institutions that incentivise assessing investment objectives and performance over a longer horizon.

Political interference can result in “trend chasing”. Trend-chasing investors have been variously described as “naïve” (Lakonishok, Shleifer and Vishny, 1994), “popular” (Shiller, 1984) and “noise” (Black, 1986) investors, with the common characteristic being that they “tend to get overly excited about stocks that have done very well in the past and overinvest in them, so that these ‘glamour’ stocks become overpriced” (Lakonishok *et. al.*, 1994). Political interference in the investment process makes trend chasing more likely for two reasons. On the one hand, politicians may apply undue pressure to pursue investments in prestige assets for political expedience and stature. On the other hand, sensitivity around political risk and exposure may result in an overly cautious or bureaucratic investment process, whereby even when trends are detected in a timely manner, organisational inertia results in “buying high and selling low”.

Finally, particularly in the context of a potential lack of clarity around the goals of sovereign wealth funds, political influence may advance the pursuit of non-financial objectives, either implicitly or explicitly. In addition to generating political and regulatory concerns on the part of recipient countries of sovereign wealth fund, such pursuits are also likely to undermine long-term investment performance, particularly if politicians to favour “pet projects” that deliver high political returns, rather than financial returns (or social utility, more generally). This risk is more pronounced if the sovereign wealth fund is to invest in the domestic economy, where the potential for investments with high political returns is significant.

The discussion of the incentive and governance problems around domestically and developmentally orientated sovereign wealth funds speaks directly to the frequent suggestions that these funds to assume a more explicitly developmental function. Collier (2012) and Santiso (2008), for example, have proposed that developing countries should eschew more conventional sovereign wealth fund models in favour of “sovereign development funds” that provide public goods. While the merits of this proposal can be debated from a number of angles, it is uncontroversial to state that political pressure and direction could have a negative impact on the incentives under which a sovereign development funds operates – just as it does for other institutions and instruments of public investment, such as development banks, state-owned enterprises and conventional fiscal spending and investment channels.

It has been suggested that sovereign wealth funds could act as catalytic “anchor investors” in the development of nascent domestic debt or other capital markets, as environmental saviours that provide funding for long-term investment in clean technologies and infrastructure (Stiglitz, 2012 and Guérin, 2013), and even as a potential “buyers of last resort” during the Eurozone debt crisis (Verma, 2012). There have also been concerns that sovereign wealth funds could be used as instruments of foreign policy or international relations (Summers, 2007 and Kimmit, 2008). All of these potential non-commercial ancillary objectives of sovereign , whether advocated or feared, raise the spectre of political influence, and risk transferring the political-economy and incentive-based problems associated with the management and investment of resource revenues out of the budget process by simply transferring it to the management of the sovereign wealth fund.

Of course, there is no guarantee that the operational independence of sovereign wealth fund will guard against the above-mentioned biases – just as there are no guarantees that an independent central bank will always succeed in avoiding dynamic inconsistencies. Moreover, the government is by no means the only threat to prudent policy behaviour. Faust (1996) has argued that the appointment of technocratic boards to conduct monetary is, at least in part, a solution to concerns that “rule by majority” would result in distributional struggles between debtors and creditors (and different income classes), which that could undermine monetary prudence. A sovereign wealth fund is similarly subjected to the popular pressures from social agents with heterogeneous preferences around the trade-offs between saving and spending, and long-term returns and short-term stability. However, as observed by Alesina and Summers (1993), central bank independence contributes to reducing political pressure (both from the government and the public) that biases policy towards inflation. The granting operational independence to a sovereign wealth fund, if complemented by additional “commitment technologies” and appropriate transparency and accountability arrangements, can significantly contribute to the mitigation of similar biases.

5.2.3. Institutionalising credibility

The central importance of credibility on the part of policymakers is a cornerstone of modern monetary consensus. The theoretical work of the 1970s and the subsequent experience have greatly contributed to the realisation that an *ex ante* commitment to price stability alone lacks credibility, because the monetary authorities have an incentive to renege on their commitment and exploit the short run trade-off between

inflation and output, *ex post*. The emphasis on the credibility of central banks arises in large part due to the endogeneity of inflation expectations and price- and wage-setting behaviour to the monetary policy process. This introduces a game-theoretic relationship between the central bank and wage- and price-setters. In order to avoid self-fulfilling inflationary spirals and reduce the cost of maintaining price stability, price- and wage-setters need to believe the monetary authorities will do what they say they will do, rather than renege on previous promises. Absent credibility, the public constantly second-guesses the future behaviour of policymakers, raising the cost of price stability by requiring higher interest rates in equilibrium.

The potential role of sovereign wealth funds and fiscal rules in managing public expectations and the behaviour of economic agents in the context of commodity-driven volatility have not been discussed much in the literature. However, there are a number of channels through which agents would respond positively to the actions and credibility of a sovereign wealth fund. The resource curse literature has identified a causal relationship running from the prevalence of corruption, rent seeking and volatility in resource-rich countries to the observed low levels of investment, particularly of a long-term nature in these economies (Mehlum *et. al.*, 2006). A sovereign wealth fund may contribute to removing the incentives and scope for corruption and rent seeking, while their role in reducing volatility is uncontroversial. The fiscal rule introduced and discussed in Chapters 7 and 8 of this dissertation, as well as other rule-based policies that use sovereign wealth funds as a means to reduce the volatility of government spending, can contribute significantly to the management of medium- to long-term expectations by private agents in resource-dependent economies. However, to change expectations and behaviour in a meaningful way, the sovereign wealth fund and the accompanying fiscal framework will need to achieve high levels of credibility. In the absence of such credibility, agents anticipate that the government will renege of its *ex ante* commitments to fiscal stability by saving an insufficient portion of revenues in “boom” periods, drawing down on assets unsustainably during “bust” periods and deviating from a pre-committed spending path.

An additional reason to emphasise the importance of credibility is more generic: sovereign wealth funds will, by design, be subject to considerable volatility, resulting both from their inherently volatile source of funding (under most fiscal models involving sovereign wealth funds, the volatility of commodity-based revenue and spending patterns are simply transferred from the budget to the funds – volatility does not

magically disappear) and their investment behaviour. With respect to the latter, note that an appropriately mandated and incentivised sovereign wealth fund (particularly a saving or investment-income type fund) will adopt a long-term and often countercyclical investment model – which allows it to harvest volatility premiums that other, more short-term investors are simply unable to.

Thus, these funds *should* go through periods (sometimes lasting a number of years) of lower and even negative returns. In all cases, political and popular support will be essential to the sovereign wealth fund's effectiveness or even its survival. Credibility and the ability to demonstrate that periodically lower investment returns are the result of exogenous market swings (to which the fund *wants* to be exposed in anticipation of higher long-run returns), rather than discretionary policy mistakes by the fund's managers are critical in the fund's defense from inevitable attacks. Chapter II outlines how sovereign wealth funds can employ a number of established rule-based investment policies to, first, avoid behavioural tendencies towards dynamic inconsistencies; and, second, protect themselves from attacks during periods of volatility and low returns.

An important lesson from monetary policy for sovereign wealth funds is the emphasis on institutionalising – that is, de-personalising – credibility. In monetary policy there is a long-standing debate around the degree which credibility is, can and should be centered around individuals or in a more elaborate institutional and rule-based policy framework. Alan Blinder (1997) famously argued that central bankers did not require rules and other “precommitment strategies” to achieve low inflation. Rather, all that was needed was the will to do the right thing, following which central bankers could “just do it”. According to Du Plessis (2003) this view “disregards a fundamental insight of the institutional literature, i.e. that the benign decisions of any particular policymaker, or succession of policymakers offer no confidence that the next policymaker would continue in similar vein”. Vesting credibility in an institution – or, more specifically, the rules and principles that it is understood to follow – helps avoids the “cult of personality”. It is not hard to see how such a cult can emerge at a sovereign wealth fund, particularly if the fund investment policies permit a relative high degree of managerial discretion over investments. The investment world is famous for developing cults of personalities around would-be “investment gurus”: a thriving cottage industry exists attempting to replicate the investment philosophies and portfolios of celebrated investors.

A model of how institutionalised credibility can assist in avoiding the cult of personality is found in the leadership succession at the Norwegian sovereign wealth fund. Knut Kjaer, who became reluctant spokesperson for the global sovereign wealth fund community during their emergence into the limelight in 2007, managed the fund since its inception. When Kjaer resigned in 2008 (at a time of great turmoil in the global financial markets), outside observers wondered how the transition to a new chief executive might impact on the fund's investment strategy. Ultimately, however, the transition was a complete non-event: the new chief executive, Yngve Slyngstad, simply stuck to the same rules and principles that guided the fund's investment approach under Kjaer's tenure. The fund has increased its exposure to equities and made its first ever allocations to real estate, but this diversification process – and importantly, the rules and principles that underpinned that process – was already underway before Slyngstad took over. It is unavoidable that the heads of a fund approaching \$1 trillion in assets will attract attention – but the extent of the Norwegian sovereign wealth fund's credibility, vested in the institution's rules and track record, rather than in the individual(s) that manage it, makes reporting on the fund rather boring.

Credibility has a very specific and important meaning in modern monetary policy, informed in large part by the endogeneity of price- and wage-setting behaviour and expectations. Credibility is critically important to sovereign wealth funds as well. In the first instance, a credible sovereign wealth fund removes a number of well-documented obstacles in resource-rich economies to long-term investment by positively affecting expectations around corruption, rent seeking and volatility. Credibility is also important from a political-economy perspective. An established track record of “doing what one said one would” provides essential insurance against political pressure during inevitable tough times. In this context, credibility might be better described as a tool towards “legitimacy” – a concept emphasised by noted scholars of sovereign wealth funds (Monk, 2009 and Ang, 2010). The central banking literature has long since turned the attention from a general emphasis on credibility to specific commitment mechanisms, notably explicit policy targets, operational rules, and accountability and transparency, which reduce the cost of establishing and maintaining credibility. The chapter now turns to the role of these three commitment mechanisms in advancing institutional credibility.

5.2.4. The use of explicit targets

As is the case with credibility, the strong theoretical and practical support for the use of explicit targets in monetary policy is in large part based on the desirability and efficiency of anchoring endogenous inflation expectations. Indeed, the use of explicit targets in monetary policy is widely understood both as a means to achieving credibility and as a benchmark for assessing whether that credibility has been achieved. As Sterne (1999), noted the adoption of explicit inflation targets are critical in “helping to define an institutional relationship between the central bank, the government and the population”. Explicit policy targets are similarly critical to the political economy and institutional relationships surrounding sovereign wealth funds.

Perhaps the most important manifestation of this role is that it clarifies the fact that the government typically sets the policy target, while the delegated institution (the monetary authority or the sovereign wealth fund management authority) is granted freedom and power to achieve it. Explicit rules promote communication and accountability, thereby reinforcing the credibility – or legitimacy – of the delegated institution. Based on a survey of the reasons for central banks’ adoption of explicit targets, Sterne (1999) concludes that “policymakers use explicit targets because they find that it is better to have narrow objectives and explain misses, rather than having imprecise objectives that make success or failure difficult to measure.”

This function of explicit targets has attractive applications for a public investment institution, such as a sovereign wealth fund. The use of various forms of targets is commonplace in the investment industry and there is no shortage of ways in which the investment objectives of a sovereign wealth fund can be clarified through the adoption of explicit investment targets. In the first place, the fund may adopt – or receive from government – an explicit (long-run) target return, expressed in either nominal or real terms. The sovereign wealth fund’s investment policies, decisions and performance can be further clarified by the adoption and disclosure of an investment benchmark (in the form of a well-known index, combination of indexes or reference portfolio), which the fund is expected to track with some acceptable degree of flexibility (in the form of a maximum tracking error). A narrow objective for a sovereign wealth fund could further be given content through the specification of explicit investment targets, as per the following stylised statement: “The fund seeks to achieve an annualised real rate of return of 5%, net of fees. This target is to be achieved

over the long term, due to the volatility implicit in short-term periods. In pursuing this target, the fund is expected to track two index benchmarks: the MSCI All Country World Index (60%) for equities and the Barclays Global Aggregate Bond Index (40%) for fixed-income securities.⁶³ This articulation in fact mirrors the stated investment objectives and targets of the sovereign wealth funds of Norway, Chile and Botswana (to name only a few prominent examples).

A natural progression from targets is to the discussion of a rule-based framework for policy implementation – that is, the game plan devised for hitting those targets. Monetary economics has moved away from stark “rules versus discretion” debates, to a modern understanding of middle ground characterised by contingent or state-dependent rules (and “flexible” inflation targeting). This shift has important implications for the discussion of fiscal rules for resource revenues and the investment rules of sovereign wealth funds, as discussed below.

5.2.5. The use of contingent rules

Economists’ understanding of the respective merits of rules and discretion in the conduct of monetary policy has evolved in the post-war era. Three distinct intellectual developments underline the piecemeal advances in understanding how rules – and in particular what kind of rules – contribute to the credibility of commitments to avoid various inflationary biases, public understanding of the monetary policy process, and the accountability of independent central banks. A major development was the work of Milton Friedman in the 1960s around limits and dangers of activist counter-cyclical policy (and his advocacy of a constant money-growth rule).

Friedman was followed by important contributions in the late 1970s by Sargent and Wallace (1975), Kydland and Prescott (1977) and Lucas and Sargent (1978) that identified incentive-based dynamic inconsistency problems in policymaking. Finally, the work of John Taylor, Michael Woodford and Lars Svensson has led to an important softening of the distinction between “stark” or “mechanistic” rules and discretion. These contributions have underlined the fact that rules – including ones that are fairly simply specified – can take information on the current and expected future state of the economy into account. In

⁶³ Note that this formulation includes some assumptions around the fund’s desired asset allocation and the selection of particular indexes through which to best express the fund’s expected returns.

this jargon of monetary economics, such rules are variously known as “activist”, “feedback”, “contingent” or “state-dependent” rules.

Combined with an explicit policy target, the modern understanding of rules as outlined above constitute what Woodford (2002) calls “principles of systematic conduct for institutions that are aware of the consequences of their actions and take responsibility for them”. Emphasising the fact that contingent rules and explicit targets by no means place policymakers in a straitjacket, Du Plessis (2003) notes that “the adoption of explicit targets has not implied a move to stark rules for monetary policy, but rather a move to a systematic framework for monetary policy that allows flexible implementation and transparent communication of policy decisions.” While the expectations-management aspect of contingent rules are of great significance to monetary policy given the endogeneity of price- and wage-setting behaviour, there are more generic virtues to contingent rules that are relevant to the design of institutional arrangements of sovereign wealth funds. These implications apply to both the fiscal rules that govern the flow of revenues and income to and from the sovereign wealth fund and the investment rules that guide the fund’s investment policies.

With respect to fiscal rules, Chapter 6 describes a number of simple savings rules for transferring a share of resource revenues to the sovereign wealth fund, which range from highly mechanistic (for example, fixed-percentage rules, which apply irrespective of the state of the economy, resource revenues or commodity prices) to less so (for example, reference-price based rules). Similarly, spending rules (flows of assets and income from the sovereign wealth fund to the budget) can be mechanistic (a fixed percentage draw) or contingent (based, for example, on the level of funding needed to maintain a stable government spending path). As noted in Chapter 6, the advantage of mechanistic fiscal rules is their simplicity, clarity and ease of communication, while advantage of more dynamically specified contingent rules is that they can be more stabilising and counter cyclical. A trade-off therefore exists between the benefits simplicity (but functional sub-optimality) of mechanistic fiscal rules for sovereign wealth funds and the management of resource revenues, and the complexity (but superior functionality) of more dynamic, state-contingent rules.

A parallel consideration of the merits of mechanistic versus contingent rules in the area of sovereign wealth funds pertains to their investment policies. As a starting point, it is clear that rule-based investing

in a general sense is widespread amongst well-governed institutional investors, including some sovereign wealth funds. The investment equivalent of a Friedman-like k-percent rule is a very strict adherence to the benchmark, with low or zero tracking error, a standard measure of the extent the investor is allowed to deviate from the benchmark. With innovations in the investment industry in recent years, this kind of mechanistic rule has the benefit, in addition of being constraining (which has obvious attractive properties in certain contexts), is low costs. An index-tracking approach amounts to simply following the market, implying zero or minimal “active management” that seeks to outperform the market. The increasingly widespread embrace of passive, indexed investment strategies – which has long had considerable academic and empirical support – reflect the belief of many investors, both of a retail and institutional variety, that fees for active management (which are typically accrued whether “alpha” or market-outperformance is achieved or not) or investments of “in-house” human capital in pursuit of outperformance are simply not worth the cost.

The following chapter will outline how sovereign wealth funds might implement a number of established rule-based investment policies that strengthens their institutional foundations. However, two important implications from the discussion around mechanistic versus more activist or contingent investment rules should be highlighted. First, the argument for mechanistic strategies is much more compelling in the area of investment than it is for monetary policy. The burden of proof lies with those in favour of a more activist investment approach in pursuit of market-beating returns: a move towards more active strategies raises costs – monitoring costs, trading costs, management fees, technological infrastructure acquisition and maintenance, and investments in human capital – and introduces additional uncertainty into the investment process. Practically, these cost considerations are important for emerging sovereign wealth funds in countries with relatively small talent pools, experience, infrastructure and expertise in investing. A new sovereign wealth fund needs to clear a high hurdle in the form of additional returns in order to justify active strategies, even if they are to be rule based. Over time, a sovereign wealth fund may accumulate sufficient human capital, technological infrastructure and institutional credibility to pursue more skill-intensive active strategies or manage the complex oversight and manager-selection processes that accompany allocating investment mandates to external managers.

Part of these costs pertain to the need for more extensive governance and institutional arrangements when contingent rules, and particularly strategies that require a degree of managerial discretion, are pursued by

sovereign wealth funds. Even if, as is desirable for all large institutional investors (let alone ones that manage public assets), the allocation to active strategies is governed by a robust rule-based framework⁶⁴, the operation and interpretation of the rule needs to be explained and evaluated. Accountability mechanisms also have to become more elaborate, as the fund's managers have to account (to the Board, political overseers and the general public) for its pursuit of particular strategies and why deviations from benchmarks – which will inevitably be negative on occasion, sometimes for lengthy periods of time – occurred. Finally, active strategies raise the complexity of agency relationships between government, the fund's management and external fund managers.

Ultimately, an overarching lesson from monetary policy is that all rule-based systems that govern processes involving at least some degree of discretion – whether it is the flow of funds to and from the sovereign wealth fund, or its investment policies – perform an important institutional function in both the *ex ante* internal decision making process and the *ex post* evaluation of the performance of an operationally independent public institution. Du Plessis (2003) notes in relation to the role of rules in the evaluation of the monetary policy that “The ‘normal’ behaviour of the central bank as well as its ‘discretionary’ decisions are, accordingly, rendered intelligible, and hence potentially transparent; and if potentially transparent, then potentially accountable.” The case for constrained discretion, encapsulated in contingent rules, rest on the belief that gains can be made from incorporating information about the state of the world (or the commodity cycle or the financial markets), rather than relying purely on a stark, information-less rule. Often policymakers will be granted the power to interpret this information and act according. This is as true for monetary policy as it is for active investing – hence, there will always be flexibility or discretion – in the interpretation and implementation of contingent rules. The existence of the rule establishes a benchmark through which both the policymaker and the public can understand the meaning and implications of the exercise of discretion.

⁶⁴ In designing contingent rules that govern active investment strategies, sovereign wealth funds should bear an important lesson from monetary policy in mind: monetary economists have recognised that specific targeting rules are typically “sub-optimal” in each specific context, but in practice the futile search for “optimal rules” has been replaced by a search for ones that are most robust to various specifications of the economic structure (see especially Svensson, 2002 and 2003). The global financial markets are prone to periodic “regime shifts” and temporary deviations from long-standing structural features and asset correlations – the importance is to identify rules that govern the active allocation process that are robust to various plausible financial conditions and relationships, rather than one that is “optimal” in the strict sense for a particular structure.

5.2.6. Transparency and accountability

In a democratic and open society, the agency relationship established by the devolution of authority in the management of resource revenues requires institutional arrangements that promote and enforce accountability and transparency on the part of the agent. This is an entirely uncontroversial foundational assumption, which then shifts the discussion towards what kinds of institutional arrangements for transparency and accountability are appropriate and most important. In less democratic environments – which clearly characterise the landscape of some sovereign wealth fund, notably in the Middle East – the attention may be less on transparency and broad public accountability, but accountability to political elites (the king, the royal family or a ministry) is nevertheless important.

Note that a number of the other lessons from the modern monetary consensus discussed above support both accountability and transparency. This include the importance of clarifying institutional mandates that clarify what policy and the institutions responsible for it can and cannot achieve; the expression of these mandates into explicit, measurable policy targets; and the adoption of (contingent) rules to guide the implementation and *ex post* and *ex ante* evaluation of policy. The need for (and apparent lack of) transparency and accountability funds has been a major area of focus in both the literature and policy discussions on sovereign wealth funds.

As noted in Chapter 4, this focus emerged from the regulatory concerns expressed by recipient countries of sovereign wealth fund investments, notably the United States, France, Germany and Australia. Most of these concerns emanated from the obscurity that surrounded leading sovereign wealth funds from the Middle East and Asia, which made it impossible to gauge even the most basic facts about these institutions, such as their assets under management; investment objectives benchmarks and target returns; source of funds and use of assets and income (fiscal rules); asset and currency allocations; internal management structures and relationships to their respective government; legal status; and their approach to the exercise of shareholder rights.

These concerns led to a number of frameworks for sovereign wealth fund transparency and accountability, as well as positive assessments of the extent to which sovereign wealth funds were in compliance. The most influential of these was a “scoreboard”, developed by Truman (2008), which listed and ranked the

public information around four aspects of sovereign wealth funds: (i) structure, (ii) governance, (iii) transparency and accountability, and (iv) behaviour. The sovereign wealth fund community itself also responded to the rising political and regulatory pressure by convening the International Working Group of Sovereign Wealth Funds (later renamed as the International Forum of Sovereign Wealth Funds). Amongst the goals of this body is establishment of – and subsequent periodic evaluation of compliance with – a set of 24 “voluntary best practices”, formally known as the Generally Accepted Principles and Practices, but more commonly referred to as the Santiago Principles after the city where they were adopted.

Of interest to the discussion in this chapter is the scope and content of these two sets of transparency and accountability measures. There are striking similarities overlap between the accountability and transparency aspects of the Truman scoreboard and the Santiago Principles, as shown in Table 5.1. (note the exact language is paragraphed for the sake of brevity), but also some differences in emphasis. Truman’s primary concern is that the potential impact of sovereign wealth funds on global financial markets cannot be anticipated due to their lack transparency, hence his heavy and granular focus on investment practices. The scoreboard lists 25 questions across the four categories, for which the results of simple “yes/no” answers are collated to create a score out of 25.

The Santiago Principles are, in turn, primarily concerned with addressing concerns over state-ownership of sovereign wealth funds and their potential use for non-commercial objectives, hence their emphasis on governance and accountability arrangements, as well as high-level data disclosure (rather than specifics about investment holding and performance). Truman’s criteria are more granular and specific, while the Santiago Principles are broader and leave more scope for local interpretation. Where Truman, for example, specifies annual and quarterly reporting cycles, the Principles uses language such as “in a timely fashion”; where Truman asks for a “clearly specified” rule around the use of assets and income, the Principles suggest the disclosure the “general approach to withdrawals from the sovereign wealth fund and spending on behalf of the government”.

Table 5.1. The Truman and Santiago Principle transparency and accountability criteria

	Truman scoreboard	Santiago Principles
GOVERNANCE AND OBJECTIVES		
Roles and responsibilities	Is the role of the government, governing body and management clearly stated?	The governance framework should establish a clear and effective division of roles and responsibilities in order to facilitate accountability and operational independence.
Accountability framework		The accountability framework should be clearly defined in the relevant legislation, charter, other constitutive documents, or management agreement.
Legal framework and status	Is there a clear legal framework?	Key features of the SWF's legal basis and structure, as well as the legal relationship between the SWF and other state bodies, should be publicly disclosed.
Functions and objectives	Is the SWF's objective clearly stated?	The policy purpose and objectives of the SWF should be clearly defined and publicly disclosed.
Non-commercial objectives		Non-economic and non-financial investment considerations should be clearly set out in the investment policy and publicly disclosed.
FISCAL RULES		
Saving rule/mechanism	Is the source of the SWF's funding clearly specified?	The source of SWF funding should be publicly disclosed.
Spending rule/mechanism	Is the nature of the subsequent use of the principal and earnings of the fund clearly specified?	The general approach to withdrawals from the SWF and spending on behalf of the government should be publicly disclosed.

Continued on the following page

INVESTMENTS		
Investment objectives and policy	Are the fund's investment objectives clearly stated?	A description of the investment policy of the SWF should be publicly disclosed.
Returns/performance	Do reports include information on the returns it earns?	
Type, geography, currency and specificity of investments	Do reports include information on the (i) types, (ii) geography, (iii) specificity, and (iv) currency allocation of investments?	
External mandates	Are the holders of investment mandates identified?	
Risk management		The general approach to the SWF's risk management framework should be publicly disclosed.
REPORTING AND AUDITS		
Annual and quarterly report	Does the SWF provide annual and/or quarterly report on its activities and results?	An annual report and financial statements on operations and performance should be prepared in accordance with recognised international or national accounting standards.
Audit reports	Is the SWF subjected to a regular audits; are these audits published and independent?	The SWF's operations and financial statements should be audited annually in accordance with recognised international or national auditing standards in a consistent manner.
High-level financial disclosure	Do regular reports on the investments by the SWF include the size of the fund?	Relevant financial information should be publicly disclosed to demonstrate its economic and financial orientation to contribute to international financial stability and enhance trust in recipient countries.
General data disclosure		The relevant statistical data pertaining to the SWF should be reported on a timely basis to the owner, or as otherwise required, for inclusion where appropriate in macroeconomic data sets.

Demands and expectations for sovereign wealth fund transparency arise from three sources. First, in line with the philosophy behind the accountability test and scores for central banks proposed by de Haan, Amtenbrink and Eijffinger (1998), is an argument about addressing the “democratic deficit” that potentially arises from institutional independence: “a delegation of powers to unelected officials can only be acceptable in a democratic society if...(independent policy institutions) are one way or another accountable to democratically elected institutions” (de Haan *et. al.*, 1998). Second, and more specific to sovereign wealth funds, are demands for transparency in particular, imposed by the international regulatory community or unilaterally by recipient country governments and financial supervisors. Finally, sovereign wealth funds, particularly when embedded a clearly communicated rule-based fiscal framework, can enhance transparency, accountability and predictability in the management of resource revenues – the absence of which is widely theorised as associated with the resource curse, as discussed Chapter 3.

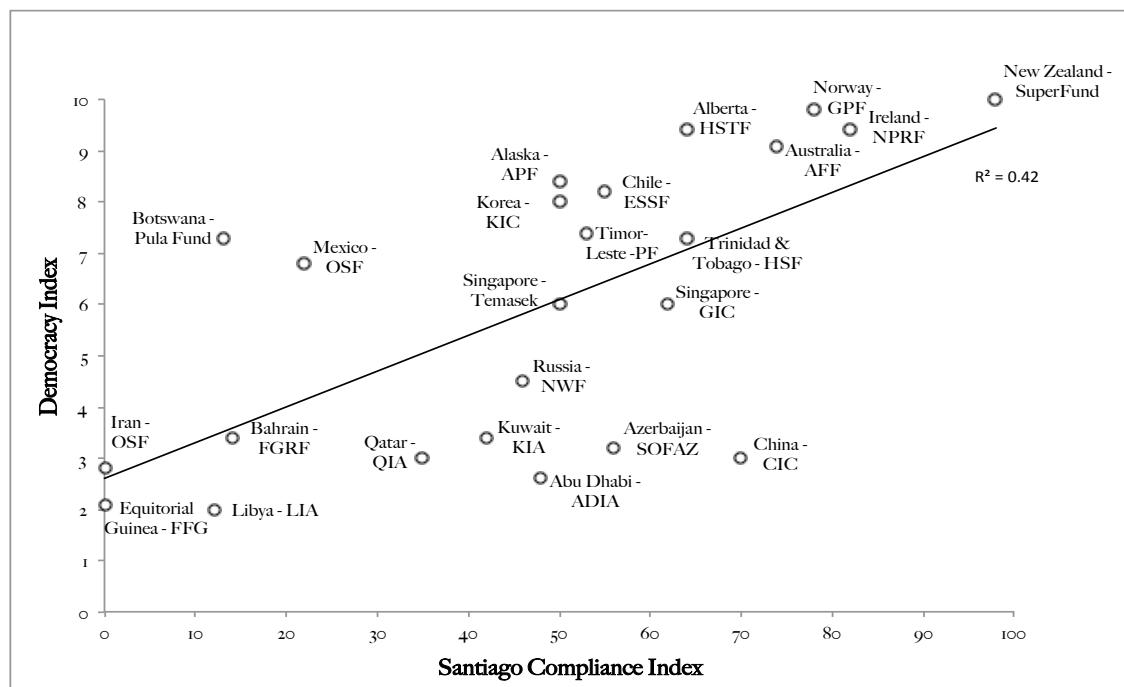
Table 5.2: The first Truman Scoreboard – selected resource-based SWFs

	Structure	Governance	Transparency & Accountability	Behaviour	Total
Norway Government Pension Fund - Global	7.50	4.00	10.50	1.00	23.00
Timor-Leste Petroleum Fund	8.00	2.00	11.75	0.00	21.75
Alberta Heritage Savings Trust Fund	7.50	3.00	9.00	0.00	19.50
Azerbaijan State Oil Fund	5.00	2.00	9.50	0.00	16.50
Chile Economic and Social Stabilisation Fund	7.00	2.00	6.50	0.00	15.50
Botswana Pula Fund	5.50	2.00	7.00	0.00	14.50
Kazakhstan National Oil Fund	6.00	2.00	6.50	0.00	14.50
São Tomé & Príncipe National Oil Account	8.00	2.00	2.25	0.00	12.25
Trinidad & Tobago Heritage & Stabilisation Fund	6.50	2.00	3.75	0.00	12.25
Kuwait Investment Authority	6.00	3.00	3.00	0.00	12.00
Russia Stabilisation Fund	4.00	2.00	3.50	0.00	9.50
Kiribati Revenue Equalisation Reserve Fund	5.00	2.00	0.50	0.00	7.50
Mexico Oil Income Stabilisation Fund	5.00	0.00	2.00	0.00	7.00
Venezuela National Development Fund	1.50	0.50	4.00	0.00	6.00
Iran Oil Stabilisation Fund	4.00	1.00	0.50	0.00	5.50
Venezuela Macroeconomic Stabilisation Fund	3.00	0.50	2.00	0.00	5.50
Oman State General Reserve Fund	3.00	0.00	2.00	0.00	5.00
Algeria Revenue Regulation Fund	3.00	1.00	0.50	0.00	4.50
Brunei Investment Agency	1.00	0.50	1.00	0.00	2.50
Qatar Investment Authority	2.00	0.00	0.00	0.00	2.00
Abu Dhabi Investment Authority	0.50	0.00	0.00	0.00	0.50
Total Possible Points	8.00	4.00	12.00	1.00	25.00
Average Number of Points	4.80	1.42	4.02	0.03	10.27

If this improvement is to be achieved, however, it follows that the objectives and operations of the sovereign wealth fund and its fiscal rule are openly communicated. Based on the assessments of sovereign wealth funds in the original Truman scoreboard, reported in Table 5.2, a number of funds fall far short to contributing to greater transparency and accountability (in fact, their secrecy may compound and reinforce the lack thereof), although subsequent Truman scoreboards have recorded improvements by a number of funds (Bagnall and Truman, 2013).

Similarly, Behrendt (2010) noted significant variation in the degree of compliance with the Santiago Principles amongst sovereign wealth funds and demonstrated a correlation between the degree of compliance, not only with the World Bank's Worldwide Governance Indicators and Transparency International's Transparency Index, but also the Economist Intelligence Unit's Democracy Index, which measures countries' electoral processes, pluralism, civil liberties, government functioning, political participation and political culture (Figure 5.1.). As with updates on the Truman scoreboard (Bagnall and Truman, 2013), more recent assessments by Behrendt do, however, note a gradual improvement across sovereign wealth funds in terms of compliance with the Santiago Principles (Behrendt, 2014).

Figure 5.1: Compliance with the Santiago Principles and democracy



Source: Behrendt (2010)

How should the lack of transparency and accountability – and the marginal gains in these areas in recent years – be interpreted? As noted earlier, the first source of demand for sovereign wealth fund transparency and accountability (as with monetary policy) rises from concerns around the democratic deficit of independent authorities. Unsurprisingly, concerns about a democratic deficit are not a powerful driver of demand for transparency and accountability in countries that are not democratic. Second, it is noteworthy that the majority of resource-based sovereign wealth funds that have shown significant improvements in transparency and accountability in recent years, as measured by Bagnall and Truman (2013), are from broadly democratic countries, such as Canada (Alberta), the United States (Alaska), Chile, Trinidad & Tobago, and Mexico.

Botswana is an exception as a country that is broadly democratic, but whose sovereign wealth fund has maintained a low transparency and accountability score; while the funds of Kuwait, Abu Dhabi and Azerbaijan have significantly improved their measured transparency and accountability scores, without becoming more democratic (the same observation applies to the large non-resource based sovereign wealth funds from China and Singapore). The pattern of improvement amongst the less-democratic group, therefore, appears to be more in response to the second source of demand for transparency and accountability – international regulatory pressure (this conclusion is intuitive, as a regulatory backlash against these funds would be a major commercial threat to these large funds, which invest hundreds of billions of dollars in global capital markets).

One final observation regarding sovereign wealth fund transparency and accountability pertains to the type of openness that might be regarded as most important and impactful. Another way to cast this question is: are there demands for transparency that can be damaging and are, therefore, legitimately resisted by sovereign wealth funds? Note that similar questions have been raised by leading central bankers and monetary economist in their field (Cukierman, 2007; Cruyssen, Eijffinger and Hoogduin, 2008; Ehrmann and Fratzscher, 2008; and Dincer and Eichengreen, 2014). When the most important contributions of sovereign wealth funds are believed to be in advancing stability and predictability in the management of volatile natural resource revenues, in providing a degree of separation in their management from the political progress, and in transforming a depleting asset (natural resources) into a sustainable and permanent one (a financial endowment), the most important elements of the previously

discussed frameworks (see Table 5.1.) are those pertaining to “governance and objectives” and “fiscal rules”, rather than, for example, high-frequency investment reports, such as quarterly reports. As Truman (2008) himself noted in regards to his demand for quarterly investment reports, “views differ on the desirability of quarterly financial reporting. Some argue that it promotes too much focus on short-term returns.”

Here, the importance of incentive compatibility and coherence with the institutional matrix, identified in Chapter 2 as important characteristics of sound institutional design, enter the discussion. Simply put, the majority of sovereign wealth funds – particularly relatively new ones – still rest on flimsy institutional and political foundations, and are subject to frequent political attacks. Clearly, poor short-term investment returns, which are to be expected from long-term investors, can be a source of ammunition for opportunistic opponents of a sovereign wealth fund. These concerns are less pressing in contexts where other elements of the institutional matrix are already supportive of the role of sovereign wealth fund (such as as the rule of law, rule-based fiscal policy and traditional of respecting the independence of accountable economic institutions), as they are, for example, in Norway and Chile.

A consideration of the appropriate horizon for transparency and accountability is also warranted. Sovereign wealth funds with long-term investment horizons associated with saving and investment mandates should have multi-year, if not multi-decade, investment horizons. As discussed in greater detail in the following chapter, the full and appropriate exploitation of this horizon suggests, and even requires, significant exposure to short-term volatility. A consistent theme in the finance literature relating to long-term investment is that this insight is difficult to understand and communicate, and that long-term thinking and a tolerance of short-term volatility is very difficult to incentivise. The question, therefore, is whether an emphasis on high-frequency financial reporting (monthly and quarterly) can be damaging to a nascent sovereign wealth fund, opening it up undue political pressures, absent complimentary elements in the gradually realised institutional matrix; and preventing the establishment of incentives that promote long-termism in investment. In the area of investments, it is likely to be much more important that the sovereign wealth fund is accountable and transparent with respect to such elements as its long-term investment objectives, target returns, investment beliefs, rules and strategies. More generally, it is self-evident that from a broad-based institutional perspective, demands for greater accountability and transparency around sovereign wealth funds’ fiscal rules, ownership and reporting structures (internal and

external governance), and ultimate policy functions and objectives are of a higher-order concerns than whether or not the fund publishes a monthly or quarterly investment report.

Conclusion

This chapter assessed the extent to which the central tenets of the modern monetary consensus may be applied to the institutional arrangements for sovereign wealth funds. In doing so, the discussion frequently returned to the set of common principles for the form and function of sound institutions identified in Chapter 2. The central importance of forward-looking expectations management plays a particularly significant role in the institutional arrangements of the modern monetary policy. This dimension, while not entirely absent in the area of sovereign wealth fund management (as argued throughout this dissertation, sovereign wealth funds and fiscal rules can enhance the stability and predictability around the spending of resource revenues), plays a less central role. Nevertheless, the more generic institutional implications and insights from monetary policy are highly applicable to sovereign wealth funds.

The first is the importance of clarifying institutional mandates and objectives, which are not only important for accountability, but also because it defines the appropriate scope of specific policies and institutions by emphasising their optimal contribution and clarifying which social objectives lie beyond their reach. It was noted that there is currently less agreement around the appropriate objectives and mandate of sovereign wealth funds than there is for monetary policy. It is therefore critical to the process of institutional design for sovereign wealth funds that great care is taken to define, both positively and negatively, exactly what the functions, mandates and objectives of sovereign wealth funds are – not least because this informs all other institutional arrangements.

The management of sovereign wealth funds share with modern monetary policy institutions the characteristics of an agency relationship, established by the granting of operational authority to independent institutions in order to avoid well-known political biases and incentive problems that otherwise result in less stable, predictable and broadly economically conducive policymaking. Operational independence has gained a particular understanding through the theory and practice of modern monetary

policy – notably, it is typically accompanied by goal dependence, and an elaborate set of complementary institutional arrangements that promote accountability and transparency. The discussion of two major initiatives aimed at advancing the cause of sovereign wealth fund transparency – the Santiago Principles (along with independent assessments of funds' compliance with the principles) and the Truman scoreboard – revealed a high degree of variation in terms of sovereign wealth fund transparency. The more general national political environment, unsurprisingly, explains a significant part of this variation (particularly the extent to which host governments are regarded as being democratic), although there is evidence that sovereign wealth fund transparency, in general, is improving (including amongst funds located in less democratic countries).

The chapter also noted the important lesson from the modern monetary consensus for sovereign wealth funds that results from an emphasis on institutionalised credibility – and the adoption of explicit targets and contingent rules as means to reduce the costs associated with achieving such credibility (which in turn also promotes accountability). The institutional framework established in this chapter combined the theoretical insights from institutional economics identified in Chapter 2 with the consensus around the institutions of modern monetary policy. This framework can be used to evaluate fiscal rules and rule-based investment policies that sovereign can (and in certain instances do) use.

SECTION III

RULE-BASED FISCAL POLICIES FOR SOVEREIGN WEALTH FUNDS

Chapter 6

Rule-of-thumb savings:

Simple mechanisms for transferring resource windfalls to sovereign wealth funds

Following heated debate during the 1975 elections, the Alberta Heritage Savings Trust Fund was signed into law in May the following year by the legislature of the oil-rich Canadian province. The fund's architects set it four lofty goals: ensuring fairness to future generations, strengthening and diversifying the economy (particularly through in-province infrastructure investments), improving the quality of life of Albertans, and providing a rainy day fund. These vague and sprawling ambitions, coupled with legislation that left considerable discretion in hands of politicians in determining priorities, set in motion a tug-of-war over the conflicting aims of the fund, which remains unresolved.

The early years of the Alberta Heritage Fund were dominated by an agenda that prioritised “societal objectives” over financial returns, under the provincial government’s economic mantra of “Alberta First”. Investments were targeted at three sectors: commercial loans at subsidised rates to encourage economic diversification; grants for health, education and environmental initiatives; and finally, income-generating investments, which were restricted to 15% of the fund’s total assets. The fund’s performance was decidedly mixed, with the commercial loan portfolio in particular requiring a government subsidy to cover losses (Warrack, 2008; and Murphy and Clemens, 2013). A second problem was chronic underfunding. Due to the emphasis on in-province developmental investments, the fund was not financially self-sustaining by means of investment income. In order to grow the fund – or merely protect the real value of its capital (“inflation proofing”) – regular funding contributions were required, which would have to be increased in the event of losses suffered on the fund’s portfolio. In reality, exactly the opposite occurred: an initial flow to the Heritage Fund of 30% of non-renewable resource revenue was halved in 1982 and ultimately completely suspended in 1987 (Warrack, 2008). Moreover, the Alberta treasury responded to the collapse in energy prices in mid-1980s by drawing down on the fund’s assets to fund public expenditure.

In 1995, the government canvassed public opinion about how to reform the floundering fund through a survey entitled “*Can we interest you in an \$11 billion question?*” Among several policy alternatives, the majority of respondents favoured restructuring the fund into a permanent endowment, which would

be invested to maximise returns and provide a steady source of income to the government, while protecting the fund's capital in real terms. The unambiguous expression of preferences by citizens for long-term savings and income-generation through the fund resulted in a shift away from in-province investments, efforts to ensure greater funding contributions are made and sustainable spending out of the fund (based, using endowment-fund principles, on its real return).

However, these changes remain largely discretionary, with the threat public resentment and the collective memory of the fund's historic mismanagement serving as the primary checks on executive's discretion in all key aspects. For example, there is no specific legal requirement for the government to contribute to the Alberta Heritage Fund; rather, the contributions are made on a discretionary basis each year, authorised by a Special Act" (Murphy and Clemens, 2013). While the plundering of the Heritage Fund has ceased in recent years, the fund's size and contribution to the Albertan economy remains limited. According to an authoritative estimate, the fund has received and retained a mere 5-6% of the province's resource revenues (Murphy and Clemens, 2013).

The history of the Alberta Heritage Fund, particularly when contrasted – as it frequently is – with the sovereign wealth funds of Norway and Alaska (see, for example, Warrack, 2008; Murphy and Clemens, 2013; and Torvik, 2012) provides a number of cautionary tales. First, it underlines the risks involved with potentially conflicting investment objectives, particularly when they are vaguely specified. Second, it demonstrates a simple fact about the long-term contribution of sovereign wealth funds to their associated economies: that a fund (or its management institution) can be rendered ineffective by the absence of robust fiscal (spending and saving) rules. Finally, the Albertan experience demonstrates how a high degree of political discretion – particularly with respect to the aforementioned domestic or developmental investments and fiscal rules – can fundamentally undermine sound intentions surrounding the establishment of a sovereign wealth fund.

These lessons bear repeating, as there is a discernable tendency amongst policymakers worldwide to trumpet the establishment of a sovereign wealth fund – in name and in institutional form – as a major achievement in itself. However, the argument advanced here is that an effective sovereign wealth fund is but a part of broader rule-based fiscal regime. The establishment of a sovereign wealth fund in name, the declaration of lofty objectives and mandates, and the creation an elaborate management structures can

become empty political gestures absent commitments to capitalise these funds in boom periods and refrain from drawing down on their assets in an *ad hoc* manner during bust periods.

This chapter considers a number of rule-based mechanisms for transferring resource revenues to and from a sovereign wealth fund. Such fiscal rules can assume a wide range of institutional characteristics – they can, for example, be explicit or implied, transparent or obscure, and pro- or counter-cyclical. Moreover, they can provide some general form of funding for a sovereign wealth fund with a number of functions (as discussed in Chapter 4, these typically include stabilisation, savings, income generation and domestic investments); or earmark or allocate funds to specific sovereign wealth fund functions.

This chapter outlines four simple rules for accumulating resource revenues in the form of financial assets. These rules, while having the attractive feature of being easy to understand and communicate, have notable shortcomings and offer only a very partial solution to the need for fiscal rules around sovereign wealth funds (focusing only on the savings dimension). Therefore, these simple rules are best understood as sub-optimal “rules of thumb” that guide the possible accumulation of sovereign wealth funds and little else. As discussed in this chapter, despite their obvious shortcomings, many sovereign wealth funds make use of rules of this kind, given their simplicity and the ease of communication they enable.

6.1. Simple accumulation rules for resource-rich countries: a conceptual overview

Accumulation mechanisms for resource-rich countries can be anchored to a number of macroeconomic variables: the consolidated or non-oil/non-resource fiscal balance, the underlying commodity price(s), or as a rule-based or *ad hoc* percentage of total resource revenues. Conditioning the accumulation rule on revenues has the advantage that it incorporates a number of critical factors related to the resource economy, as total resource revenue is a function of both exogenous factors, such as the resource price, and aspects over which policymakers have at least some control, such as production levels, and the taxes, duties and levies imposed on resource extraction (and the efficiency with which they are collected).⁶⁵ An

⁶⁵ In some countries, notably Nigeria, total oil revenues are also a function of the extent of oil theft and sabotage. In Nigeria, these are not trivial factors – the Extractive Industry Transparency Initiative estimated that Nigeria lost \$10.9bn in revenue in 2009–11 due to oil theft, a figure that equates to 10% of reported government revenue from oil over the same period.

accumulation rule anchored on commodity prices bases the savings process on factors that are exogenous to government policies, as governments typically have some control over production and revenue capture, but no influence on market-determined resource prices (unless, as has historically been the case in Saudi Arabia, the producer is so large that it enjoys some pricing power). The decision to anchor the accumulation rule or mechanism on either revenue or price change is at the discretion of policymakers and reflects their preference for exposing the savings process to factors that are endogenous (production levels and tax rates) and exogenous (commodity-price movements) to government decisions.

As noted above, the rules discussed in this section work best as a means towards accumulating financial assets in a sovereign wealth fund. With the exception of the rule based on the financing of the non-resource deficit, none of these rules in any way integrate savings decisions with spending and stabilisation decisions. Moreover, these rules do not provide indications of how accumulated assets may be split between the stabilisation and savings functions of a sovereign wealth fund. Instead, these rules assume a high degree of *a priori* political will and consensus around the desirability of putting aside assets from current spending in order to provision for future spending needs and stabilisation needs.

One way to, therefore, understand the role of these basic rule of thumb savings processes is that they may be an interim step towards a fully-fledged rule-based fiscal framework that links savings, stabilisation and spending policies and rules can be adopted (outlined in the following section). Once countries have accumulated such a critical level of funds (or if they have already done so previously), an integrated and contingent fiscal rule is clearly preferable. If the emphasis is, however temporarily, purely on the accumulation of financial assets, the following four rules are examples of simple accumulation processes through which this may be achieved.

6.1.1. Fixed-percentage transfers

Simple, mechanistic rules transfer a fixed percentage of annual resource revenues to a sovereign wealth fund. If consistently adhered to, such transfers are entirely agnostic to the state of the commodity-price or -revenue cycle, production levels or the economy. A variation of this simple rule may be to introduce some explicit or implied “escape clause” that suspends the rule in response to a negative shock (most obviously a drop in exogenously determined commodity prices). While these rules – particularly in the absence of

escape clauses – are potentially pro-cyclical, as they oblige the government to transfer revenues even in years of unanticipated revenue shortfalls, they have the advantage of being very easy to communicate and difficult to manipulate. Examples of sovereign wealth funds that receive their funding through fixed-percentage saving rules include US state permanent funds, such as the Alaska Permanent Fund and the Wyoming Permanent Mineral Trust Fund, and the Kuwait Investment Authority.

6.1.2. Transfers based on deviations from a moving average

More dynamic accumulation rules may be conditioned on deviations in resource revenues (or resource prices) in a particular year from its moving average of preceding years. For example, if a country receives \$60bn in oil revenues in a given year, having on average received \$50bn in oil revenues in the preceding four years; a rule may specify that the above-average \$10bn should be transferred to a sovereign wealth fund. While this rule has the advantage of hardwiring counter-cyclical properties – transferring more revenues to the fund when prices and revenues exceed the average level of recent years; and *vice versa* – transfers can also be volatile in periods of sharp fluctuations in commodity prices and resource production.

This volatility does not impose significant adjustments to fiscal policy, but may complicate the operations and investment process of the sovereign wealth fund. The rule also imposes some technical challenges and introduces scope for manipulation. First, policymakers need to decide the period and weightings to use in applying the moving average – and can find ways to manipulate the time period and weightings in order to make more resources available for spending rather than transfer to the sovereign wealth fund. Second, the rule can be applied symmetrically, allowing for both in- and outflows from the fund, depending on whether revenues are above or below the moving average; or asymmetrically, with positive transfers to the fund when revenues exceed their moving average, but no outflows from the fund when revenues drop below the average. The Ghanaian sovereign wealth fund's saving mechanism is based on deviations from a moving-average of past prices.

6.1.3. Transfers based on reference prices

Another dynamic and potentially counter-cyclical set of accumulation rules are conditioned on deviations in the underlying commodity (oil) price from a specified reference price. Such reference prices may be

established by the legislature, executive or technocratic (and potentially independent) policymakers, most typically as part of the annual budget process. Under these types of rules, the government commits to transferring excess revenues that arise when the observed commodity price rises above the reference price, resulting in unanticipated windfalls. For example, if the government sets a reference price of \$75 per barrel for oil in the 2014 budget and the average oil price for the year ends up being \$90 per barrel, 20% of revenues are transferred to the sovereign wealth fund at the end of the year. This provides leeway to regularly adjust the accumulation rule by adjusting the reference price, and to pick a conservative, high-accumulation rule (low reference price) or low-accumulation rule (high reference price).

As with preceding rule based on a moving average, reference-price based rules can be applied symmetrically, permitting in- and outflows from the fund, based on positive and negative deviations from the reference price; or asymmetrically, only allowing inflows to the fund when the observed price exceeds the reference price. One important implication is that the strength of the government's commitment to saving is dependent on whether it sets a high or low reference price. This underlines the critical importance of the process and institutions through which the reference price is determined. Additionally, price-based transfer rules define the windfall concept entirely in reference to the exogenously determined price of the commodity, and exclude factors that are at least in part endogenous to outcomes such as the level of production and revenue capture (although, in theory, the rule could also be conditioned not on a reference price, but a reference level of total or resource revenues). The funding of the Nigerian Sovereign Investment Authority's sovereign wealth funds and the State Oil Fund of Azerbaijan are based on a reference price for oil.

6.1.4. Financing of sustainable non-resource fiscal deficits

A number of countries have adopted rules that transfer *all* resource revenues to the sovereign wealth fund, which then in turn transfers an annual amount of funds equal to size of the non-resource fiscal deficit back to the budget. The advantage of this rule is that, if prudently applied (i.e., if the non-resource deficit is sustainable), it will ensure that government spending does not become dependent on resource revenues. In order to be sustainable, such rules need to ensure that the financing of the non-oil deficit through the resource revenues and/or the sovereign wealth fund is not too large.

The most famous example of this rule is adopted by the government of Norway, which limits the non-oil deficit to an amount equal to the expected average long-run real return of its sovereign wealth funds (which it believes is 4%) – that is, the government may run a non-oil deficit equal to 4% of the size of the Norwegian sovereign wealth, which is then financed by a transfer from the fund to the national treasury to balance the overall budget. Adhering to this rule ensures that oil revenues are sustainably consumed. This is a highly effective, if conservative, rule that achieves intergenerational equity in the consumption of the proceeds from a depleting natural asset.

However, one shortcoming of this type of rule is that it cannot be introduced in countries that are already dependent on resources for fiscal revenues, as the non-resource deficit will be very large and, therefore, impossible to finance through the sovereign wealth fund's annual investment income. In Nigeria and Alaska, for example, where oil revenues account for around 90% of total budget revenues, the concept of a non-resource deficit-funding rule is of no practical significance, as the non-oil deficit is impossibly large. Non-resource deficit rules, therefore, only work in the context of significant non-resource revenues. More positively, it can help prevent a country from *becoming* dependent on resource revenue in the first place, if it constrains itself to spending only a small amount of resource rents in the form of real returns generated by the sovereign wealth fund.

The main features, advantages and disadvantages of these four types of rules – as well as countries and funds that make use of rules that follow some version of these rules – are summarised in Table 6.1. Section 6.2 offers an empirical investigation of a counterfactual scenario in which two of the above-mentioned rules are applied to three contrasting oil-dependent countries, Saudi Arabia, Nigeria and Azerbaijan. By analysing how these rules would have worked in a backward-looking fashion, using data on actual oil revenues for the 2004-13 sample period, the exercise identifies the extent of financial assets that these countries *could have* accumulated during this period of generally rising resource prices and revenues.

Table 6.1: Key features of simple accumulation rules

Type of rule	Operation	Advantages	Disadvantages	Examples
Fixed percentage	A fixed percentage of annual resource revenue is transferred to the SWF – for example 10% or 20% of oil revenues.	Easy to communicate and monitor (if data total resource revenues is available, accurate and public).	Rule is mechanistic and does not respond to cyclical state of the economy or commodity prices/revenue – government still has to transfer a portion of revenues in a low-revenue year. ⁶⁶	Kuwait Investment Authority Alaskan and Wyoming Permanent Funds
Deviation from moving average	Revenues are transferred to (and potentially from) the SWF when revenues are above (or below) their multi-period moving averages. Policymakers need to decide if rule is symmetrically or asymmetrically. ⁶⁷	A more dynamic, counter-cyclical rule than the fixed-percentage transfer rule. Does not require transfers to the SWF in periods of low revenues.	Difficult to communicate and monitor, and therefore open to abuse. Can generate volatile transfers to (and from) the SWF, complicating the fund's investment process.	Ghana Heritage Fund Mongolia Fiscal Stabilisation Fund
Reference-price	Revenue transfers are based on deviations from a pre-determined reference price for the underlying commodity.	Can provide strong counter-cyclical force. Also allows government to better plan multi-year public spending programs, as unanticipated surpluses are saved rather than spent.	Rule is constantly open for manipulation in the absence of a binding commitment or institutional arrangement to set prudent (low) reference price. Transfers to the SWF can be very lumpy.	Nigerian Sovereign Investment Authority/Excess Crude Account (informally) State Oil Fund of Azerbaijan
Non-resource deficit financing	The government commits to running a non-resource fiscal deficit that can be sustainably funded by income from the sovereign wealth fund.	If prudently applied, combats fiscal dependence on resources and ensures sustainable consumption of resource revenues (incentises the generation of non-resource revenues).	Requires strong commitment from government to run sufficiently small non-resource fiscal deficit. Cannot be implemented in countries that are already fiscally dependent on resources (but can help prevent a new producer from becoming dependent).	Norwegian Pension Fund Global Timor Leste Petroleum Fund

⁶⁶ Unless a separate “escape clause” is established (in law or implicitly) to suspend transfers to the sovereign wealth fund in low revenue/price periods.

⁶⁷ Rules are symmetrical if outflows from the fund are permitted when revenues fall below average; and asymmetrical when only inflows are permitted.

6.2. Country applications: counterfactuals of the 2004-13 oil boom

The analysis in this section includes two established oil-producers, Nigeria and Saudi Arabia, who experienced an upward trend in revenues over the period (particularly due to a number of windfall years towards the end of the period); as well as Azerbaijan, whose revenues rose sharply, not only due to the upward trend in oil prices between 2000-13 (which also boosted the revenues of the established oil producers) but also due to a sharp increase in oil production over the period. The analysis shows that if countries followed relatively modest savings policies between 2004 and 2013, the accumulation of sovereign wealth fund assets would have been significant. This finding is revealing in its own right, but also have important implications for the analysis that follows in Chapters 7 and 8, where a more contingent rule-based fiscal framework is introduced that combines the transfer decision with the stabilisation and saving functions of resource-based sovereign wealth funds.⁶⁸ As the rules discussed in this chapter are focused exclusively on the savings process, they are best understood as being relevant to a temporary period in which a country accumulates a critical level of initial assets, before implementing the more contingent fiscal rule discussed in Lise and 8.

6.2.1. Historical resource revenues

Data on country-level resource revenues can be calculated based on IMF estimates of the ratio of resource revenues to GDP, which is available at the annual frequency from the Fund's Article IV consultations. In order to get cross-country data on the annual dollar amount of resource revenues, this ratio is applied to estimates of each country's nominal GDP in US dollar at market prices from the *World Development Indicators*. This yields a series of annual data on the total resource revenues, expressed in billions of US dollar for a number of countries for the 2000-13 sample period. In order to ensure accuracy, the data is crosschecked with national sources, where these are available. Table 6.2 shows the annual oil revenues generated by Saudi Arabia, Nigeria and Azerbaijan over the sample period, as well as the average oil price for the years.

⁶⁸ As discussed in Chapters 7 and 8, having a critical level of initial funds reduces the trade-offs involved with implementing savings and stabilisation policies.

Table 6.2: Oil revenues (nominal US\$bn) and average oil price

	Azerbaijan	Nigeria	Saudi Arabia	Oil price (US\$)
2000	0.3	16.2	57.2	30.4
2001	0.2	15.6	49.0	26.0
2002	0.7	12.2	44.3	26.2
2003	0.8	16.3	61.6	31.1
2004	0.9	25.2	88.0	41.5
2005	1.3	34.4	134.5	56.6
2006	3.0	40.0	161.2	66.1
2007	5.0	33.9	149.9	72.3
2008	18.8	53.7	262.2	99.7
2009	12.1	18.0	115.8	62.0
2010	18.2	32.1	178.7	79.5
2011	22.1	56.7	275.8	94.9
2012	20.8	48.3	305.3	94.1
2013	20.6	37.0	276.0	98.0

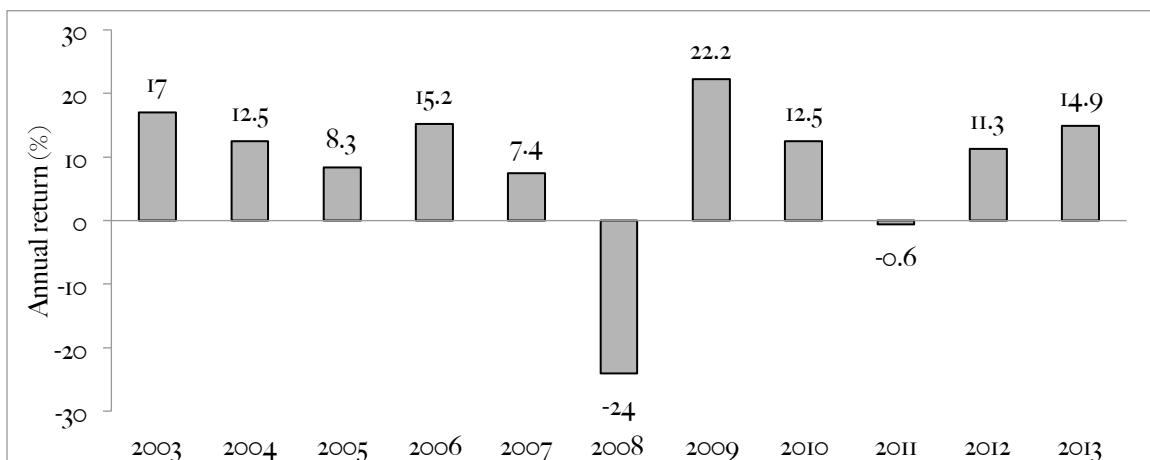
Source: IMF Article IV consultations, national sources and author's calculations. Oil prices are for the annual average for WTI crude oil, as provided by the US Energy Information Agency.

6.2.2. Historic financial market returns

The returns on a diversified global portfolio are a reasonable, low-cost benchmark for sovereign wealth fund investments, and can be therefore be used to approximate a plausible set of investment returns on the accumulated assets. For illustrative purposes, and based on the best available information regarding the asset allocation of sovereign wealth funds and similar long-term institutional investors, it is important to approximate the fund's return through a portfolio is broadly diversified in terms of geography and currency-, asset-class and risk-factor allocations (Avendaño and Santiso, 2011; Megginson and Fotak, 2015). Such a portfolio can be constructed based on the following allocations: 25% in the S&P 500 Index (large market-capitalisation US stocks), 10% in the Russell 2000 Index (small market-capitalisation US stocks), 15% in the MSCI EAFE Index (21 developed markets excluding North America), 5% in the MSCI EME Index (emerging market equities), 25% in the Barclays Capital Aggregate Index (global bonds), 5% in the Barclays 1-3m Treasury (US dollar money markets), 5% in the CS/Tremont Equity Market Neutral Index (global hedge funds), 5% in the Dow Jones/UBS Commodity Index (global commodities) and 5% in the NAREIT Equity REIT Index (a leading proxy for US real estate). Annual returns on this portfolio are shown in Figure 6.1. In order to isolate the impact of investment returns, this

performance will also be compared to a stylised scenario where the fund simply makes a fixed 5% annual nominal return.

Figure 6.1: Annual returns on globally diversified portfolio, 2004-13



Source: Bloomberg

Using this data, it is possible to construct a number of counterfactual scenarios in which government implemented an accumulation rule from the set of simple rules discussed above. Given the procyclical nature of the fixed-transfer rule and the more data-intensive nature of rules based on the non-oil deficit, two simple rules are considered. The first is a moving-average rule under which transfers to the sovereign wealth fund (savings) are based on “upside” deviations in revenue from its four-year moving average. The second is a reference-price rule in which transfers to the sovereign wealth fund are based on upside deviations in the price of oil from a predetermined reference price, so that a percentage of revenues proportional to the percentage difference between the actual price and pre-specified one.

Note that the application of both accumulation rules is asymmetric – the government transfers money *to* the sovereign wealth fund when revenues exceed the moving average or the oil price is above the reference price, but it does not transfer money *from* the fund back to the government when revenues or prices fall. The government does have other policy options for insuring against downside risk to revenues, such as hedging against a drop in oil prices in the option market. For example, the government can secure a floor price by buying options to sell oil at \$60 per barrel. Mexico has adopted this approach to managing downside risks to revenue (Frankel, 2012).

6.2.3. Applying the moving-average rule

Assume that the governments of the countries listed above committed to accumulating foreign assets from windfall oil revenues, starting in the year 2000. In order to determine what constitutes a windfall, the governments calculate the four-year moving average of revenues, and save all revenues arising in any given year in excess of that moving average, starting in the year 2003. Figure A.1. in the Appendix shows the difference between actual revenues and the four-year moving average of revenues for the three countries.

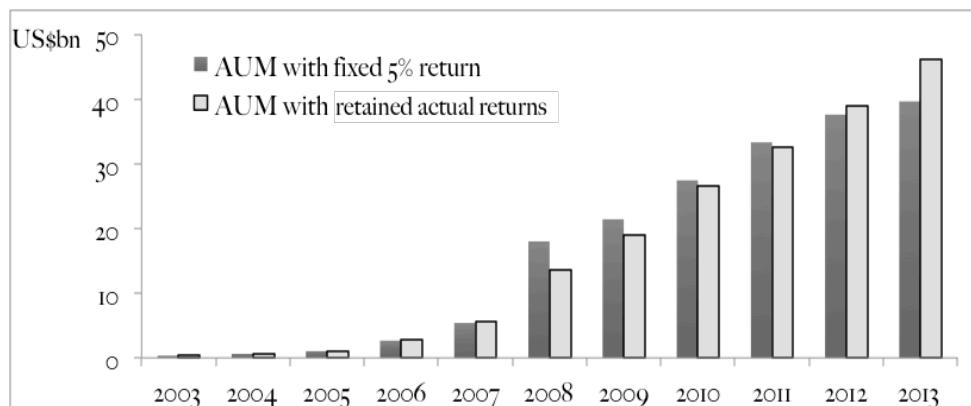
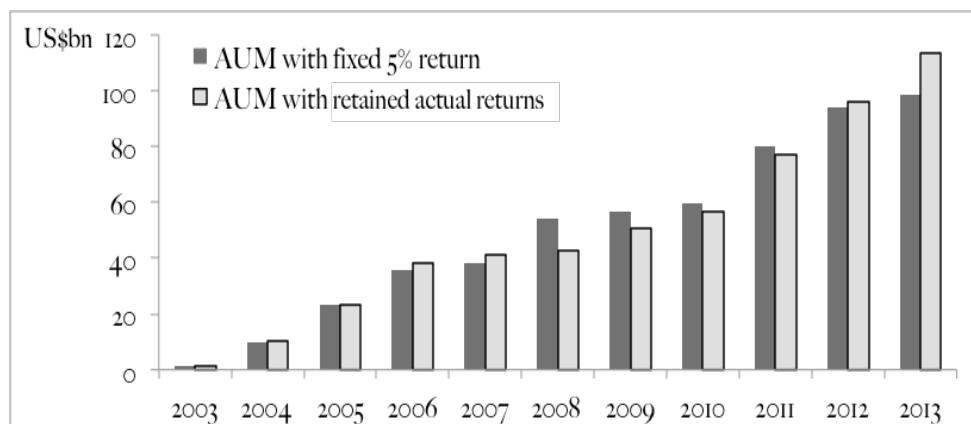
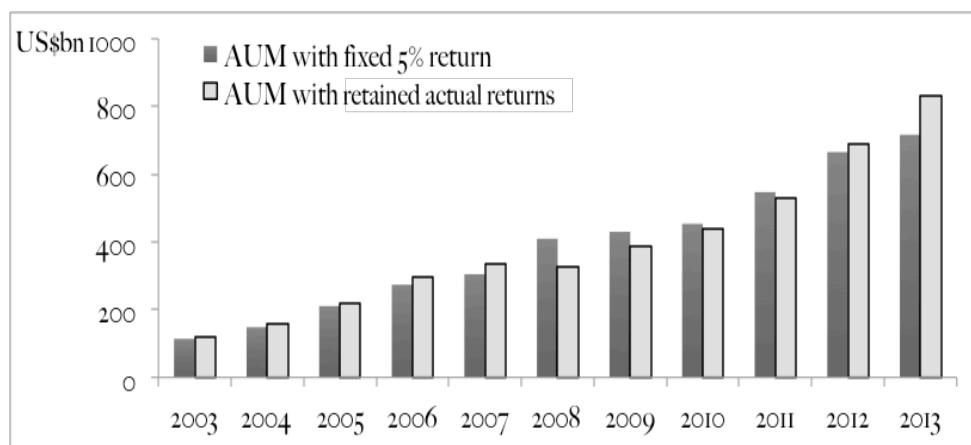
Of course, the government would invest the money transferred to the fund, as (at least during this build-up phase) the sole objective is to accumulate a critical level of financial assets with which to stabilise future revenue volatility and/or create a financial endowment for permanent spending. The fund has no short-term liabilities in this initial accumulation phase, and can therefore invest in a relatively aggressive, risk-tolerant manner, as implied by the choice of the globally diversified portfolio described earlier. For comparison and in order to assess whether the results are in some way biased by exceptional investor returns, the evolution of the funds assuming a fixed 5% annual nominal return is also shown.

Table 6.3: Key indicators of the moving-average rule, 2003-2013

	Azerbaijan	Nigeria	Saudi Arabia
Years yielding positive transfers	11 out of 11	8 out of 11	10 out of 11
Total oil revenues (\$bn)	123.6	395.6	2,006
Total transfers (\$bn)	30.7	72.3	413.0
Implied savings rate	24.8%	18.3%	20.6%
Fund assets by 2013 with fixed 5% return (\$bn)	39.6	98.5	716.5
Fund assets in 2013 with global portfolio return (\$bn)	46.0	113.2	829.7

Note: for Saudi Arabia, the fund starts with initial capital of \$100bn at the start of 2003, as the country had already amassed substantial savings by that point from previous boom periods.

Table 6.3 shows a number of key statistics around the counterfactual application of this rule in the three countries: the number of years between 2003 and 2013 in which the rule yields a transfer to the funds (i.e., revenue is above the moving average), total transfers, total oil revenues, and the implied savings rate generated by the rule; while Figure 6.2 shows the growth in the funds' assets from 2003 to 2013 under the two return scenarios.

Figure 6.2: Accumulated assets under moving-average rule with retained investment income**6.2.a. Azerbaijan****6.2.b. Nigeria****6.2.c. Saudi Arabia**

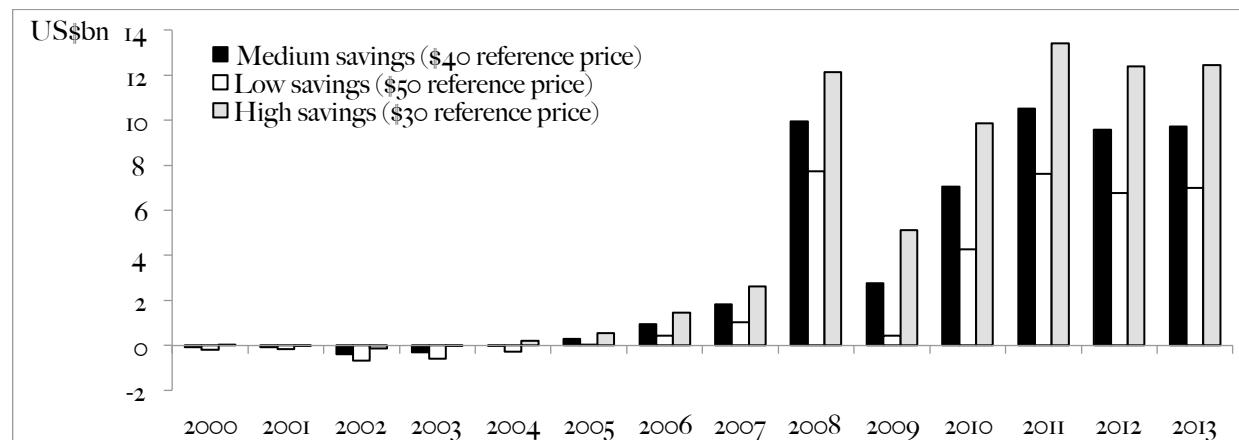
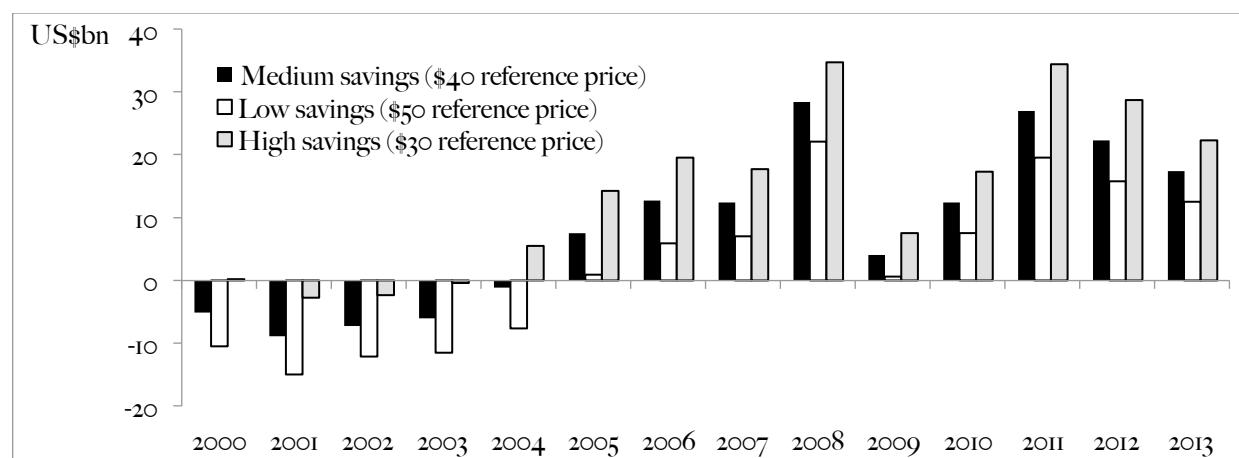
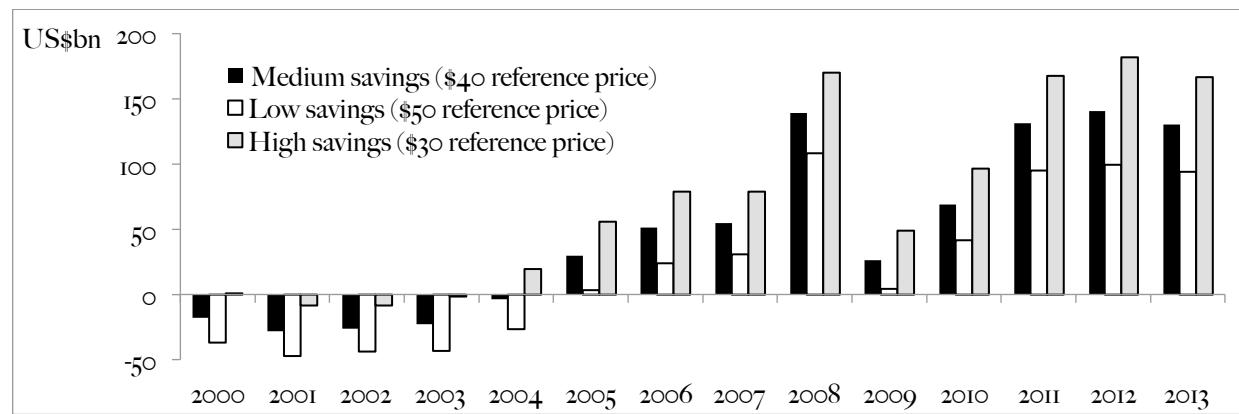
Note: all values are in nominal US\$bn

6.2.4. Applying the reference-price rule

Accumulation rules can also be conditioned on the underlying commodity price, rather than total revenues. It is therefore useful to investigate the implications of a reference-price based rule described above. The key element in determining how conservative any such rule is – and therefore the size of transfers to the sovereign wealth fund – is the choice of a high or low reference price. The choice of a low reference price implies a conservative accumulation rule, and *vice versa*.

To analyse the impact of different reference prices, consider a counterfactual starting from three plausible reference prices, established in 2000: \$30, \$40 and \$50 per barrel, respectively (recall that the observed average price for WTI crude oil for 2000 was \$30.4). In order to inflation-adjust the reference prices, assume that it increases by 2% per annum. \$30 reference price for 2000 yields a \$38.8 reference price in 2013, the \$40 reference price in 2000 equals \$51.7 in 2013, and the \$50 reference price in 2000 equals \$64.8 in 2013. This provides for three inflation-adjusted reference-price paths: (i) a high-savings path, derived from a starting \$30 reference price in 2000; (ii) medium-savings path, starting from a \$40 reference price in 2000; and (iii) a low-savings path, starting from a \$50 reference price for 2000. A saving rule can be specified mandating the transfer of a percentage of revenues to the sovereign wealth fund equivalent to the percentage of a deviation of the actual price from the reference price – that is, if actual oil prices are 10% above the reference price in any given year (for example, \$44 relative to reference price for the year of \$40), 10% of total oil revenues would be transferred to the fund.

The difference for each of the three countries between the actual revenues (based on the observed oil price) and the revenues consistent with these three price paths is shown in Figure 6.3. Note that while Figure 6.3 shows both positive and negative deviations in revenues, the asymmetric version of the rule would transfer assets to sovereign wealth fund only when the values are positive. It is striking that the medium-savings price path (using the \$40 reference price for 2000) does not result in any savings until 2005, given the relatively low oil prices during that period. Excess revenues, arising when prices are above the respective price paths, are dominated by four years – 2008 and 2011-2013 – across all three specifications of the reference price.

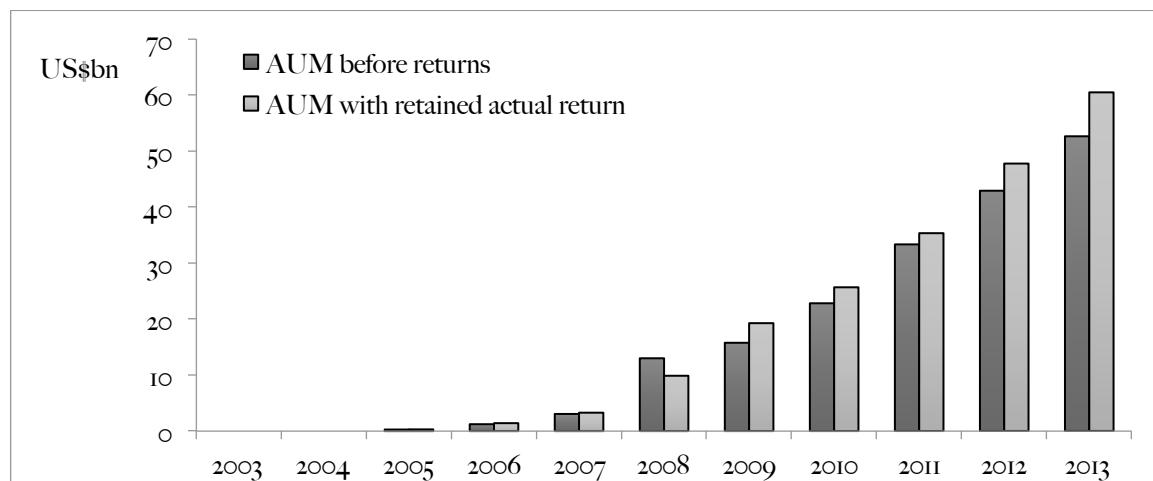
Figure 6.3: Annual transfers to the fund based on reference-price rules**6.3.a. Azerbaijan****6.3.b. Nigeria****6.3.c. Saudi Arabia**

Note: all values are in nominal US\$bn

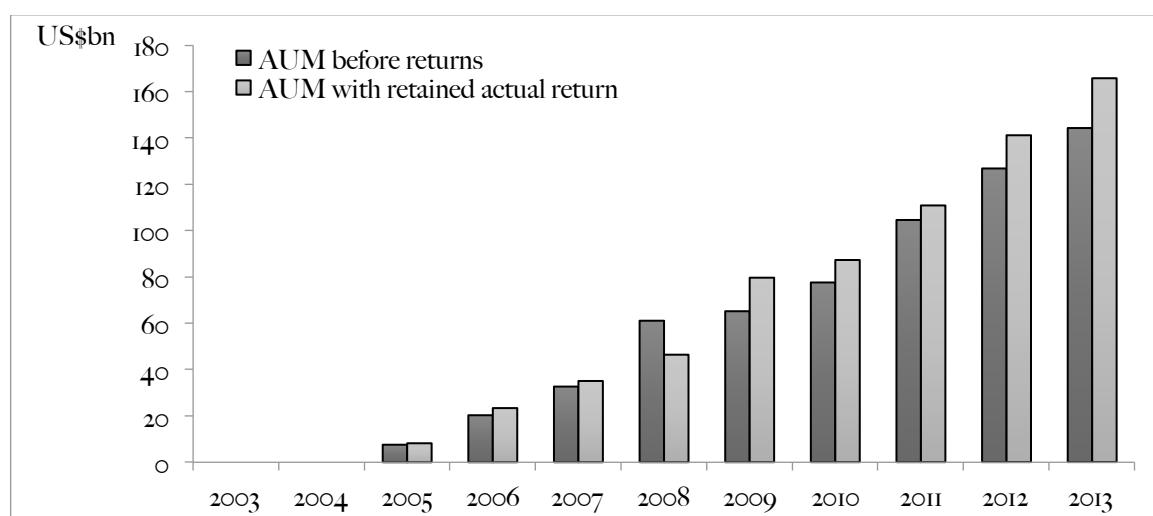
As was the case for the moving-average rule analysed earlier, the government would invest the assets transferred to the sovereign wealth fund, so that the accumulated assets would grow not only due to transfers, but also through the compounding of investment returns on those assets. Assume that the government adopts the medium-savings price path and saves all resource revenues that arise when the actual oil price exceeds the price signaled by the price path in any given year. Figure 6.4 shows the result to such a rule with investment returns added.

Figure 6.4: Accumulated assets under \$40 reference-price rule with retained investment income

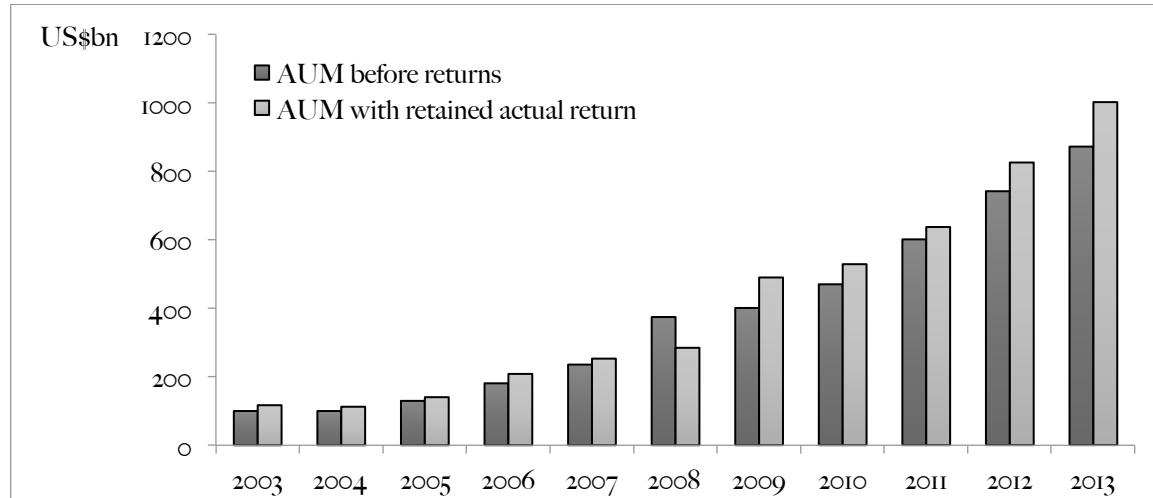
6.4.a. Azerbaijan



6.4.b. Nigeria



6.4.c. Saudi Arabia



Note: all values are in nominal US\$bn

6.3. General policy implications

This chapter has introduced a number of simple accumulation rules, and applied them in a backward looking manner to construct a number of counter factual scenarios for the period 2003 – 2013. Basic moving-average and reference-price rules were applied to data for Saudi Arabia, Nigeria and Azerbaijan⁶⁹ to quantify how large the accumulation of assets in a hypothetical sovereign wealth fund would have been under the implementation of these rules. The exercise showed that all three countries – and the same argument applies to other countries producing oil and other commodities that experienced a favourable price environment, particularly towards the end of the sample period – could have amassed significant assets over the years in question. With simple combination of a simple savings rule to capture windfall revenues (without requiring countries to save in years when revenues are down sharply) and the investment of the accumulated assets in a balanced, globally diversified equity-bond portfolio, Saudi

⁶⁹These three countries are chosen here, as they illustrate the effect of various savings rules in three distinct contexts and experiences over the sample period: a large oil producer that enjoyed stable production and price-driven increases in revenues (Saudi Arabia); a country that experienced not only price-driven volatility but also production-driven volatility (Nigeria); and a country that enjoy consistent production and consequently revenue increases (Azerbaijan).

Arabia would have amassed a total of \$830bn - \$1 trillion by the end of 2013, while Nigeria and Azerbaijan would have accumulated \$113bn - \$165bn and \$46bn-\$60.5bn, respectively.

These findings underline above all the importance and value of saving windfall revenues during boom years. Yet, it is important to recognise the limitations of the analysis conducted thus far. The rules analysed above completely isolate the accumulation decisions from the spending decisions and the possible functions of the sovereign wealth fund, as discussed in the Introduction. The idea behind these rules is that the government is committed to saving a portion of the windfall in a way that is economically (and politically) viable, in order to accumulate assets and establish principal capital for a sovereign wealth fund. Once the government has completed this initial accumulating period, attention can turn to a more integrated and contingent fiscal rule that matches the assets of the sovereign wealth fund to its function, particularly stabilisation and the generation of investment income through savings. Subsequent chapters will continue the analysis in this direction, but it is worth highlighting the most important policy implications from the analysis and application of simple accumulation rules:

6.3.1. The power of savings in boom years

The analysis underlines how important and powerful it is to save a portion of revenues during boom periods (or even in single boom years) in which exceptionally high resource prices result in an unanticipated revenue windfall. For established resource producers who are dependent on resource revenues to finance the budget, implementing accumulation rules that are centered on such boom years should be relatively painless, as the government can maintain spending in low- or even average-revenue years; while only saving when resource revenues rise unexpectedly due to exogenous price movements.

Of course, the resource revenue boom could arise also from an increase in production levels. For new resource producers, modest savings from rapidly rising revenues allows the government to graduate the scale-up in public spending and investment, while also creating a buffer fund with which to stabilise resource revenues and endow future generations. By saving only a quarter of revenues during the first decade of oil production and investing them prudently, Azerbaijan would have created a buffer equal to roughly twice annual resource revenues – which, as discussed in Chapter 8, places the country in a

reasonably strong position to stabilise future resource revenues and endow future generations with investment income once the underlying resource depletes.⁷⁰

6.3.2. Reference-price rules are very sensitive to the chosen price

Many countries, including Nigeria and Azerbaijan (and previously, Chile and Russia) have adopted a variant of the reference-price rule used above, either formally or informally, to guide the decision making process around saving windfall revenues. The analysis above underlines a simple and intuitive fact about these rules: the commitment to save revenues during a windfall period can only be realised if policymakers establish a prudent reference price. A \$10 difference has a massive impact on the total amount of funds transferred to the sovereign wealth fund. Consider, the example of Nigeria, the use of three different reference-price paths, based on a real oil price of \$30, \$40 and \$50 (with 2000 as the base year) resulted in total transfers (before investment returns) of \$92bn, \$144bn and \$202bn respectively.

The sensitivity of the magnitude of savings to the specification of a reference price-path raises important questions around the process or mechanisms through which the reference price (or indeed other “triggers” for savings) is set: is it at the discretion of the ministry of finance, by an independent panel of experts, in consultation with the IMF, or according to a formula or model?⁷¹ How frequently is the reference price (or reference-price path) updated in light of revised oil-price expectations? These are critically important issues to consider with respect to the governance and institutional arrangements of the sovereign wealth fund.

⁷⁰ The implied savings rate of 20-25% refers to the amount of revenue put aside in the fund. Note, however, that the government is able to invest those funds. In the absence of short-term spending of those assets, these assets earn compound returns, which in the analysis above equates to roughly 50% of the saved amount. Therefore, the effective savings rate (the transferred amount, minus the compound returns earned on those savings) drops to around 10%-15%.

⁷¹ The moving-average rule considered above, while conditioned on revenue rather than price, is an example of a formula-based mechanism for implementing the rule. The moving-average approach could easily be adapted to apply to price movements too.

6.3.3. Transfers can be “lumpy”

The rules analysed above, particularly the reference-price rule, can generate highly concentrated or “lumpy” transfers to the sovereign wealth fund – for example, years in which oil prices are below the reference price (generating no new transfers to the fund) can be followed by a single year in which price far exceed the reference price (generating a big transfer to the fund). In the scenarios above, for example, the overwhelming share of the total net transfers occur in only two boom periods, namely 2008 and 2011-13. While this is not necessarily a problem from the perspective of government spending, it does potentially complicate the long-term investment planning and strategy of the sovereign wealth fund. If this is the case, the government and policymakers may need to consider an additional mechanism to stagger transfers to fund, enabling it to better plan the implementation of its investment strategy.

6.3.4. Symmetrical versus asymmetrical rules

Unsurprisingly given the volatility of oil and other commodity prices over the sample period, there is a significant difference in total transfers under the versions of the accumulation rule that permits both in- and outflows (symmetrical) and ones that only allow for inflows (asymmetrical). Using the example of Nigeria again: under the medium-saving price path, a symmetric rule with in- and outflows from the fund would have yielded net transfers of \$116bn, while an asymmetric rule with inflows only allowing only for inflows in boom years, would have resulted in \$144bn in transfers. It is critical for policymakers to decide whether the fund’s transfer rule apply in a symmetrical or asymmetrical manner, not only because it has a serious impact on the total net assets transferred to the sovereign wealth fund, but also because the need to provision for potentially large (and unpredictable) outflows from the fund will significantly impact the fund’s investment strategy. With the possibility of outflows, the fund will have to hold a significant portion of its portfolio in liquid assets, which will lower its expected long-term average return.

6.3.5. Exchange rate implications

It is insightful to consider some of exchange rate dynamics in the relationship between resource revenues (typically priced in US dollars), government spending (typically in local currency) and the assets and income of the sovereign wealth fund, which, as modelled here, invests largely in foreign assets. In the

modelling of various savings rules in this chapter (as well as the model introduced in the following two chapters), the simplifying step is taken to dominate the entire framework in US dollar, including resource revenues, the level of spending of oil revenues, and the assets and income of both components of the sovereign wealth fund.

A possible extension of the empirical analysis of fiscal rules could explicitly model interactions between oil revenue, financial income and the real exchange rate. However, the decision to denominate the framework in US dollars can be justified based on a number of observations. First, if the government wishes or needs to spend income from oil and the sovereign wealth fund in local currency, but is concerned about a possible currency mismatch, the exchange rate exposure could be hedged through the use of currency futures and options. More fundamentally, the majority of oil- and other-commodity exporting countries are in fact primarily concerned with the ability to maintain their level of income and spending in foreign-currency terms during period of oil revenue volatility. As typical exporters of commodities and importers of a wide range of tradable goods, a drop in commodity prices constitutes a terms-of-trade shock, the effects of which could be offset by sovereign wealth fund earnings in dollar. In addition to the trade channel, many commodity producing economies have fixed exchange rates and/or large dollar-denominated debts – due to the “original sin” dynamic identified by Eichengreen and Hausmann (2005) – which makes a steady stream of dollar-based income invaluable for managing exchange-rate and debt-repayment pressures in the event of a drop in resource revenues.

Conclusion

This chapter has discussed a number of simple rule-based mechanisms for transferring public assets arising from natural resource revenues into funds, portfolios and institutions that are able to invest these assets with a long-term investment horizon, with higher exposure to risk and illiquidity in order to generate higher returns. After discussing a number of different types of accumulation rules, the chapter demonstrated the extent to which these rules would have resulted in the accumulation of significant assets in three country cases, namely Saudi Arabia, Nigeria and Azerbaijan, between 2000 and 2013.

The policy implications outlined above are universal to all resource-rich countries intending to embark on a transition period of accumulating assets with which to subsequently implement a more integrated and contingent fiscal rule that combines savings and spending decisions, and distinguishes between the stabilisation and income-generating functions of a sovereign wealth fund. It can be very useful for new resource producers - or established producers moving towards the establishment of sovereign wealth fund type model for fiscal policy – to implement simple accumulation rules that determine how much and when a portion of revenues are set aside to capitalise a new sovereign wealth fund. While static and mechanistic rules that set aside a fixed percentage of annual revenues are easiest to implement and communicate, more dynamic and cyclically adjusted rules are more desirable from an economic perspective – particularly in a dynamic setting across a boom-bust cycle in commodity revenues.

Chapter 7

An integrated fiscal rule:

A contingent rule for spending, saving and stabilising resource revenues

Enormous differences exist within the group of countries for which volatile and depleting resources constitute a significant share of public revenues. The group includes some of the richest economies in the world, such as Norway, Canada and Australia; and the poorest, such as Nigeria, Timor Leste and Bolivia. Countries that have adopted sovereign wealth funds are similarly diverse, although as discussed in Chapter 4, the argument is frequently made that these funds and fiscal rules aimed to spreading the allocation of resource revenues over successive generations are inappropriate in the context of many developing countries. A central contention of this dissertation is that this criticism is misplaced, not only because it appears strangely sanguine about common causes of the resource curse, but also because it fails to appreciate the flexibility of the sovereign wealth fund model.

In order to be widely applicable, a framework based on fiscal rules and the use of sovereign wealth fund income and assets should be sufficient flexible to allow implementation in a variety of contexts, characterised by different preferences, needs and constraints. Amongst the structural factors that determine an appropriate and feasible response to use of resource revenues are: the level of economic development and national income, the degree of resource dependence, the current and anticipated long-term public liabilities and spending needs, countries' growth and debt-servicing potential, and the size of accumulated assets from previous resource revenue booms. In the context of fiscal rules and sovereign wealth funds, these structural features determine the balance between the spending, saving and stabilisation of resource revenues.

The simple savings rules discussed in Chapter 6 exhibit some degree of flexibility. Clearly, countries can tailor the rules in such a way as to permit greater or less spending of resource revenues in the near term, and make their own assessments of the appropriate balance between allocations to stabilisation, savings and domestic investment funds. However, these rules, while having the general advantage of simplicity, is sub-optimal to the extent that they do not provide for an analysis of spending, saving and stabilisation needs in a single, integrated framework. Second, while reference-price and moving-average based rules allow for some degree of state dependence or contingency, the adjustment mechanisms are fairly crude.

The fiscal rule outlined in this chapter and applied in Chapter 8, is based on the framework developed for Kazakhstan by Hausmann, Lora and Lora (2014) and improves on the shortcoming of these simple rules by incorporating a number of the desirable institutional properties identified in the theoretical discussion in Chapter 2. It is a contingent rule with built-in feedback mechanisms that respond to unanticipated fluctuations in the resource revenues, of both a cyclical and long-term nature. The tradeoffs involved with spending, stabilising or saving resource revenues are considered jointly – that is, these choices are integrated into a single framework, rather than treated as separate decisions. While therefore allowing for some degree of flexibility, the framework is still rule based, thereby constraining policymakers in a manner that prevents time-inconsistent policies. The most obvious example of this is that the rule prevents spending an undue, unsustainable and inefficient portion of a temporary resource windfall. More generally, Hausmann *et al.*'s (2014) rule assists in enhancing the predictability of government actions with respect to the consumption of these volatile and finite sources of fiscal income, and distinguishes between technical decisions around the reduction of volatility versus discretionary choices around inter-temporal trade-offs in the time profile of resource revenue consumption.

The theoretical set-up of the fiscal rule introduced in this chapter follows Hausmann *et al.* (2014), although the version of the rule in this chapter introduces a different rate of return for the Stabilisation Fund and the Investment Income Fund (Hausmann *et al.*'s original formulation assumes the same return for both funds). The modelling of the rule in this chapter and Chapter 8 does, however, depart from Hausmann *et al.*'s (2014) approach in a number of ways. Whereas the latter simply generated completely randomised paths for fund returns (around a stable mean) and oil revenues (around a specified trend), the approach in this dissertation is more involved. First, the simulation of modelled returns of the Investment Income Fund is in this dissertation fitted to historic distributions of a 60/40 bond-equity portfolio; while that of the Stabilisation Fund are modelled as an autoregressive process. Finally, the simulation of oil revenue paths in this dissertation includes both a predictable component and a randomised element. The methodology for modelling various elements of the fiscal rule are discussed in section 7.3. of this chapter.

The integrated, contingent fiscal rule introduced in this chapter can be viewed as a logical extension from rule-of-thumb savings rules of the kind discussed in the previous chapter, while adding greater sophistication at the cost of complexity. The rule will most likely be successfully adopted following an

initial phase of accumulating financial assets in a new sovereign wealth fund (a process that could feasibly rely on the type of simple rules discussed in Chapter 6). This chapter starts with an intuitive overview of the fiscal rule, followed by a more formal discussion of its dynamics. The chapter then discusses methodology employed to model the potential operation of the rule in specific country cases, the results of which are presented in Chapter 8.

7.1. An intuitive overview of the rule

The first departure from the simple, and more widely used, rules discussed in Chapter 6 is that, rather than transferring a portion of resource revenues to a sovereign wealth fund *after* their allocation in the budget, the rule proposed here assumes that *all* revenues are transferred first to a sovereign wealth fund. The distribution of funds from the sovereign wealth fund to the budget is then governed by a spending rule that generates a stream of revenue, which is more stable and predictable than the underlying resource revenue itself. The most important function of the rule is that it decouples spending patterns from both the cyclical volatility of revenues and their long-term decline due to the depleting of the underlying resource wealth.

The sovereign wealth fund in the rule consists of two sub-components: a Stabilisation Fund and an Investment Income Fund. The convention in the literature on sovereign wealth funds is to simply refer to the latter structure as a “savings fund”. However, a distinction between savings funds and investment-income funds made here clarifies an important point: pure savings funds preserve and accumulate assets for future use exclusively; while, in addition to preserving assets over time (savings), an Investment Income Fund also provides a steady (and permanent) source of funds for current spending.⁷²

The spending rule proposed here includes transfers from both components of the sovereign wealth fund. Transfers from the Investment Income Fund are based on its expected long-run real return, for example 5% per annum. This rule ensures that the fund is “inflation proofed” (that is, its capital is protected in real

⁷²The Investment Income Fund in the framework described here could also be called a “permanent fund”, as per the convention in the public finances of American states with similar funds; or an “endowment fund”, as per the convention in the literature on universities and foundations with similar funds. The Savings Fund could be described as a “future-generations fund”.

terms over the long run); and that income/revenue streams from this fund are both stable and predictable. The second component of the sovereign wealth fund, the Stabilisation Fund, also makes an annual transfer to the budget, and based in part on the previous year's transfers and in part on the value of assets in the Stabilisation Fund. Combined, the three revenue components (one from the Investment Income Fund and two from the Stabilisation Fund) anchors spending through boom and bust periods of the commodity cycle.

The need for an Investment Income Fund arises in the context of declining resource revenue (based on declining production, rather than temporary price-driven decline) and/or raising spending needs. Under the stylised assumption that resource revenues are permanent and not subject to a long-term decline, the Stabilisation Fund and the spending rule alone are sufficient to stabilise transfers (and, hence, government spending) in perpetuity, even when underlying resource revenues are highly volatile.⁷³ When resource revenues are assumed to be permanent, there is no need to transform declining natural wealth into permanent financial wealth, which means an Investment Income Fund is not needed – the only challenge is that of stabilising the volatility of that permanent wealth. Note, however, that even under the permanent resource scenario, a government may still wish to create a separate Investment Income Fund that is invested in more risky assets in order to generate a higher return and *raise* the average size of transfers over time (rather than just stabilising and maintaining the current level spending). This would naturally involve a trade-off between current and future spending, as transfers from current revenues, implying some foregone spending in the near term, would be required to grow the Investment Income Fund.

In the more typical situation where resource revenues are expected to decline over time, the investment income supplements – and, potentially, completely replaces – the depleting natural resource as a source of permanent income to the government. Within this context, the share of annual resource revenues that are transferred to the Investment Income Fund becomes a discretionary policy variable, reflecting the preferences of policymakers for trading off current for future spending. If the objective is to stabilise the real level of spending during and after the depletion of the resource base, the fiscal rule and the percentage of revenues to be transferred to the fund can be set accordingly, using the best available information

⁷³ The assumption of permanent revenue means that revenues (in real terms) move within a steady range, which can be wide given the volatility of revenues, around a constant mean.

regarding the size and value of a country's resource endowment. The impact of different percentage transfers to the Investment Income Fund are demonstrated in the country examples below. Note that, once resource revenues have completely ceased to exist, the Stabilisation Fund can be gradually depleted and the Investment Income Fund will stabilise at a permanent steady-state level in real terms. There are no new revenue inflows "feeding" the fund, and it is transferring only its real return to the budget (these dynamics are formalised below).

A final set of observation regarding this rule-based framework is institutional. Separating the sovereign wealth fund into Stabilisation and Investment-Income Fund components enables a differentiation between the management, investment mandates and asset allocation of the two funds. The Stabilisation Fund needs to hold more liquid assets, as its transfers (or implicit liabilities) are more volatile and unpredictable than that of the Investment Income Fund, which only transfers its expected average long-run real investment return. The latter can have a much more illiquid and risk-orientated asset allocation, which raises its expected return, generating more revenue for government spending and investment in the long run. An Investment Income Fund should also operate at arm's length from the government and the standard budget and fiscal process, as its mandate is to focus on long-term portfolio decisions in order to meet its target expected long-run average return.

7.2. Formalising the key relationships of the rule

Having provided an intuitive overview of the main dynamics of the proposed rule-based fiscal framework above, the key relationships can be formalised using a few simple equations. If a resource-dependent government is committed to stabilising public spending, it should attempt to decouple spending from the underlying resource revenues, which are subject to massive annual swings and long-term unpredictability. To achieve stability and sustainability, this commitment should be symmetric: government needs to show restraint in spending resource revenues in boom periods, as this is what allows them to maintain a steady level of spending in bust periods.

7.2.1. The spending rule with permanent revenues and one fund

In order to achieve this, consider a rule in which spending is anchored to two underlying factors: some percentage of the previous year's spending and fixed percentage of assets held in Stabilisation Fund (which, as discussed above, receives *all* resource revenues – not just unspent surpluses or excesses). Such a rule can be specified as follows:

$$T_t = \alpha T_{t-1} + \beta S_{t-1} \quad (1)$$

where T is an annual transfer from the fund to the government; S is the size of the Stabilisation Fund; and α and β are fixed parameters that indicate the respective weight given to each of the components respectively in stabilising spending.

Through this equation, government spending is stabilised through plausible combinations of α and β . It is possible to identify values for α and β that provide optimal solutions to the stabilisation objective in a calibration of the model, given certain assumptions regarding the distribution of future oil revenues and fund returns. The criteria used for identifying suitable parameter values are discussed below, but the decision is based on the criteria that the operationalised rule provides a satisfactory degree of stability in spending, while ensuring a high probability that the Stabilisation Fund is not depleted prior to the completion of the resource production lifecycle. The robustness of the parameters are tested using Monte Carlo simulations that incorporate scenarios in which there is a combination of low-revenue and low-return outcomes (as discussed below). Over time, the level of the Stabilisation Fund will evolve according to the following accounting identity:

$$S_t = (1+r_t)S_{t-1} + X_t - T_t \quad (2)$$

where r is the interest generated on the Stabilisation Fund and X is the amount of resource revenue transferred to the fund. As per Equation (2), the Stabilisation Fund's value is therefore determined by its return and the net transfers (total transfers to the fund minus funds transferred to the budget to stabilise spending).

This simple savings and spending rule, and the manner in which it decouples spending from volatile resource revenues, has a number of attractive features. It is not anchored on, and does not rely upon, assumptions about future resource prices, production volumes or total revenues in order to stabilise spending. If resource revenues go up during any particular year, the value of the Stabilisation Fund will increase and the government will receive a fraction, β , of that increase in the following year. Should revenues stay the same the year after that, the government receives another fraction, $\beta(1+r)$; plus a fraction, α , of the increased transfers of the previous year. On the other hand, if revenues were to fall, the annual transfer to the Stabilisation Fund would also fall only by a fraction, β , in the following year, with further adjustments the subsequent years. The rule, therefore, assures that transfers to the government (i.e. spending) adjust upwards and downward gradually in response to often-dramatic annual changes in resource prices, production and revenue.

This rule has attractive stabilising properties in the short run, but it is also instructive to consider its dynamics over the long run. Assume a steady-state scenario in which resource revenues and the rate of return on Stabilisation Fund are fixed. Under this stylised scenario, the value of the Stabilisation Fund relative to resource revenue reaches a steady state, expressed by the following equation (note, steady-state variables are expressed in small caps):⁷⁴

$$\frac{s}{x} = \frac{(1-\alpha)}{\beta - (1-\alpha)r} \quad (3)$$

From Equation (3), the size of the fund as a share of resource revenues transferred to the Stabilisation Fund will be determined by three variables: the parameters of the spending rule, α and β , and the interest rate, r . The stabilising transfers to the budget are expressed as follows:

$$t = x \left(\frac{\beta}{\beta - (1-\alpha)r} \right) \quad (4)$$

An important implication from the steady-state analysis is that transfers *from* the Stabilisation Fund are larger than transfers *to* it. As follows from Equation (4), $t > x$, given that in addition to annual resource

⁷⁴The steady-state dynamics shown in Equations (3) and (4) are derived in the Appendix to this chapter.

revenues, the government receives the returns generated on the fund. Therefore, under the assumption that resources revenues are permanent (that is, a “steady state” in which revenues are not subject to terminal declines over the long run), the rule is sufficient to achieve not only the stabilisation objective, but also a saving objective.⁷⁵

In the more likely scenario in which resource revenues are no longer assumed to be permanent but rather subject to declines over the long run, the Stabilisation Fund can no longer serve both the stabilisation and savings functions. The reason for this is that, once the steady-state assumption of a fixed level of resource revenues is relaxed, the long-run secular decline in such revenues leads to a depletion of the fund’s assets, if spending remains anchored (that is, if the level of transfers from the fund is not reduced). Under non-steady state conditions, the transfers from the fund required to achieve stable spending, as per Equation (4), draws increasingly heavily on withdrawals from the fund: if resource revenues are faced with a long-term downward trend, no possible combination of parameters α and β can achieve the stabilisation objective indefinitely.

Consequently, before resources are depleted the addition of an Investment Income Fund, whose investment income over time replaces resource revenues as the source of permanent income, is required. At the limit, when resource revenues have ceased, the Stabilisation Fund is completely depleted and the Investment Income Fund now performs the stabilisation and savings functions. At this point, the government has completed the transformation of natural-resource wealth and income into financial assets as a source of government revenue and wealth.

7.2.2. Depleting resource wealth: introducing the Investment Income Fund

As noted above, if resource revenues are permanent, a Stabilisation Fund is sufficient to achieve both the stabilisation and saving functions, as government would receive in perpetuity not just the current resource revenues, but also the investment returns on the fund. The continual (albeit volatile) inflow of annual resource revenues means that the level of the Stabilisation Fund oscillates within stable bounds, rather

⁷⁵ As the return generated on the Stabilisation Fund is lower than that of a dedicated long-term investment fund, certain countries create different portfolios, tranches and funds to pursue various type of investment strategies. That is, even with the (stylised) assumption of permanent revenues, a government may establish two separate funds: one to provide liquidity and one to generate higher returns.

than being drawn down to fund spending. In reality, however, oil and most other commodities associated with sovereign wealth funds are, by definition, non-renewable resources. Once production (and hence revenues) starts to decline, the Stabilisation Fund would be gradually consumed until it is eventually depleted. While the spending of resource revenues will be stabilised over the horizon of the production lifecycle, no part of the resource wealth is left for future generations.

If the government wishes to endow future generations with a permanent source of income financed by the revenues generated on depleting natural assets, it is necessary to build up an endowment during the years of extraction of the resource.⁷⁶ Assume that a fraction, θ , of total oil tax revenues is saved every year into the Investment Income Fund (the rest going to the Stabilisation Fund), so that:

$$XE_t = \theta X_t \quad (5)$$

where XE is the share of total revenue that is transferred to the Investment Income Fund and θ can be interpreted as a flow “savings rate” for oil revenues. Over time, the size of the Investment Income Fund will be determined by the following identity:

$$E_t = (1 + i_t) E_{t-1} + XE_t - TE_t \quad (6)$$

where i is the return generated on the Investment Income Fund and TE is the transfer obtained from the fund based on the size of the fund in the preceding year, multiplied by the fund’s expected average long-term real return, δ :

$$TE_t = \delta E_t \quad (7)$$

⁷⁶ As noted earlier in Chapter 4, Collier *et. al.* (2010) have argued that inter-generational equity does not require leaving a financial endowment from finite resources to future generations, under the assumption that future generations would be wealthier and/or that the resource endowment is better-spent financing infrastructure and other forms of public investment (for example, education) that will raise output and income in the future. In that case, the government may be willing to simply implement the stabilisation-only part of the framework and therefore run down the fund as resource revenues decline. In practice, however, the disappointing track record of infrastructure and other forms of public investment financed by resource revenues, as documented by Gelb (1988) and Robinson and Torvik (2005), have led an increasing number of countries to use sovereign wealth funds as a means to inter-generational wealth and income transfer.

Basing the size of the transfer from the Investment Income Fund on the expected average long-term real return, δ , is a prudent strategy (assuming that expected return is realistic): using the *average annual* (rather than the observed annual) return ensures a stable stream of income to the government; spending only *real* returns ensures that the fund's capital is not eroded by inflation and can be maintained indefinitely (i.e. the fund's capital is "inflation proofed" and it generates "permanent" income); and finally, focusing on the *long-run* return enables the fund to capture a number of premiums (for example, volatility, value and illiquidity premiums) that raise the expected return of the fund. It is important that the fund's *actual* average return over time is not lower than the *assumed* or *expected* average return (used to determine the value of δ) – otherwise the fund would be depleted or reduced, leaving a smaller endowment for future generations.

Under these conditions, the two funds have different dynamics. The Stabilisation Fund tends to a steady-state equilibrium that is proportional to the revenues feeding it, before gradually depleting once those revenues end. The Investment Income Fund grows continuously during the production lifecycle to reach its permanent level once revenues end. An important implication is that combining a Stabilisation Fund and an Investment Income Fund is a way to stabilise and maintain the level of domestic expenditure *beyond* the resource production lifecycle – and potentially into perpetuity – if the government only spends the real income generated on the Investment Income Fund. With the introduction of the Investment Income Fund alongside the Stabilisation Fund, the rules of operation of the model can be set so that it simultaneously meets the stabilisation and saving objectives. The key relationships in the framework combining the Stabilisation Fund and the Investment Income Fund are captured in Table 7.1.

Table 7.1: Summary table of equations and variables of the fiscal rule

Saving rule (resource revenue allocation)	$X_t = XS_t + XE_t$ $XS_t = (1 - \theta)X_t$ $XE_t = \theta X_t$	X_t = Oil revenue XS_t = Revenue allocated to the Stabilisation Fund XE_t = Revenue allocated to the Investment Income Fund θ = “saving rate” (fixed share of oil revenue transferred to the Investment Income Fund)
Spending rule (transfers from the sovereign wealth fund)	$T_t = TS_t + TE_t$ $TS_t = \alpha TS_{t-1} + \beta S_{t-1}$ $TE_t = \delta E_{t-1}$	T_t = Total transfers (from both funds) TS_t = Transfer from Stabilisation Fund TE_t = Transfer from Stabilisation Fund α = Fixed percentage of preceding year’s transfer from Stabilisation Fund β = Fixed percentage transfer from Stabilisation Fund δ = Fixed percentage transfer from the Investment Income (expected long-run real return)
Fund dynamics (size and growth of the funds)	$SWF_t = S_t + E_t$ $S_t = (1 + r_t)S_{t-1} + XS_t - TS_t$ $E_t = (1 + i_t)E_{t-1} + XE_t - TE_t$	SWF_t = Total sovereign wealth fund assets (two funds combined) S_t = Stabilisation Fund value E_t = Investment Income Fund value r_t = Stabilisation Fund return i_t = Investment Income Fund return

As in the case of the one-fund version of the framework, α and β should be chosen so as to stabilise transfers to the government from the Stabilisation Fund. In turn, δ should correspond to the expected long-term return of the Investment Income Fund; while the savings rate, θ , can be chosen to assure the accumulation of an endowment; thereby, achieving the saving objective without jeopardising the stabilisation objective. The higher the savings rate, θ , the more willing policymakers are to accept a lower current or near-term level of spending from resource revenues in favour of transfers to future generation (and a higher level of permanent spending); while a lower θ implies a greater preference for spending the resource revenue as they arise, leaving less of an endowment for future generations. In summary, the fundamental dynamics and features of this rule-based fiscal framework are as follows:

- The rule decouples spending from resource revenues so that volatility in spending is reduced and both positive and negative shocks to resource revenue are only passed through to spending in a stabilised and delayed manner. Volatility is effectively transferred to the fluctuating levels of the Stabilisation Fund.
- This decoupling is achieved by basing annual spending on three sources: (i) a fixed percentage of the previous year's spending (α); (ii) a fixed percentage of the value of the Stabilisation Fund (β); and (iii) a fixed transfer from the Savings Fund (δ), equal to its long-run average real return.
- The Stabilisation Fund's size fluctuates in line with shocks to resource revenues. The fund's value increases when positive shocks to revenue occur, as the government is constrained by the fiscal rule from spending the excess revenue windfall immediately. Likewise, the Stabilisation Fund decreases when negative shocks materialise, as the rule permits withdrawals from the fund in order to stabilise spending.
- The long-term growth of the Savings Fund is determined by the size of transfers from annual resource revenues – a higher savings rate implies lower near-term spending in favour of higher future (and permanent) spending. As the Savings Fund grows, its annual contribution to the budget in the form of investment income (based on its expected long-run real return) supplements resource revenues – and potentially replaces it entirely, upon depletion of the resource.
- Finally, if the level of spending from the Savings Fund does not exceed its long-run real return, its capital value will be preserved in real terms, meaning it becomes a permanent endowment and a source of permanent income across generations. Critically, in the context of finite resources, this enables spending to be maintained at a level commensurate with the level of savings, even once oil or other resource revenues diminish and ultimately cease.

The governments' preferences and political constraints have to be incorporated into the framework and the way key parameters are calibrated to specific circumstances. The basic assumption is that the

government favours stability in spending; which, subject to certain feasibility constraints, determines the values for the stabilisation parameters, α and β , of the spending rule.⁷⁷ Second, the government faces an inter-temporal tradeoff between current and future spending in determining the desired savings rate, θ . In analysing these tradeoffs, it is important to bear in mind that all things equal, policymakers may also have a degree of “impatience”, valuing near-term spending higher than the promise of future spending (that is, future spending is discounted). As shown in the following chapter, these policy preferences are incorporated into the calibration of the rule to specific country cases.

7.3. Modelling in the rule

An attractive features of the rule-based framework described above is that it allows policymakers to tailor policies – and assess the trade-offs involved in stabilisation, spending and savings decisions – to context-specific needs, preferences and constraints. To demonstrate this flexibility, the rule is applied to five prototypical resource-rich countries: Kazakhstan, Azerbaijan, Nigeria, Ghana and Saudi Arabia. These give countries have wide-ranging economic fundamentals, historic and expected future resource production profiles, and are at different stages of their economic development, thereby offering perspectives on how the framework could operate in contrasting settings.

In order to apply the framework in a forward-looking manner, the modelling strategy needs to account for the inherent uncertainty and volatility around key variables. Resource revenues and the returns generated on the Investment Income Fund, in particular, are subject to considerable volatility – after all, the volatility and uncertainty around resource revenues is the primary reasons for adopting the fiscal rule in the first place. The key inputs into the fiscal rule that therefore need to be modelled are the returns of the Investment Income Fund, the returns of the Stabilisation Fund and oil revenues. The modelling of these inputs in this dissertation departs from Hausmann *et al.*'s (2014) approach in a number of ways. Whereas Hausmann *et al.* (2014) assumed the same rate of return for both funds and simply generated completely randomised paths for this return (around a stable mean), the modelling of these input in this dissertation is

⁷⁷ The argument for stable spending rests on a number of well-established theoretical pillars. This may derive from an ethical concern with intergeneration equity; or on the permanent-income and life-cycle approaches pioneered by Friedman (1957) and Modigliani and Brumberg (1954), respectively. Preferences for, and the general desirability of, stable public spending are also standard building blocks in literature on the macroeconomics of the business cycle (Blanchard and Fischer, 1989), and the microeconomics of household utility (Deaton, 1991).

differentiated: the simulation of modelled returns of the Investment Income Fund is fitted here to historic distributions of a 60/40 bond-equity portfolio; while that of the Stabilisation Fund are modelled as an autoregressive process. Finally, the simulation of oil revenue paths in this dissertation includes both a predictable trend component and a randomised element. The methodology for modelling various elements of the fiscal rule are discussed in sections 7.3.1, 7.3.2. and 7.3.3.

7.3.1. Simulating Investment Income Fund returns

As noted earlier, the Investment Income Fund is assumed to have a long investment horizon and the ability to be exposed to a number of risk factors that may increase the volatility of the fund's returns in exchange for a higher expected long-run average return. In order to simulate this return profile, assume that the Investment Income Fund's return approximates that of a classic 60/40 equity-bond portfolio, the workhorse benchmark for long-term institutional investors, such as pension funds, endowments and sovereign wealth funds (Cochrane, 1999, and Ang, 2014). In simulating future returns for the Investment Income Fund, a large number (in this case, 1000) of different return paths are simulated. This approach, referred to as Monte Carlo simulations, incorporates a wide range of potential future return paths into the analysis, based on a distribution that mimics the observed distribution of historic portfolio returns.

Given the ample historical evidence that stock- and balanced-portfolio returns are not normally distributed – for example, the distribution of stock returns are known to have “fat tails” – a distribution for future returns that includes higher moments beyond the mean and variance of historic returns is fitted (Stein and Stein, 1991; and Ang and Timmermann, 2012). In order to take skewness, kurtosis and fat tails in the distribution of past returns into account, portfolio returns are modelled to follow a Generalised Lambda Distribution. The four-parameter Generalised Lambda Distribution is capable of mimicking various distributions and data samples, including those with fat tails, and is therefore used with increasing frequency and academic support for the simulation of portfolio returns (Asquith, 2006 and Pfaff, 2012).

To fit a Generalised Lambda Distribution on historic balanced-portfolio returns, a 60/40 equity-bond portfolio is constructed, based on annual real returns of the S&P 500 and 10-year US Treasuries (calculated based on the constant-maturity approach), employing data collected by Shiller using on public

sources.⁷⁸ The portfolio is rebalanced back to the 60/40 equity-bond weighting annually, and real returns are calculated by subtracting the year's inflation, measured by the percentage change in the US Consumer Price Index. Based on this data, the characteristics of the distribution historic real returns are shown in Table 7.2, along with that of the simulated returns fitted through maximum likelihood estimation, assuming a Generalised Lambda Distribution.

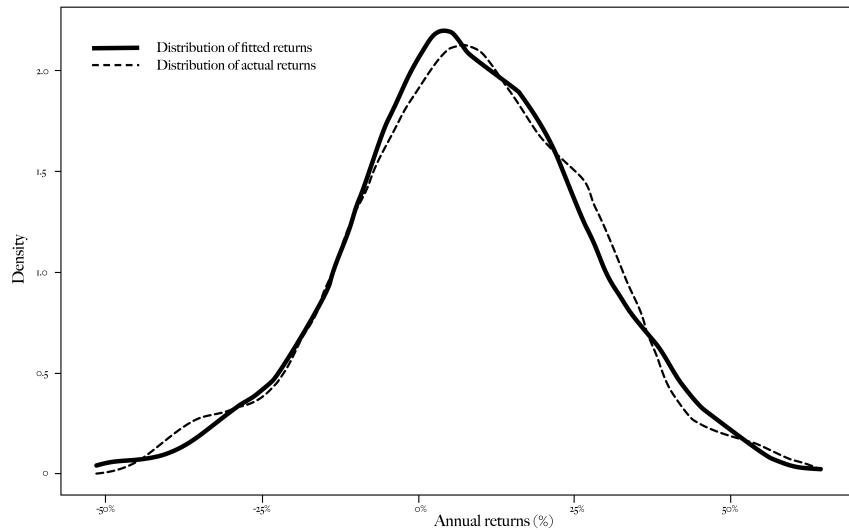
Table 7.2: Key features of the distribution of historic and simulated returns

Moment	Historic returns	Simulated returns
Mean	0.0596	0.0596
Variance	0.0144	0.0147
Skewness	-0.220	-0.226
Kurtosis	0.0210	0.357

Based on the distribution of historic annual returns from 1879 to 2014, the portfolio fitted through maximum likelihood estimation has an average (expected) annual real return of 5.96%, with considerable variation around that mean. As noted earlier, and shown in Figure 7.1, which shows both the distribution of actual annual returns and that of the fitted returns, the Generalised Lambda Distribution takes the higher moments of the non-normal distribution of past returns, particularly the existence of "fat tails" and skewness (hence the non-symmetric clustering of returns around the mean).

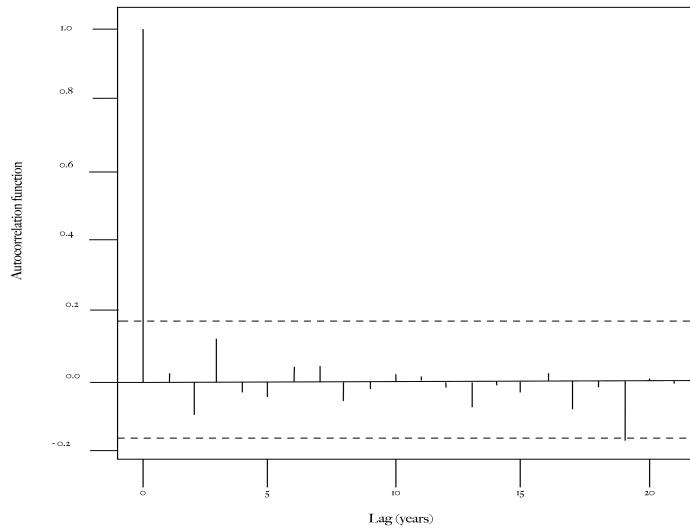
⁷⁸ The data has been maintained on Shiller's Yale University website (www.econ.yale.edu/~shiller/data.htm) since the publication of two celebrated books, *Market Volatility* (1989) and *Irrational Exuberance* (2000). The methodological approaches to the construction of these time series are not controversial, but are discussed in Chapter 26 of Shiller (1989) and on the author's website.

Figure 7.1: Distribution of simulated and actual 60/40 portfolio returns



Note: the distribution of historic annual returns is for 1879 to 2014.

For the stability of the rule, it is important to assess the degree of “persistence” in fund returns, which can be tested based on the degree of autocorrelation in past returns. The assumption that equity returns, certainly at the annual frequency, are independently identically distributed (i.i.d) enjoys considerable empirical support (Ang, 2012). As shown in Figure 7.2, annual S&P 500 returns have not historically been auto-correlated, and the annually rebalanced, equity-dominated 60/40 portfolio has similar characteristics: there is no evidence of positive (or indeed negative) autocorrelation or “persistence” in historic balanced-portfolio (or pure equity) returns at the annual frequency.

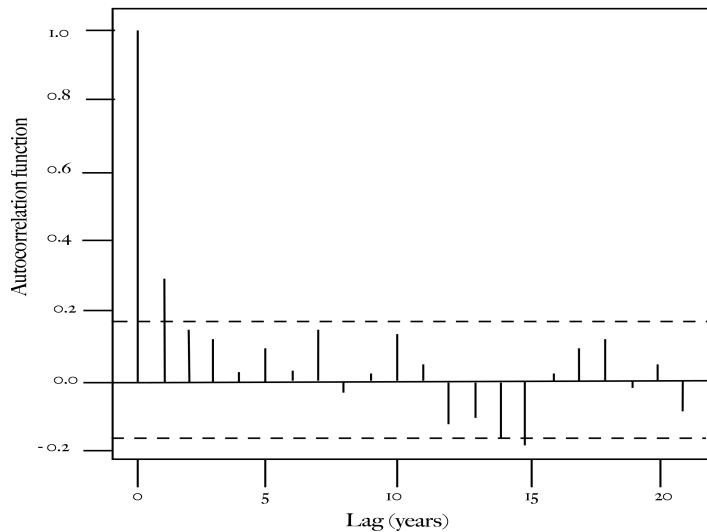
Figure 7.2: The lack of persistence in balanced-portfolio returns

Note: dotted line indicates the 95% confidence interval

Figure 7.2 shows that there is no evidence of systemic autocorrelation or persistence in the Investment Income Fund's returns. In a practical sense, the concern around possible autocorrelation in the returns of either of the Stabilisation or the Investment Income Fund is that a series of persistently low real returns could deplete the fund. It is therefore important to test, and potentially account, for a degree of autocorrelation in the Stabilisation Fund's returns below.

7.3.2. Simulating Stabilisation Fund returns

Compared to the Investment Income Fund, the Stabilisation Fund's portfolio can be assumed to be primarily concerned with the preservation of capital and liquidity. In order to model this return behaviour, the Stabilisation Fund's returns are approximated by the 10-year US Treasury yield (assuming constant-maturity yield). Unlike equity- and balanced-portfolio returns, it cannot be assumed that 10-year US Treasury yields are i.i.d and have no (positive) autocorrelation. The empirical evidence and academic theory suggested the real return on US Treasuries are related to the interest-rate cycles, which have at least some degree of positive autocorrelation. Figure 7.3 shows that there is statistically significant evidence of positive autocorrelation in 10-year US Treasury yields with a 1-year lag. That is, the real returns on the Stabilisation Fund are likely to have some persistence.

Figure 7.3: Evidence of limited autocorrelation in US Treasury yields

Note: dotted line indicates the 95% confidence interval

The evidence of statistically significant autocorrelation at a one-year lag shown in Figure 7.3, suggests that it is unrealistic to expect that the returns of the Stabilisation Fund follow a random pattern around a stable rate. Therefore, a simple autoregressive integrated moving average (ARIMA) model is fitted for purpose of the simulation. The intention of the exercise is to “stress test” the rule by incorporating high levels of persistence in the Stabilisation Fund’s returns, rather than having an accurate forecast of real US 10-year Treasury yields. The equation for the fitted AR (1) model, again estimated using maximum likelihood methods, is as follows:

$$Y_t = (1 - 0.294) * 0.0237 + 0.294 * Y_{t-1} + \varepsilon_t$$

The modelled return of the Stabilisation Fund is, therefore, a weighted average of the long-term mean (0.0237) and the yield level the previous year, this accounts for both the mean reversion component and the persistence that real treasury yields might have, plus a random normally distributed error ε_t , which has mean zero and standard deviation 0.05. Importantly, in a large number of draws, the interest rate moves occasionally far away from its long-term value (and do not return that mean within the forecast horizon).

It is, of course, possible to model the process in a way that allows for greater mean reversion, less persistence (driven by the random-walk component) and a “tighter” distribution of rate paths (which

would result from a smaller standard deviation of the error term). However, for the purpose of calibrating the model, the risk of potentially significant persistence around low returns in the simulated rate paths is captured. This ensures that the results are robust to the risk of depletion of the Stabilisation Fund under such a scenario. The simulated rate paths allows for “stress testing” the fiscal rule under assumptions of exceptionally high persistence in returns on Stabilisation Fund.

7.3.3. Simulating oil revenues

The simplest way to project oil revenues is to assume that they fluctuate around an expected oil-revenue path over the relevant horizon, which can be represented as follows:

$$X_t = Xp_t + \mu_t \quad (14)$$

where Xp_t is the projected value for period t and μ_t is a random term (normally distributed around zero).

It is instructive to think of Xp_t as the permanent component of oil revenues, which can be expressed as its lagged variable multiplied by 1 plus its projected rate growth, gp_t , and a random component, λ_t (also, normally distributed around zero):

$$Xp_t = Xp_{t-1}(1 + gp_t + \lambda_t) \quad (15)$$

Therefore

$$X_t = Xp_{t-1}(1 + gp_t + \lambda_t) + \mu_t \quad (16)$$

This process, therefore, assumes that oil revenues have two sources of random fluctuations: one that affects the projected rate of growth, and therefore has a permanent effect on the level of oil revenues in the future; and one that is entirely transitory and leaves no trace in the subsequent behaviour of oil revenues. The heuristic interpretation of this process is as follows: oil revenues may depart permanently from their originally projected path if, for example, the actual size of an oil well turns out to be different from the original size estimated or a secular regime shift in global commodities leads to a change in investments in

exploration and development that affects long-term or future national production volumes. That is, the permanent-shock component captured in Equation (16) derives from changes in production levels. Oil revenues may also depart temporarily if, for example, an oil pipeline suffers some damage that limits the flow of oil for some time or, more importantly, a change in global energy prices affects the revenue generated on existing production volumes. That is, the transitory-shock component in Equation (16) derives from temporary production shocks and price movements.

Table 7.3: Expected trend in oil revenues for selected countries (US\$bn)

	Kazakhstan	Azerbaijan	Nigeria	Ghana
2015	17.2	14.7	16.4	0.6
2016	11.7	16.2	8.4	0.7
2017	16.0	17.8	11.8	0.8
2018	17.6	19.9	14.8	1.3
2019	19.5	21.5	16.8	1.8
2020	21.8	20.0	20.7	2.6
2021	22.7	18.8	24.6	3.1
2022	24.5	17.9	29.5	3.8
2023	25.7	16.9	35.4	4.0
2024	27.4	16.0	42.5	3.8
2025	27.0	15.0	51.0	3.7
2026	26.5	14.0	61.2	3.3
2027	25.4	13.1	55.7	2.8
2028	25.0	12.2	54.8	2.6
2029	24.4	11.4	53.5	2.3
2030	23.5	10.7	51.5	2.1
2031	22.6	10.0	49.5	1.8
2032	21.6	9.3	47.4	1.6
2033	20.7	8.7	45.3	1.4
2034	19.7	8.1	43.2	1.2
2035	18.7	7.6	41.0	1.0
2036	17.7	7.1	38.9	0.9
2037	16.8	6.6	36.8	0.7
2038	15.8	6.2	34.7	0.5
2039	14.9	5.8	32.5	0.3
2040	13.9	5.4	30.4	0.2

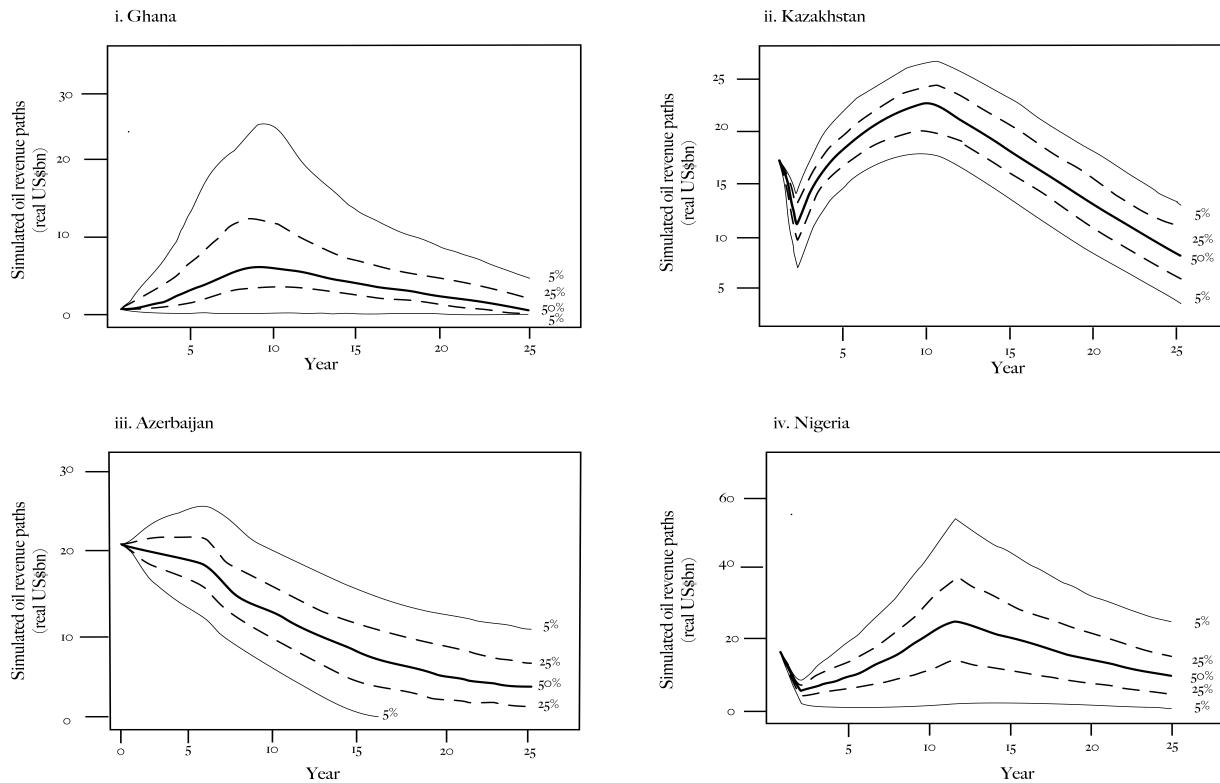
Sources: IMF Article IV consultations and Fitch country reports

In simulating oil revenues as an input into the modelling of the fiscal rule, the expected-path component is based on current “best-guess” estimates of oil revenues and oil reserves/production. In order to generate this baseline trend for future revenues, around which to construct Monte Carlo simulations that incorporate the above-mentioned two sources of random shocks, the country-level oil-revenue forecasts collected by the International Monetary Fund under their Article IV consultations are used. The data collected after 2015 provide oil revenue forecasts for up to 2020 – and incorporate the expectations of a very gradual recovery in revenues, following the collapse of oil prices starting in late 2014. In all cases, revenue estimates are crosschecked with those of Fitch country reports. Beyond the 2020 horizon, a country-by-country trend path is projected based on the expected production volumes (using the best available estimates from geological surveys of proven oil reserves). The simulated revenue paths are shown in Figure 7.4, while the forecasted revenue trend for the countries used in the application of the model is shown in Table 7.3 and the long-term oil-revenue trend for each country is described, along with the other input assumptions, in Table 7.4.

It is important to underline the manner in which oil-revenues (and thus, indirectly, oil prices and oil production levels) enter the fiscal rule. As noted earlier, the fiscal rule has the attractive feature that it “decouples” spending from resource revenues: volatility in spending is reduced, as both positive and negative shocks to resource revenue are passed through to spending in a smoothed and lagged manner, through changes in the level of the two components of the sovereign wealth fund. However, there is a need to distinguish between the role of oil revenues (prices and production) in the *operation of the fiscal rule* and the *simulation of oil revenues* as an input in the modelling of the rule.

First, the *operation of the fiscal rule* has the attractive feature of not being conditioned on assumptions or forecasts for oil revenues, prices or production. Rather, the rule conditions the level of spending from oil revenue on the size of assets held in two separate sovereign wealth fund accounts and an autoregressive component based on the previous year’s spending. In this way, the volatility associated with oil revenues (due to the unpredictable nature of oil prices and long-run oil production trends) are “filtered” or “absorbed” through the two sovereign wealth funds. The rule has built-in “auto-corrective” or “auto-stabilising” properties, as fiscal spending adjusts gradually (through changes in the value of the two sovereign wealth fund) to changes in oil revenues. The *operation of the fiscal rule* can, therefore, be described as independent of short-term fluctuation in oil revenues, prices and production.

Figure 7.4: Simulated oil revenue paths including random components



In the long run, however, oil revenues – to the extent that they are a major determinant of the evolution of size of the sovereign wealth fund – are clearly important to the spending path. While the *operation of the rule* does not, therefore, require the specification of oil-price or oil-production assumptions and forecasts, oil revenues are an important input in the *simulation of the rule* and its inputs. In the modelling of rule in this dissertation, total oil revenues are modelled (rather than oil prices and oil production separately). As discussed in this sub-section, the simulation of oil revenues as an input into the modelling of the fiscal rule makes the foundational assumptions that (i) part of the path of future oil revenues are randomly determined (most obviously due to oil prices, but also permanent shocks to production), and (ii) that current “best-guess” estimates of the trend in production can be used as a baseline for simulating oil revenues (around which randomised components are added to account for the high degree of volatility and unpredictability in oil prices and production).

7.3.4. Initial fund sizes and spending levels

The final inputs into the model are the initial values of the Stabilisation Fund, the Investment Income Fund and the level of spending from oil revenues – that is the values of key variables of the spending rule in year $t = 0$. These starting values are important, given the essentially autoregressive nature of the spending rule: initial levels need to be realistic and appropriate, as by design the level of spending (transfers) persists for a long time through the rule. Similarly, the existing level of savings in year $t = 0$ is important, as it determines the level of sustainable draws from the Stabilisation and Investment Income Funds.

Table 7.4: Country inputs, assumptions and starting values

	Kazakhstan	Azerbaijan	Nigeria (actual)	Nigeria (counterfactual)	Ghana
Oil production outlook	Gradual increase to peak levels in 2024, followed by gradual decline	Currently around peak levels and assuming steady decline starting in 5 years.	Production increases over next decade from current levels, followed by steady decline after 2026.	Production increases over next decade from current levels, followed by steady decline after 2026.	New producer, with output rising steadily through 2022. Production declines and stops by 2040.
Anticipated revenue trend	Gradual recovery up to 2020, followed by production-driven trend	Gradual recovery by to 2020, followed by gradual decline of 7% p.a.	Gradual recovery up to 2020, followed by production-driven trend, with peak of \$60bn in 2026, followed by gradual decline to 2040.	Gradual recovery up to 2020, followed by production-driven trend, with peak of \$60bn in 2026, followed by gradual decline to 2040.	Oil revenues rise from \$0.5bn to \$4bn by 2022, followed by gradual declines through 2040.
Initial transfer (2015)	\$8bn	\$13bn	\$10bn	\$10bn	\$0.2bn
Stabilisation Fund (2015)	\$12.8bn	\$25bn	\$4bn	\$50bn	\$0.3bn
Investment Income Fund (2015)	\$51.2bn	\$12bn	\$1bn	\$30bn	\$0.25bn

Note: Saudi Arabia is not included in this table, as the application of the rule is backward looking. Saudi inputs are discussed separately in Chapter 8.

For countries experiencing the emergence of a new resource windfall, for example Ghana, these values are close to zero (incorporating only a small amount of current savings and oil revenue). However, for countries with established resource revenues and existing savings through their sovereign wealth funds (and other buffers), the initial values of the three elements of the spending rule can be based on public data from national budgets and IMF's Article IV consultation reports. The initial values of the Stabilisation Fund and the Investment Income Fund are based on the size of assets under management of the national sovereign wealth fund (and related budgetary buffers) in the case of Nigeria, Kazakhstan and Azerbaijan. These input assumptions discussed in greater detail on a country-by-country basis below, and presented in Table 7.4.

7.3.5. Calibrating the parameters of rule

With the inputs described above, spending rule can be calibrated for each country. The values of α and β , which determine the size of transfers out from the Stabilisation Fund; and the value for θ , which determines the size of transfers to (and, hence, the long-term growth of) the Investment Income Fund. In theory, the level of spending out of the Investment Income Fund can also be a policy variable, and have some time-varying properties. However, the purpose of the Investment Income Fund is to remain a source of permanent income, so the value of δ should equal to the fund's expected long-run average real return. As discussed earlier, the historical long-run average real return of a 60/40 equity bond portfolio is 5.96% - however, in order to ensure a prudent calibration of the framework, the spending rate is reduced to 5% (that is $\delta = 0.05$). Following the permanent-income approach to the use of the Investment Income Fund proceeds, the policymaker has little scope for adjusting or controlling this parameter, as long-run returns are determined market-based returns to exposure to risk factors.

The identification of feasible parameters for α and β is a technical exercise. The objective is to find a robust combination of parameters, based on country-specific characteristics for the expected trend in future oil revenues, the level of current and target-path for future spending, and the size of previously accumulated assets. Note that, for any given set of inputs, there are a number of feasible combinations of α and β that provide stability in transfers from the Stabilisation Fund – rather than a unique solution. As a general rule, a higher α requires a lower β , and *vice versa* (for example, $\alpha = 0.8$ and $\beta = 0.1$ could yield

similarly stabilising results as $\alpha = 0.7$ and $\beta = 0.15$). In order to select the desired set of parameters, a step-wise approach to finding appropriate parameter values is adopted.

Assume that policymakers prefer as high a value for α as possible (as $\alpha = 1$ would completely stabilise spending). A high value for α also addresses the concern over loss aversion: by definition, a high α ensures that there cannot be a significant year-on-year reduction in spending. Therefore, the first criterion is to choose the highest value of α from within the set of feasible α and β combinations. However, α cannot be implausibly large, as this risks explosive dynamics in the evolution of the Stabilisation Fund, depleting the fund if revenues are consistently low (and generating excessive growth in the fund if revenues are consistently high).

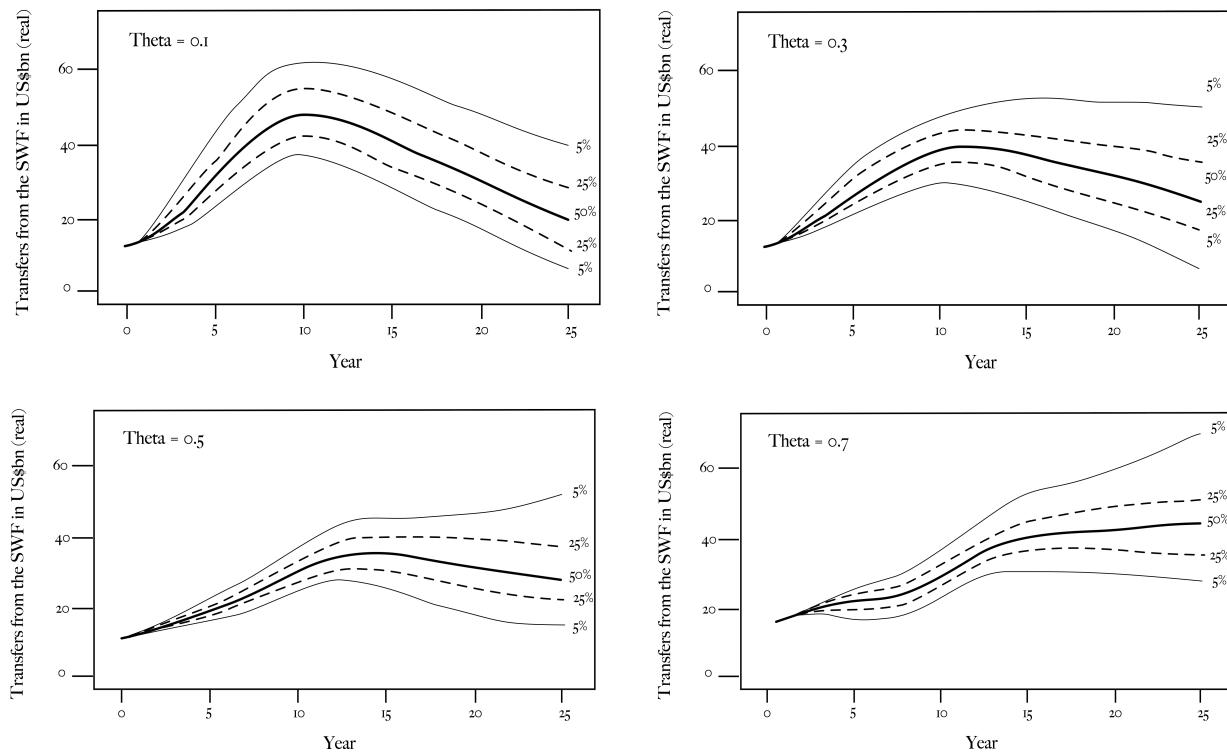
In order to find the highest feasible value for α , a two-step process is followed. First, using all the country-specific inputs described above, 1,000 Monte Carlo simulations of the whole framework are run to identify all the combinations of α , β and θ that meet the criteria of having a low risk of triggering a depletion of the Stabilisation Fund (recall that a depletion would occur when the parameters enable excessive spending relative to revenues). This set of feasible parameters are selected based on the criteria that the Stabilisation Fund's assets remain positive in at least 95% of the simulations. This establishes a country-specific set of parameter combinations, referred to here as the "feasibility set". Second, from this feasibility set, only the values of β and θ values associated with the highest possible α are considered. This is intuitive, as the highest feasible α naturally establishes a stabilising anchor with autoregressive properties. With the feasibility set, the choice of β affects the stabilisation of transfers, while the θ affects the inter-temporal trade-offs between near- and long-term spending. A lower θ implies higher near-term spending relative to long-term spending, while a higher θ implies lower near-term spending in favour of higher spending in future (including permanently).

It can be assumed that policymakers dislike sharp drops in spending, even if it helps ensure a higher level of spending in aggregate or in the future (due loss aversion and a desire to reelected); and discount higher levels of future spending relative to near-term spending (impatience). These two conditions affect the choice of β and θ respectively. In calibrating the spending rule, the highest possible β that is available from the feasibility set is chosen (although a lower β would be a more prudent or safer option, ensuring that the framework "survives" – that is, the Stabilisation Fund avoids depletion – in a great number of simulated outcomes).

The choice of θ is treated as a discretionary policy choice, reflecting the time-preference of policymakers and the value placed on the welfare of future generations. The impact of different values of θ for the spending profiles over time is shown in Figure 7.5 (the same approach will be used in the application of the rule to different country cases in the following chapter). Figure 7.5 depicts a set of stylised spending levels for fixed values of α and β , combined with four different values of θ . Starting from left to right in the top panel, the impact of θ equal to 0.1 and 0.3 respectively is shown; while the bottom panel shows the outputs for θ equal to 0.5 and 0.7.

The results of the simulated spending profile will be presented as a distribution, as per Figure 7.5. As the results from the Monte Carlo simulation process are not normally distributed, the low-probability “tail outcomes” are not symmetrical to the higher-probability outcomes. The distribution of outcomes, particularly the “upside potential”, increases with higher θ – this is an illustration of the effects of compounded returns, as the Investment Income can grow very large under a scenario that combine a higher portion of revenues being transferred to it *and* higher than expected returns generated on the fund.

Figure 7.5: Hypothetical spending profiles based on different savings rates



A number of observations are worth highlighting. First, the spending profile flattens and eventually steepens as θ increases. This is intuitive, as a higher θ implies that a greater share of revenues is transferred to the Investment Income Fund (policymakers are willing to forego current consumption for future consumption). Lower values of θ imply that a smaller percentage of revenues are transferred to the Investment Income Fund, allowing spending to rise more rapidly over the first 10-15 years of the forecast horizon, but at the expense of lower long-term – and, importantly – permanent, post-resource spending. The methodology described in this chapter for the calibration of the fiscal rule, along with the visualisation of the modelled outcomes in terms of probabilities, will be used in the following chapter. Chapter 8 will apply the rule to a number of illustrative country cases and discuss the implications of the results.

Conclusion

This chapter has presented a simple fiscal rule for the spending, stabilisation and saving of resource revenues. The framework is based on a rule that anchors spending – or, more precisely transfers from the sovereign wealth fund to the government – on a function of the previous year's spending and the balance of assets in the sovereign wealth fund(s). In contexts where resource revenues are a permanent source of income – with annual revenues fluctuating within a stable band around a stable mean – the sovereign wealth fund needs only to consist of an adequately capitalised Stabilisation Fund. However, in the more realistic situation where resource revenues are expected to decline after a period of peak production (now assuming volatile annual flows within and around a drifting moving average), the government needs to build-up an Investment Income Fund, which is a financial endowment that replaces resources as a source of permanent income to the government. This simple set of rules does not depend on any assumption about the expected trajectory of oil prices or its distribution function, as is often required in other stabilisation rules. Nor does it require choosing any specific oil production scenario to define the parameters.

This fiscal rule underlines the clear trade-off between a rapid ramp-up in public spending financed by resource revenues (“front-loaded spending”) and the accumulation of a significant pool of financial assets in the Stabilisation Fund; and, if the government wants to leave a financial endowment from the depleting

natural asset as source of permanent income, in the Investment Income Fund. The trade-off between current spending and the creation of a Stabilisation Fund is not that acute (beyond the initial accumulation with which to establish the fund); but the establishment of an Investment Income Fund involves more substantial reduction in the level of current spending in order to establish the endowment and maintain permanent spending. The higher the savings rate, the sharper this trade-off.

Of course, a number of resource-rich countries have already accumulated such assets during previous commodity booms – these countries essentially already have the financial building blocks in place to successfully implement the framework, given the establishment of appropriate institutional arrangements to ensure adherence to the rules. For countries that are yet to build-up the requisite initial “capital buffers” with which to establish the sovereign wealth fund, the challenge is more substantial, particularly if the government wishes to continue consuming a high percentage of its annual resource revenues. Ideally, these historically “low savings” countries will use future periods of unanticipated revenue booms to set aside a portion of windfall with which to implement the framework.

Appendix to Chapter 7: Steady-state conditions of the Stabilisation Fund

To better understand the long run interactions between the level of the Stabilisation Fund, resource revenues and transfers from the fund, it is useful to derive steady state conditions. Assume no changes in annual revenues and the interest rate – that is, rather than allowing for fluctuations around the stable mean, in the steady state these variables are always equal to their mean. Recall the spending rule that governs transfers from the Stabilisation Fund is captured by the following equation (in a dynamic state):

$$T_t = \alpha T_{t-1} + \beta S_{t-1}$$

and that the level of the Stabilisation Fund will evolve according to the following accounting identity:

$$S_t = (1 + r_t) S_{t-1} + X_t - T_t$$

In the steady state, the two equations above can be rewritten as, where steady state variables are denoted in lower case without subscripts to indicate time period:

$$t = \alpha t + \beta s \quad (\text{A.1})$$

$$s = (1 + r) s + x - t \quad (\text{A.2})$$

Equation (A.1) can be rewritten as:

$$s = \frac{(1 - \alpha)}{\beta} t \quad (\text{A.3})$$

And Equation (A.2) can be rewritten as:

$$x = t - r(s) \quad (\text{A.4})$$

To derive the size of the Stabilisation Fund as a share of resource revenues in the steady state, substitute and rearrange using Equations (A.3) and (A.4):

$$\begin{aligned}
\frac{s}{x} &= \frac{\frac{(1-\alpha)}{\beta} TS_{ss}}{t - r(s)} = \frac{\frac{(1-\alpha)}{\beta} t}{t - r \frac{(1-\alpha)}{\beta} t} = \frac{\frac{(1-\alpha)}{\beta} t}{\left(1 - r \frac{(1-\alpha)}{\beta}\right) t} \\
&= \frac{\frac{(1-\alpha)}{\beta}}{1 - r \frac{(1-\alpha)}{\beta}} = \frac{(1-\alpha)}{\beta - r(1-\alpha)} = \frac{1}{\frac{\beta}{(1-\alpha)} - r} = \frac{(1-\alpha)}{\beta - (1-\alpha)r}
\end{aligned}$$

Hence, in the steady state, the size of the Stabilisation Fund relative to revenue is determined only by the parameters, α and β , and the interest rate, r :

$$\frac{s}{x} = \frac{(1-\alpha)}{\beta - (1-\alpha)r}$$

To determine the dynamics of the transfers to be received by the government in the steady state, use Equations (A.3) and (A.4):

$$x = t - r \frac{(1-\alpha)}{\beta} t = \left(1 - r \frac{(1-\alpha)}{\beta}\right) t$$

Rearranging, the steady-state level of transfers from the Stabilisation Fund are a function of the share of revenues transferred to the funds, the α and β parameters choices, and the interest rate, r :

$$t = \frac{x}{1 - r \frac{(1-\alpha)}{\beta}}$$

Chapter 8

From oil to equities:

Applying the rule to illustrative country cases

In Chapter 4 reference was made to the manner in which the former head of the Norwegian sovereign wealth fund made the case for converting natural resource wealth into permanent financial wealth – or, as he described it, diversifying part of the nation’s wealth “from oil to equities”. The fiscal rule proposed in Chapter 7 does exactly the same thing, while recognising that the countries also need differentiate between the need to hold liquid assets for fiscal-stabilisation purposes and holding long-term assets to generate income and grow the financial portfolio. The flexibility of the rule also reflects an understanding that capital-scarce resource-rich countries may have economically or politically founded reasons why a greater share of current resource wealth needs to be spent in the near term rather than transformed into permanent financial wealth.

This chapter discusses the application of the fiscal rule proposed in Chapter 7 to five instructive country cases: Kazakhstan, Azerbaijan, Nigeria, Ghana and Saudi Arabia. The five countries differ in terms of their levels of initial savings, degree of resource dependence, the consumption of current resource revenues, their outlook for the future trend resource production, and in terms of their current public spending and investment needs. The application of the rule to these contrasting cases, therefore, allows us to assess how the framework operates in different circumstances.

Kazakhstan is an example a country that has accumulated significant savings in recent years, relative to the current level of spending and oil revenues. This enables high starting (or “initial”) levels for both the Stabilisation and Investment-Income Fund components of the sovereign wealth fund in the model. The country’s expected resource revenues trend assumes an initial increase, due to gradual price recovery and production increases, followed by a gradual decline. Despite the prospect of a gradual decline in oil production, therefore, Kazakhstan’s level of savings implies strong initial conditions through which to pursue reforms to their existing sovereign wealth fund structures, adopt a more rule-based saving and spending process, and raise the level of government spending in a sustainable way.

Like Kazakhstan, Azerbaijan has accumulated assets in its existing sovereign wealth fund structures – although its savings, relative to current spending, is less impressive. Azerbaijan also faces a less promising long-term outlook for oil production and revenues: revenues are expected to rise somewhat over the next five years due to a gradual recovery in oil prices, followed by a steady decline due to falling production. Azerbaijan's initial conditions are, therefore, similar to that of Kazakhstan, except with a lower relative level of savings and a less positive revenue outlook.

Nigeria has exceptionally high levels of resource dependence – and, consequently, limited room for saving from resource revenues, without reducing the level of spending (or enjoying large, unexpected revenue windfalls). Very low savings and an expected long-term decline in oil revenues compound Nigeria's challenges, after an initial period of rising prices and production. These conditions limit Nigeria's policy options around the use of oil revenues (and underline the importance of raising non-oil revenues to ensure the country's long-term fiscal stability).

As a typical emerging oil producer, Ghana is anticipating a sharp, but relatively short-lived, rise in resource production. Importantly, with oil revenues rising from current negligent levels, Ghana's current lack of fiscal dependence on oil (coupled with significant public spending and investment needs) establishes a policy choice between spending oil revenues as they arise; versus moderating the increase in spending due to new oil revenues, while saving a portion of those revenues over the expected production period to leave a financial endowment to support spending by future generations.

Finally, Saudi Arabia one of the world's largest oil producers, with massive proven oil reserves, most of which has a low marginal extraction cost. Saudi Arabia has also accumulated significant savings during previous oil revenue booms. However, the absence of robust fiscal rules results in a rapid depletion of these assets in bust periods. Given Saudi Arabia's very high dependence on oil revenues and rising long-term spending needs, the need for holding financial assets and generating investment income are acute.

Table 8.1: Initial conditions, strengths and weaknesses

	Kazakhstan	Azerbaijan	Nigeria	Ghana	Saudi Arabia
Existing savings	Very High	High	Very Low	Low	High
Level of current oil consumption, relative to revenue and savings	Moderate	High	Very High	N/A	High
Long-term outlook for oil production	Positive	Negative	Positive	Positive	Positive
Current public spending and investment needs	High	High	Very High	Very High	High
Current fiscal dependence on oil revenues	Moderate	Moderate	Very High	Very Low	Very High

The respective strengths and weaknesses of the five countries used as the examples in this chapter, as they pertain to the case-specific calibration of the fiscal rule, are summarised in Table 8.1. These initial conditions reflect those of many other resource-rich countries, so that the implications of the application of the fiscal rule discussed in this chapter has wider lessons for policymakers in resource-rich countries. These inputs affect the outcome of the calibration exercise for each country (using the methodology described in Section 7.3.5). Table 8.2 shows the stabilisation-parameter values identified for each country.

Table 8.2: Spending rule parameters for each country

	Kazakhstan	Azerbaijan	Nigeria (actual)	Nigeria (counterfactual)	Ghana
Alpha Anchor on previous year's stabilisation transfer	0.7	0.6	0.5	0.7	0.7
Beta Additional transfer from the Stabilisation Fund	0.1	0.1	0.05	0.05	0.1
Delta Transfer from the Investment Income Fund	0.05	0.05	0.05	0.05	0.05

8.1. Kazakhstan

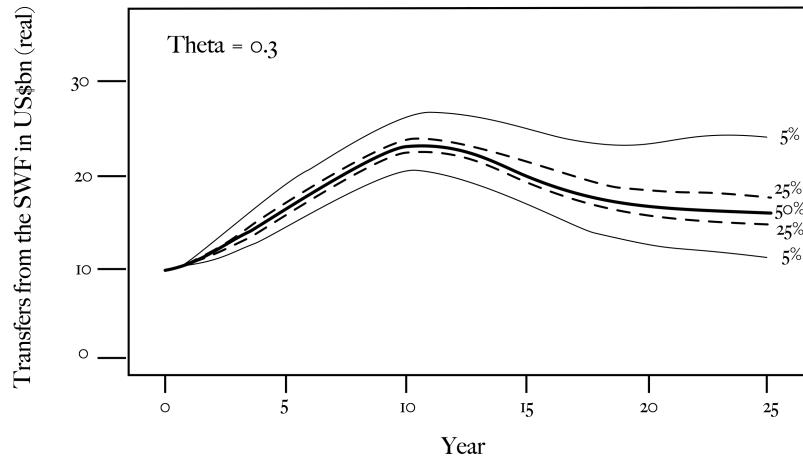
Kazakhstan is in the most favourable position with respect to fiscal sustainability of the five countries under consideration here. Indeed, its level of savings (assumed here to be \$64bn) relative to spending and oil revenues places it exceptionally high compared to a peer group of global oil-dependent economies. This position of strength is evident in the comparatively high parameters for the spending rule that can be permitted, following the selection criteria described in the previous chapter. The process identified parameters for Kazakhstan of $\alpha = 0.7$ and a $\beta = 0.1$; with $\delta = 0.05$, based on an assumed 5% real earning potential of the Investment Income Fund.

Figure 8.1, shows the modelled transfers from the two components of the sovereign wealth fund for Kazakhstan, with the calibration of the rule such that $\alpha = 0.7$, $\beta = 0.1$ and $\delta = 0.05$; coupled with different values for θ . As discussion in Chapter 7, θ is a discretionary policy variable that reflects preferences for the tradeoff between current and future (including permanent) spending; lower savings (lower values for θ) permit a significant scale-up in public spending over the first 10-15 years of the forecast horizon, but then results in a drop in spending as oil revenues decline, until spending ultimately stabilises at a long-run level based on earnings from the Investment Income Fund alone.

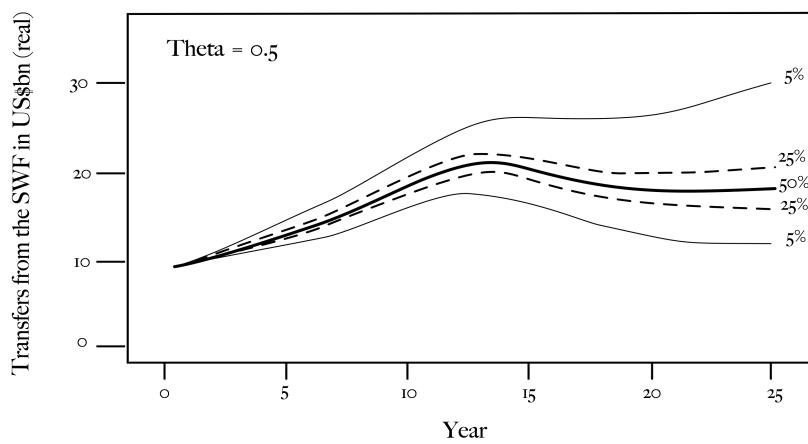
With a relatively low savings rate of 30%, Kazakhstan would be able to raise the level of spending based on oil revenue and financial income to around \$23bn per year under the central tendency in the distribution of outcomes (recall that all outputs in the model are expressed in real terms). However, beyond the peak in spending (achieved after 12-23 years in the forecast), spending would decline along with oil revenue, given the limited degree of savings – that is, limited transformation of depleting natural assets into permanent wealth. Eventually, oil-derived spending will stabilise around \$15bn per annum, based on income from the Investment Income Fund. Higher saving rates of 50% and 70% allows for a more stable spending profile over the forecast horizon. With a 50% savings rate, spending rises gradually to a peak under the central tendency of around \$20bn before declining slightly and stabilising around \$18bn in perpetuity. In that sense, the Investment Income Fund completely replaces oil as store of national wealth and source of fiscal income (note that the simulated values of the Stabilisation and Investment Income Funds, for all countries under various savings rates, are included in the Appendix to this chapter).

Figure 8.1: SWF transfers for Kazakhstan with different savings rates

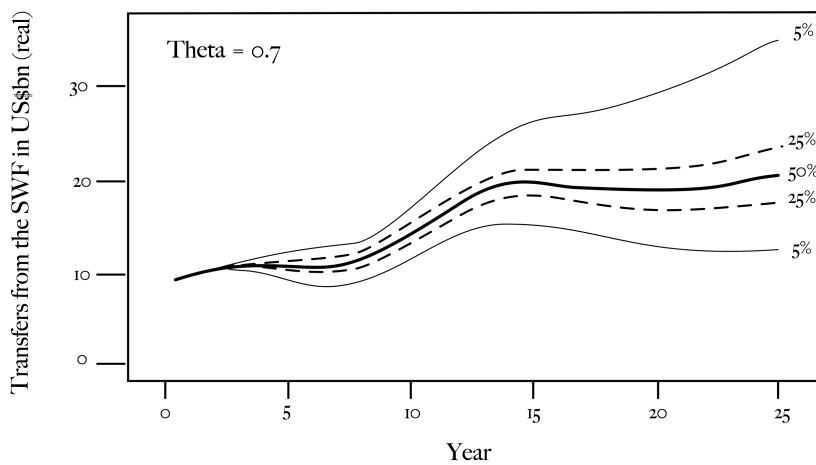
8.1.a. Low savings (30% transfer to the Investment Income Fund)



8.1.b. Medium savings (50% transfer to the Investment Income Fund)



8.1.c. High savings (70% transfer to the Investment Income Fund)

**Note:** all values are expressed in real terms

The lessons and policy implications of the modelling of the rule for Kazakhstan can be summarised as follows. The Kazakh example demonstrates above all the value of previously accumulated saving: the high level of accumulated assets enables high value for the key parameters in the spending rule, with the practical implication that spending is firmly anchored, and can rise over time through growth in the value and earnings from the Investment Income Fund. Under more conservative formulations of the fiscal rule, with higher saving rates, spending stabilises in perpetuity at a high level: roughly double that (in real term) of Kazakhstan's current level of spending from oil and transfers from its sovereign wealth fund.

Another implication for the results for Kazakhstan, and particularly how the spending rule shapes the trajectory of spending over time under different savings rates (that is, different values for θ), is that previously accumulated savings have effective "bought" Kazakh policy options for the future. Policymakers can have many valid reasons for choosing different saving rates. It may be that urgent infrastructure investments are required – for example, in the oil and gas sector, in order to raise future expected revenues beyond those used as a baseline in the modelling for Kazakhstan; or in the non-oil economy with the potential to create non-resource based economic activity and revenue. Under such circumstances, a relatively lower savings rate (for example, a θ of around 0.3), which will enable a significant, but still stabilised, increase in the level of spending over the coming decade, while still leaving an endowment for future generations in the form of an Investment Income Fund, so that the decline in spending once oil depletes is not too severe. Alternatively, policymakers may be concerned about identified future liabilities, requiring a much higher savings rate. As the simulation demonstrated, due to the high level of previously accumulated savings, Kazakh policymakers have a greater set of feasible policy options than many other economies enjoy.

8.2. Azerbaijan

In anticipation of this gradual decline in oil revenues, the two-fund version of the fiscal rule is necessary, if policymakers wish to both stabilise spending, and to some degree increase or maintain the current level of spending even as oil revenues decline. In order to achieve the latter (in the context of declining oil

production), an Investment Income Fund that receives a share of existing and future savings out of future oil revenues, is required to transform depleting oil assets into a permanent financial wealth.

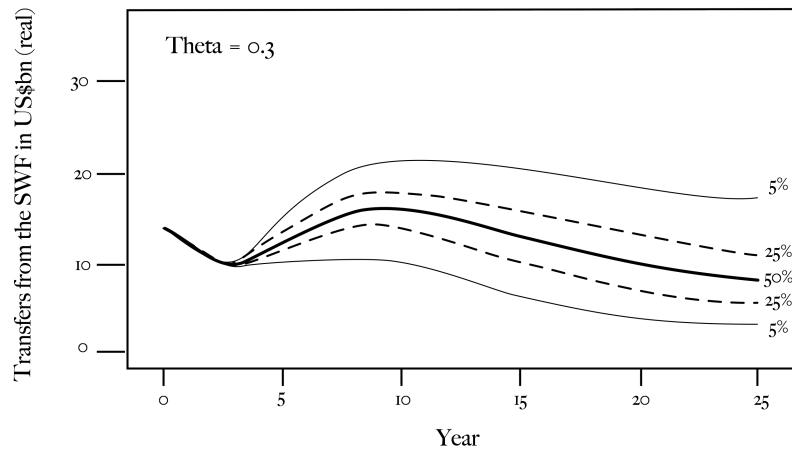
As noted previously, the stabilisation parameters identified for Azerbaijan are for $\alpha = 0.6$ and a $\beta = 0.1$. An alternative specification of $\alpha = 0.7$ and a $\beta = 0.075$ would also have been possible, and created almost identical results. As in all examples discussed here, $\delta = 0.05$, based on an assumed 5% real earning potential of the Investment Income Fund. A parameter choice of $\alpha = 0.7$ and a $\beta = 0.1$ would be possible, however, it risks very low levels of spending and a depletion of the Stabilisation Fund under an unsatisfactorily high percentage of outcomes in the model (that is, in more than 5% of the simulated outcomes).

Figure 8.2 shows the modelled transfers from the two components of the sovereign wealth fund for Azerbaijan, with the calibration of the rule such that $\alpha = 0.6$, $\beta = 0.1$ and $\delta = 0.05$; coupled with different values for θ . For a low θ of 0.3, implying savings from oil revenues of 30% respectively, note that spending rises following a small, temporary drop over the first few years of the forecast, due to the sharp drop in oil revenues and a slightly higher-than-sustainable initial level of spending. With $\theta = 0.3$, spending from oil revenues and investment income rises to around \$18bn after ten years (based on the central tendency in the distribution of modelled transfer paths). However, the low level of savings and transfers to the Investment Income Fund under this scenario results in a gradual decline in spending as resource production declines. Eventually, the Stabilisation Fund will deplete, in line with oil revenues, and spending from saved oil wealth will stabilise below \$10bn per year (in the central tendency), based on earnings from the Investment Income Fund alone.

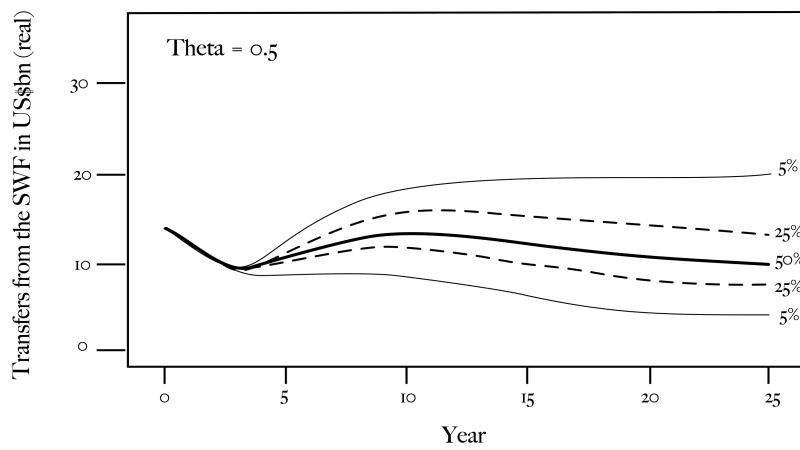
If policymakers wish to maintain a flatter and more stable level of spending across the forecast horizon, including when oil production has ended, higher savings ($\theta = 0.5$ or 0.7) are necessary to generate stream of a permanent income. As shown in Figure 8.2, savings of 50% and 70% achieve this objective. A 50% savings rate still generates an increase in the level of spending over the first 10-15 years, followed by a small decline: under the central tendency, spending rises to around \$12.5bn per year, before declining and eventually stabilising around \$10bn per year. A high savings rate of 70% establishes the flattest spending profile, with spending stabilising at around \$12bn per year in the central tendency in perpetuity.

Figure 8.2: SWF transfers for Azerbaijan with different savings rates

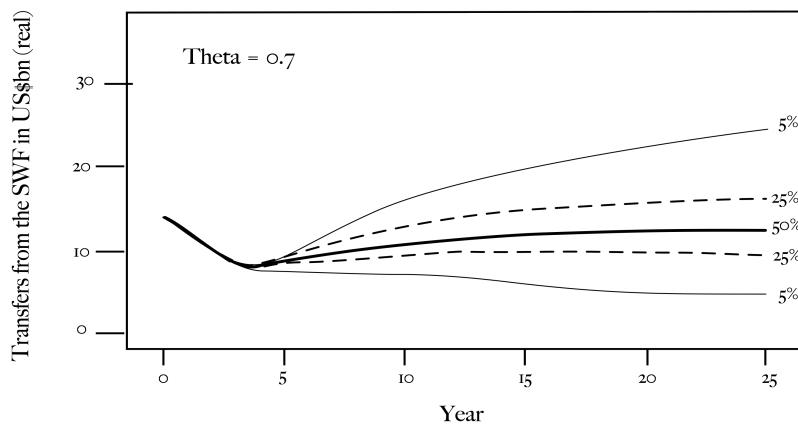
8.2.a. Low savings (30% transfer to the Investment Income Fund)



8.2.b. Medium savings (50% transfer to the Investment Income Fund)



8.2.c. High savings (70% transfer to the Investment Income Fund)



Note: all values are expressed in real terms

The lessons and policy implications from the Azerbaijan example can be summarised as follows. Given that the oil revenues are assumed to peak and then start to decline within a decade, the government needs to maintain a high savings rate of at least 50% (but more likely 70%) of oil revenues, if indeed it wants to maintain current levels of spending from oil revenues. Of course, the government could decide *not* to do so, but that would require raising alternative sources of fiscal revenue through which to finance and maintain future public spending.

Second, in order to ensure the fiscal stability of the rule, a small (tolerable) degree of initial spending is required under all savings rates – that is, all the outputs in Figure 8.2 show a small drop in spending over the first three years of the forecast. This suggests that current levels of spending are slightly higher than sustainable, given the level of initial savings and the assumed revenue outlook (additional savings of around \$10bn would have completely eliminated the initial drop in spending). This is consistent with suggestions by the International Monetary Fund (2014) that savings from oil revenues over the past decade are “insufficient”.⁷⁹

8.3. Nigeria

Nigeria has encountered many difficulties with respect to the management of its oil sector and, in particular, oil revenues. These problems manifest in a number of ways, but one that is particularly pertinent to the calibration of the fiscal rule for the country, is that unlike many oil- and other commodity-producing countries, Nigeria has not accumulated significant financial assets and reserves during previous revenue booms, including the most recent one between 2003-14. This lack of initial funds means that the country faces a difficult set of choices around the current and future use of oil revenues, as expressed in through the fiscal rule.

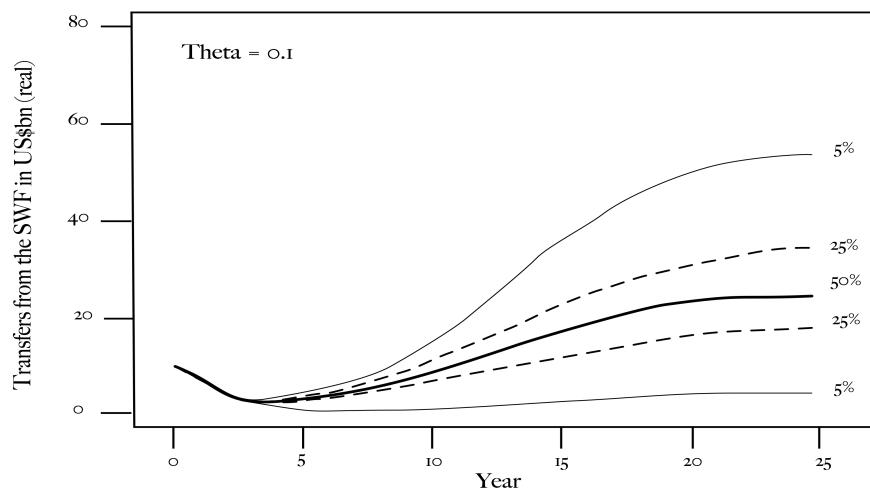
⁷⁹ IMF. (2014a). Republic of Azerbaijan: 2014 Article IV Consultation-Staff Report, 11 June 2014.

One option would be to significantly reduce the level of oil-revenue consumption in order to build up such funds, which is only really feasible under a scenario of a significant recovery in oil prices and revenue.⁸⁰ Alternatively, Nigeria may need to give up on the idea of leaving any substantial financial endowment to future generations and redouble efforts to grow the non-oil economy and non-oil revenues (recall that oil has accounted for more than 90% of consolidated government revenue since 2005). Under the latter approach, Nigerian policymakers would still be advised to adopt the single-fund version of the rule, and focus on the objective of reducing the volatility of oil-based spending through the spending rule and a Stabilisation Fund. The impact of these two policy choices is discussed below.

Even if somewhat charitable assumptions about Nigeria's starting point for the calibration of the model are made, the challenges are severe. Assume that the initial level of spending from oil is \$10bn per year (derived from the latest IMF Article IV consultation report); and that Nigeria has \$5bn in saved assets split between \$4bn in the Stabilisation Fund and \$1bn in the Investment Income Fund, which is broadly in line with the assets of the stabilisation and savings components of the Nigerian Sovereign Investment Authority (leaving some room for the transfer of other surplus assets, such as those from the Excess Crude Account).

It is immediately apparent that the rule all but fails in the Nigeria context. Given the combination of a higher ratio of spending relative to oil revenues (indeed, spending is almost double that the size of assumed oil revenue at the start period of the simulation) and a low level of savings, the best combination of parameters for Nigeria are a low $\alpha = 0.5$ and $\beta = 0.05$. Moreover, these parameters need to be combined with incredibly low savings rates in order to avoid a high probability of depleting the Stabilisation Fund. Given an $\alpha = 0.5$ and $\beta = 0.05$, a $\theta = 0.1$ results in a depletion event in 5.5% of the simulated outcomes; while higher savings rates are not feasible (or at least introduce significant risk of depletion of the sovereign wealth fund), as they raise the probability of default (to 6.6% for an $\theta = 0.2$, 7.7% for $\theta = 0.3$, and 11.2% for $\theta = 0.4$). Figure 8.3 shows the results of the calibration of the rule for Nigeria with $\alpha = 0.5$ and $\beta = 0.05$, a $\theta = 0.1$.

⁸⁰ One way in which this may occur is through a sharp increase in oil production relative to current expectations, through significant new discoveries and investment in exploration. While there are a number of estimates that suggest Nigeria still has significant unproven oil reserves and scope for large production increases, this is too speculative an outcome to be the basis for prudent policy.

Figure 8.3: SWF transfers for Nigeria with a 10% savings rates

Note: all values are expressed in real terms

The outcome of the rule, calibrated in this manner, is nothing short of disastrous for Nigeria, resulting in a simply unbearable drop in oil-derived spending over the first decade of the forecast horizon. In the central tendency of the range of modelled outcomes, oil-based spending drops from \$10bn per year to around a meager \$2bn by 2020, before rising gradually.⁸¹ The model does suggest a sustainable level of real spending around \$25bn – but this is only achieved at the end of the forecast horizon (that is, around 2040). It is unlikely that policymakers would commit to the level of austerity proposed by the model in order to possibly achieve this outcome in the distant future.

An interpretation of this result is that the drop in spending underlines the cost to Nigeria of not having saved a share of resource revenue in the past decade through a sovereign wealth fund that could be used in future to stabilise and diversify revenue sources. Consequently, the dramatic drop in oil revenues means that spending has to drop to unfeasible levels in order to avoid a depletion of existing funds and build up funds large enough to stabilise spending and have a permanent income stream in the long run. As

⁸¹ One partially mitigating factor in this precipitous drop would be the exchange rate. The primary reasons why the funds are at such high risk of depletion in the Nigeria case are the country's low initial savings and the expectation that oil revenues are set for a sharp decline over the period 2016 – 2020 (as per Table 7.2), based on IMF Article IV assumptions. However, the system is modelled in terms of US dollar – in reality, the Nigeria naira weakened dramatically after 2014 when oil prices collapsed, so the domestic-currency value of the drop in spending is less severe. Over the medium term, however, the assumption is that these exchange effects disappear.

previously discussed in reference to policymakers' preferences, such a drop in spending is politically unfeasible (as well as potentially devastating to the real economy). Therefore, a different approach to the calibration of the model that reflects these realities should be considered. Policymakers could argue that the country has massive current infrastructure and human capital investment needs, coupled with significant growth potential in the non-oil economy, if these investments are made. Consequently, following the arguments of Collier *et. al.* (2010), it could be argued that Nigeria does not need to establish a permanent income stream from oil, as over time the economy will develop and diversify generating alternative revenue source (arguably even more so if it uses oil revenues today to invest in much needed infrastructure and human capital).

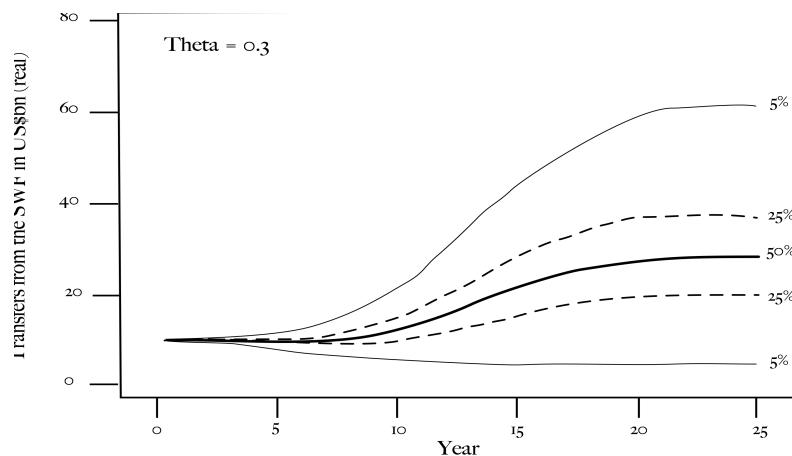
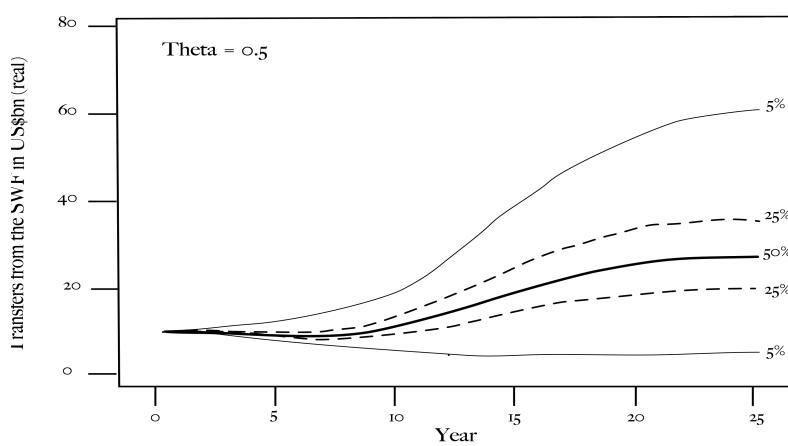
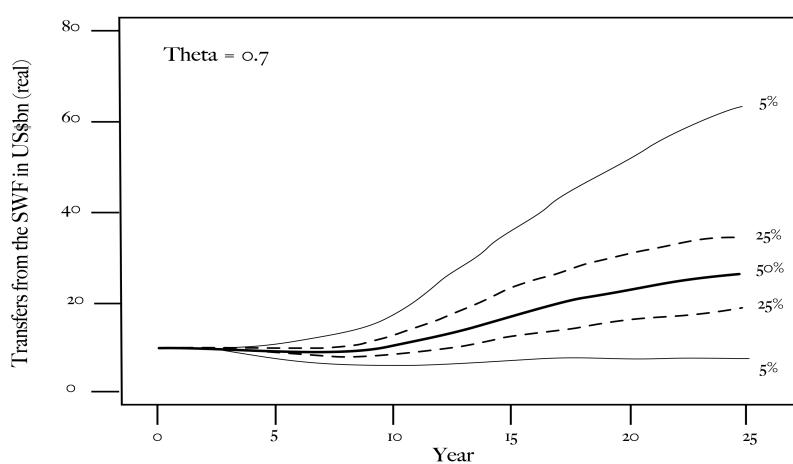
Under this approach, the government would abandon efforts to build up an Investment Income Fund, and rather focus only on stabilising oil revenues over the lifecycle of oil production. In terms of the calibration of the model, these choices would amount to Nigeria putting all previously accumulated savings – as well as future oil revenues – into the Stabilisation Fund (that is, $\theta = 0$). This approach would still require some reduction in the level of spending and/or saving out of future oil revenues in order to build a larger Stabilisation Fund; but after that, the spending profile will mirror the resource revenue profile (albeit in a more stabilised form).

Another way to demonstrate the power of accumulated savings is to consider a counterfactual scenario in which the rule is calibrated under the assumption that Nigeria does have significant savings to draw upon. Consider, for example, that Nigeria received an estimated \$440bn in oil revenues between 2000 and 2013. In Chapter 6 it was shown that a simple saving of revenues arising above a \$40 per barrel Brent crude price (based on a 2000 real price for oil) would have resulted in a total \$144bn in savings over this period (a number that would have grown to between \$165bn if these savings were invested in a globally diversified portfolio and the proceeds reinvested).⁸²

⁸² Oil theft – both at the pipeline and from revenues – is another way to think about missed opportunities for savings. Oby Ezekwesili, a former vice president of the World Bank, suggested in 2012 that Nigeria has lost an estimated \$400bn in oil revenues since independence, while the country's Petroleum Revenue Special Task Force estimates that Nigeria lost an \$29bn between 2002 and 2012 alone due to a gas price-fixing scam; coupled with an additional \$6bn on average per year in lost revenue due to oil theft (British Broadcasting Corporation, 2012). Separately, Lamido Sanusi, the former governor of the Central Bank of Nigeria, has suggested that the Nigerian National Petroleum Corporation, the country's national oil company, failed to remit a total of \$49.8bn to the national treasury in a matter of only 7 months between January and July 2013 (Iriekpen, 2016).

Even with more conservative assumptions around the level of initial savings available in 2015, so that the initial size of the Stabilisation Fund is \$50bn and that of the Investment Income Fund is \$40bn, the spending rule could then have been calibrated with parameter values of α , β and δ of 0.7, 0.05 and 0.05, respectively – therefore with a higher α than before, which reduces the magnitude of the drop in spending due to lower oil revenues from 2016 through 2020. As shown in Figure 8.4, this rule combined with different savings rates would almost guarantee no reduction in oil based spending (in the central tendency of the distribution) in response to the dramatic drop in oil revenues included in the assumptions, as there is enough money in the sovereign wealth fund to cushion the decline in revenue. Such small reductions in oil-based spending could conceivably be met with higher non-oil revenues, without inflicting major damage on the real economy.

With lower saving rates, the level of spending peaks around 2035 (around 20 years into the forecast horizon, which is just after oil production and revenues are assumed to have peaked). Under a scenario in 50% of oil revenues are transferred to the Investment Income Fund, the level of oil-derived spending reaches \$20bn by 2030 under the central tendency of the distribution, and permanently stabilises around \$30bn (including beyond the forecast horizon). The extent of the trade-off involved with different savings rates on spending levels in the very long term is not apparent in Figure 8.4, as it mostly takes effect over a horizon that extends beyond the forecast horizon modelled here. However, the level at which spending stabilises with a savings rate of $\delta = 0.3$ after oil revenues deplete will be lower than that which is possible in perpetuity with higher savings rates, such as $\delta = 0.5$ or 0.7 (although the impact of this difference will largely occur beyond the forecast horizon employed here).

Figure 8.4: Counterfactual SWF transfers for Nigeria with higher initial funds**8.4.a. Low savings (30% transfer to the Investment Income Fund)****8.4.b. Medium savings (50% transfer to the Investment Income Fund)****8.4.c. High savings (70% transfer to the Investment Income Fund)**

Note: all values are expressed in real terms

The policy implications from these simulations for Nigeria are relevant not only for the country, but for their more general application regarding the power of savings and the limited options policymakers in resource-dependent countries have in the absence of such savings. The model underlines how difficult it will be for Nigeria to achieve both stabilisation and savings objectives given its current starting point and the expectations of dramatically lower oil revenues over the first few years of the forecast horizon. The country has not taken the opportunity of previous oil revenue booms, including the most recent one, to accumulate savings. This limits Nigeria's policy options for the future, given the assumption of a long-term decline in oil revenues, which is assumed to start around 2026, following an initial increase in revenues up to that point. Realistically, this leaves Nigeria requiring a combination of reduced spending from oil, increased oil production (much of which is not in policymakers' control), and significant growth in non-oil revenues.

It may be more realistic for Nigeria to forgo efforts to generate a permanent source of income financed by oil, and rather aim to merely stabilise oil revenue over the remaining years of production, while attempting to raise both oil and non-oil revenue. The spending rule – and the Stabilisation Fund component of the sovereign wealth fund – would remain essential to stabilising the volatility of oil revenues under this option; as would the ability transfer a share of future revenues to the fund to prevent its depletion in response to future negative oil-revenue shocks. Finally, the counterfactual demonstrated forcefully the extent to which Nigeria would have faced much less acute tradeoff if a larger (but not implausibly large) share of past oil revenue were saved.

8.4. Ghana

The Ghanaian example is different from the three countries discussed above, as it is not yet a major producer of oil and does not derive a significant share of revenues from oil. Oil production is, however, to grow significantly over the next 10-15 years, followed by a gradual decline (absent any additional discoveries of oil deposits, which is certainly not impossible, given the extent of exploration and investment in Ghanaian oil over the past decade). Given comparatively small amount of oil revenue currently being generated, Ghana faces the prospect of very significant growth in oil revenues, as

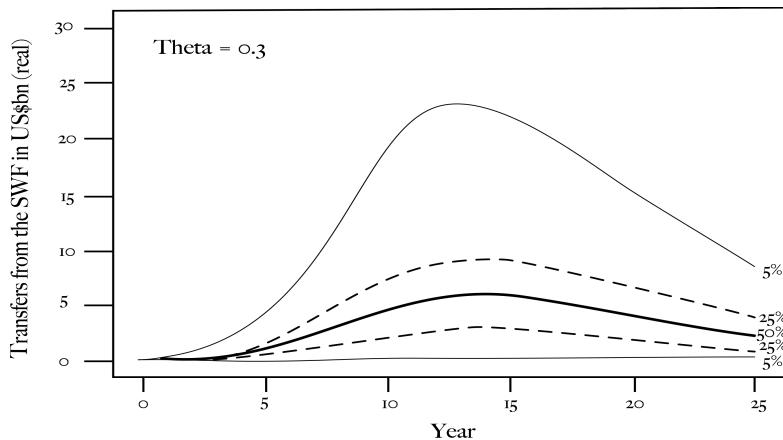
production (and potentially oil prices) increase rapidly. Indeed, uncertainty around the outlook for the magnitude and timing of future oil revenues in the case of Ghana is driven not only (or even mainly) by the volatility of oil prices, but by uncertainty around production levels and the size of deposits. This combination of factors – along with other aspects, such as the large public spending needs – are typical of a large number of low-income countries with recent resource discoveries, not least a number of other African countries, such as Uganda, Tanzania and Mozambique.

Given the low level of past oil revenues, Ghana is essentially “starting from scratch” and is not assumed to have access to significant savings or a high level of initial spending of oil-derived revenue at the start of the forecasting period. Assume that initial spending is equal to \$0.2bn, while the Stabilisation Fund and Investment Income Fund hold \$0.3bn and \$0.2bn, respectively (in line with the report assets of the Ghana Stabilisation Fund and the Ghana Heritage Fund). The key parameters, α , β and δ are set as 0.7, 0.10 and 0.05, respectively. Figure 8.5 shows the results of the spending rule calibrated for Ghana, using these parameters.

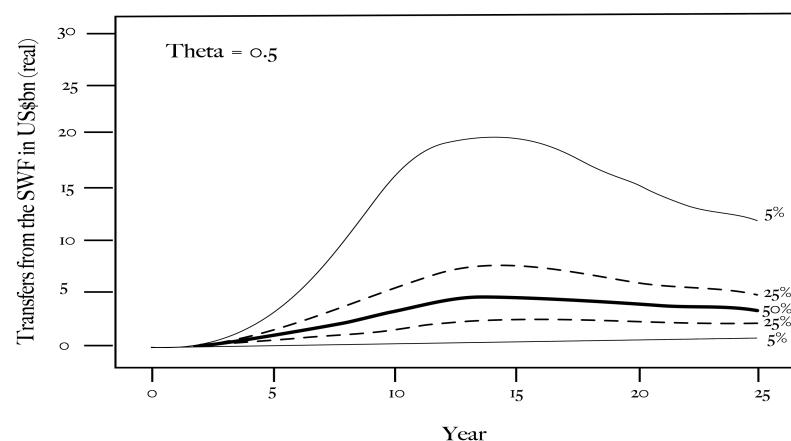
The high-savings strategy – that is, transferring 50–70% of oil revenues to the Investment Income Fund – may be prudent in the Ghanaian case, given the rapid level increase and decrease in the oil revenues (production driven), as well as the fact that oil production is assumed here to completely cease by 2040. Note, however, that even a high saving rate of 70% ($\theta = 0.7$) permits a significant rise in oil-related spending, which will raise to \$2bn per year from negligible current levels over the first 10 years of the forecast horizon, and stabilise in perpetuity at a level around \$5bn per year (all based on the central tendency of the distribution of simulated outcomes). All of this would, of course, be additional to the levels of spending that existed prior to the discovery of oil and is funded from other fiscal revenues outside of oil (assuming that oil revenues do not crowd out these alternative sources of fiscal revenue).

Figure 8.5: SWF transfers for Ghana with different savings rates

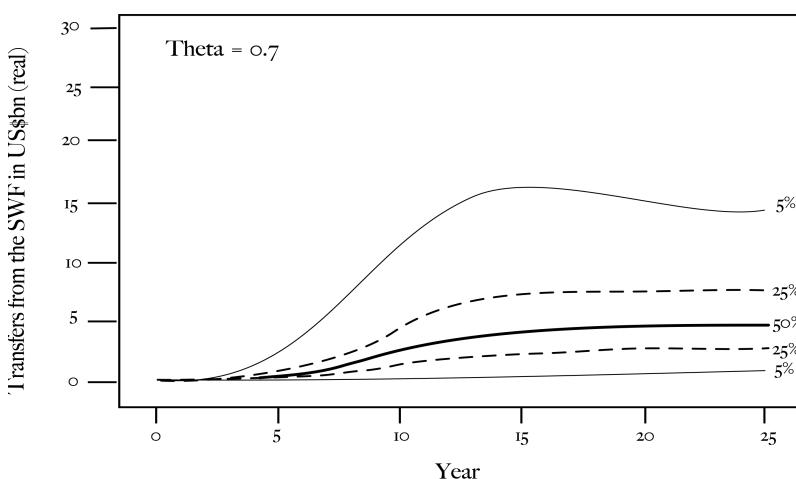
8.5.a. Low savings (30% transfer to the Investment Income Fund)



8.5.b. Medium savings (50% transfer to the Investment Income Fund)



8.5.b. High savings (70% transfer to the Investment Income Fund)

**Note:** all values are expressed in real terms

If the combined objectives of Ghanaian policymakers are to: first, stabilise the volatility of incoming oil revenues; second, raise the level of oil-based spending gradually over the first decade of oil production; and third, maintain the level of oil-based spending at or near its peak levels once oil revenues start to decline (through income from the Investment Income Fund), the rule implemented with a high savings rate achieves these combined goals. Of course, as with all other countries, policymakers may wish to spend a greater share of oil revenues upfront, but this leaves a smaller Investment Income Fund for the future generations in the post-oil period and hence of lower level of sustained spending. A savings rate of 30% ($\theta = 0.3$) allows oil-related spending to increase to around \$7bn after 15 years (in the central tendency of the distribution of simulated outcomes); followed by a decline as oil revenues deplete.⁸³ The smaller allocation of revenues to the Investment Income Fund results in a stable permanent level of oil-related spending of around \$2.5bn in real terms (under the central tendency) once oil production ends. Regardless, of the savings rate chosen, the spending rule proposed here will stabilise the short-term volatility in spending.

The following conclusions can be drawn from the calibration of the model for Ghana – a case that holds useful insights for other low-income countries with the prospect of new resource production and a concomitant increase in new resource revenues. First, being a new resource producer, with low levels of resource dependence and an established set of non-resource revenue sources, provides scope for implementing sound savings and stabilisation policies. Indeed, the challenge could be framed as one of not allowing new resource revenues to introduce unwanted cyclical and dependence into the fiscal framework – risks that the fiscal rule would help prevent.

Given the sharp rise in oil production, Ghana would still see a significant rise in spending from oil revenues and associated financial income – even under the most conservative savings policy modelled here. This rise would be more stable and predictable than simply spending income oil revenue in the absence of a sovereign wealth fund and a fiscal rule; and place Ghana on a path to maintain a high level of

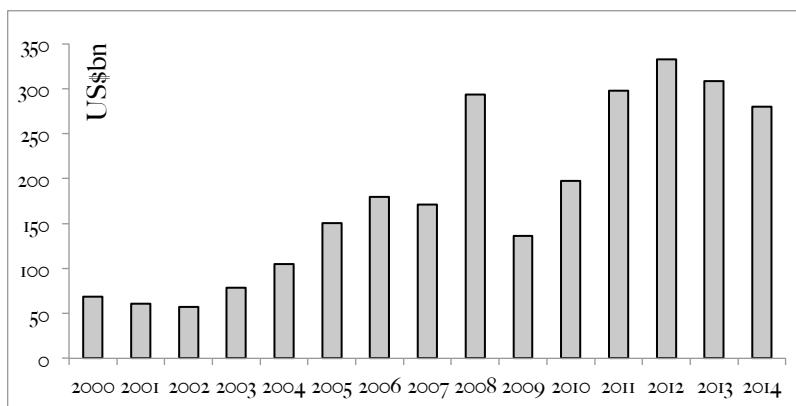
⁸³ Note that the distribution of outcomes under the low-savings scenario has very fat tails. This is because the calibration of the rule in this manner makes oil-related spending almost entirely dependent upon the modelled distribution of oil revenues. Given the methodology employed to simulate a distribution of revenue outcomes around an assumed path (discussed in Chapter 7), this results in a small probability of very high revenue outcomes (for example, in the top 5% of outcomes, spending from oil revenues can peak at around \$25bn per year due to low savings and high revenues).

oil-based spending in perpetuity; long after oil production has stopped. The calibration of the model provided here would be robust to any shocks to the level of oil production – for example, if new discoveries result in a secular rise in revenues above the expected path. Such a development would simply lead to a faster ramp up in government spending and/or a higher level of permanent spending in the future through faster than expected growth in the Investment Income Fund.

8.5. Saudi Arabia

The four examples discussed above involve calibrating the parameters of the fiscal rule to meet a set of policy objectives based on input assumptions and forward-looking simulations of a number of critical variables. It is, however, also instructive to evaluate the fiscal rule in a backward-looking manner, which this section does by constructing a counterfactual in which Saudi Arabia is modelled to have adopted the fiscal rule at the end of 2004 (that is, the rule applied as of the 2005 fiscal year).

Figure 8.6: Annual Saudi oil revenue for 2000-2014



Source: Official data from the Saudi Arabian Monetary Agency

This exercise has the benefit of enabling the use of observed, rather than simulated, data on oil revenues and financial-market returns, as per the counterfactuals based on simpler rules-of-thumb for savings in Chapter 6.⁸⁴ As was done in those exercises, the returns of the Investment Income Fund are proxied by

⁸⁴Note also that whereas the findings for the previous four countries in this chapter were expressed in real terms, this Saudi counterfactual uses actual (observed) data and the results are in nominal terms.

the annual returns generated by a globally diversified portfolio, while the observed yield on ten-year US Treasury bonds serve a proxy for Stabilisation Fund returns. Oil-revenue data are taken from official data released by the Saudi Arabian Monetary Agency and are shown in Figure 8.6.

Before discussing the counterfactual application of the fiscal rule for Saudi Arabia, it is instructive to highlight a number of structure features and characteristics that frame the policy challenges confronting Saudi policymakers with respect to the management of the country's oil wealth and financial assets.

8.5.1. Framing the policy challenge: structural features of the Saudi economy

Saudi Arabia has been the world's leading oil producer from several decades and is set to continue receiving significant revenues from oil for decades to come – its deposits of commercially viable proven oil reserves are unrivalled, and it is conceivable that Saudi Arabia will be able to maintain stable levels of oil production for decades to come. Moreover, Saudi Arabian oil is amongst the cheapest to extract worldwide, making it one of the most resilient producers in a low-price environment (a fact that featured prominently in the Saudi Arabia's rhetoric and supply strategy during and after the late-2014 collapse in oil prices). In addition to its oil wealth, Saudi Arabia has amassed several hundreds of thousands of dollars in savings from previous revenue booms, held in foreign exchange reserves and other official investment vehicles. Yet, despite its natural and financial wealth, Saudi Arabia faces significant fiscal challenges in both the short and long term, as discussed below.

8.5.1.a. Savings at risk of depletion

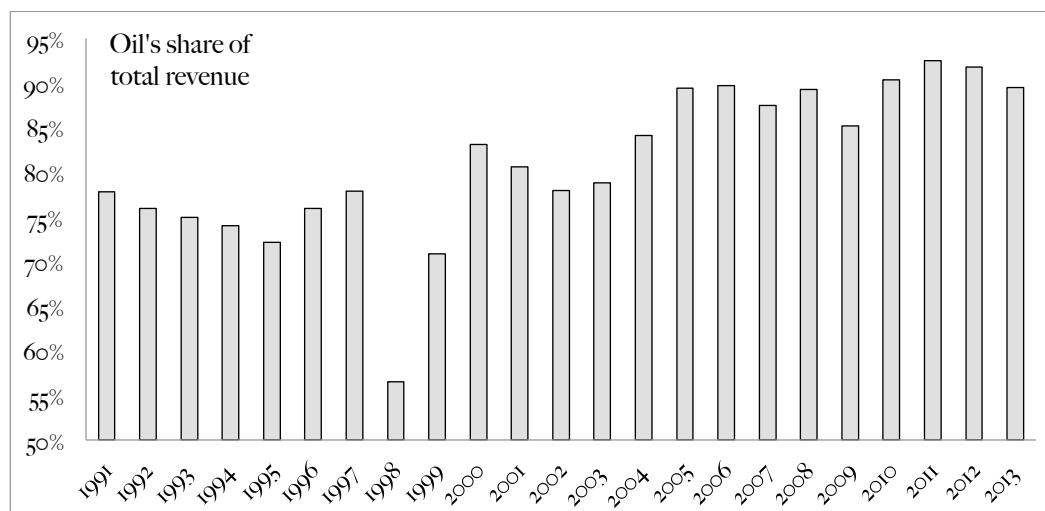
The drop in global oil prices in the second half of 2014 resulted in large fiscal deficits and a decline in officially reported foreign exchange reserves from more than \$750bn at peak (in mid-2014) to \$580bn as of the end of the first quarter of 2016. After more than a decade of rising oil prices and revenues, fiscal surpluses and growing reserves, the prospect of sustained period of oil price post the 2014 collapse will put the Saudi Arabia's savings from earlier oil revenue booms at risk of depletion. The IMF calculated that if total government spending rises at an annual compound growth rate of 4.5%, while oil revenues were on average 30% below the baseline forecast between 2014 and 2019 (where the baseline was simply an extrapolation of the preceding five years), SAMA's assets would fall by around \$450bn by 2019. Both the

observed and modelled depletion of reserves are a direct result of the absence of binding fiscal rules that constrain spending growth and establish a mechanism for using the earnings on accumulated assets in a sustainable way.

8.5.1.b. Oil dependence: high and rising

The Saudi economy and fiscal health remains highly dependent on oil. Moreover, oil dependence has risen persistently since the late 1970s, is most apparent in relation to government revenue. Figure 8.7 shows the extent to which the share of total government revenue derived from oil has trended upward since early 1990s and exceeded 90% in the last few years of the previous oil boom. Even in low oil-price environments, oil's share of total revenue has remained above 80%. Exceptionally high oil dependence is also evident in the composition of Saudi Arabia's exports, where oil and its derivatives account for almost all the growth in Saudi exports since the mid-1990s. Crude oil accounts for around three-quarters of exports, while refined oil and petroleum gases account for an additional 10% (Hausmann *et. al.*, 2011).

Figure 8.7: Increasing fiscal dependence on oil



Source: Official data from the Saudi Arabian Monetary Agency

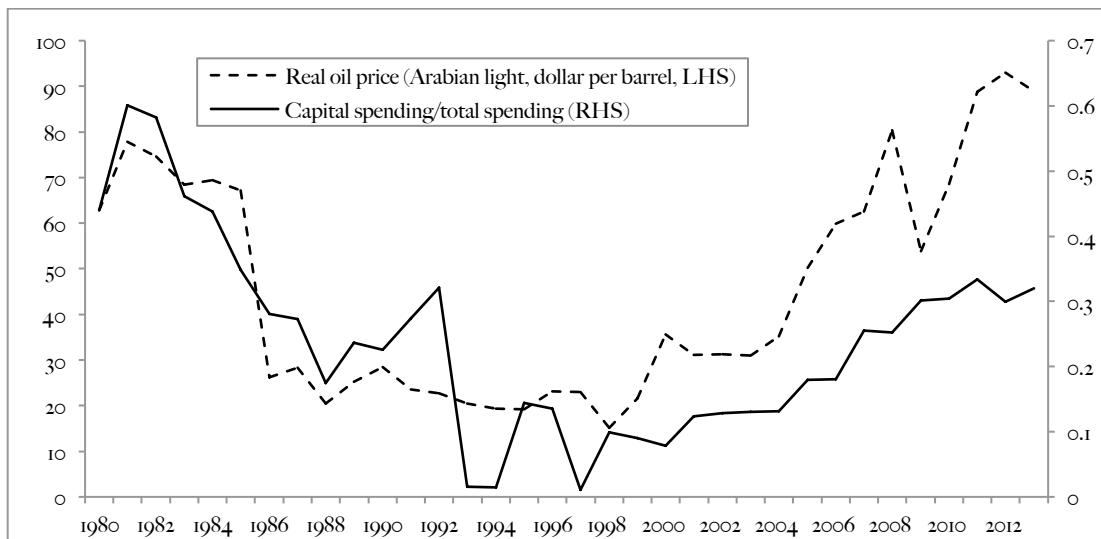
As with many other dependent economies, foreign-currency export earnings are particularly important for Saudi Arabian economic (and social) stability, as the majority of consumer and capital goods are imported. Moreover, the Saudi riyal is fixed to the dollar, which requires holding sufficient foreign assets

at all times to maintain the fixed exchange rate. A substantial depletion of reserves could endanger the stability of the Saudi riyal peg.

8.5.1.c. Oil-induced volatility in revenue, debt and capital spending

As a direct corollary of Saudi Arabia's dependence on oil, fiscal variables are volatile and medium- to long-term patterns are closely correlated with cyclical developments in the energy markets. The absence of countercyclical fiscal rules in Saudi Arabia is evident in the close connection between the share of capital expenditure in total expenditure to oil prices, as shown in Figure 8.8. This suggests that, when even Saudi policymakers have been able to maintain relatively stable spending growth throughout periods of short- and medium-term oil-price volatility, the burden of adjustment has historically fallen heavily on the capital-spending component of the budget.

Figure 8.8: Oil-driven cyclicity in capital spending



Source: Official data from the Saudi Arabian Monetary Agency

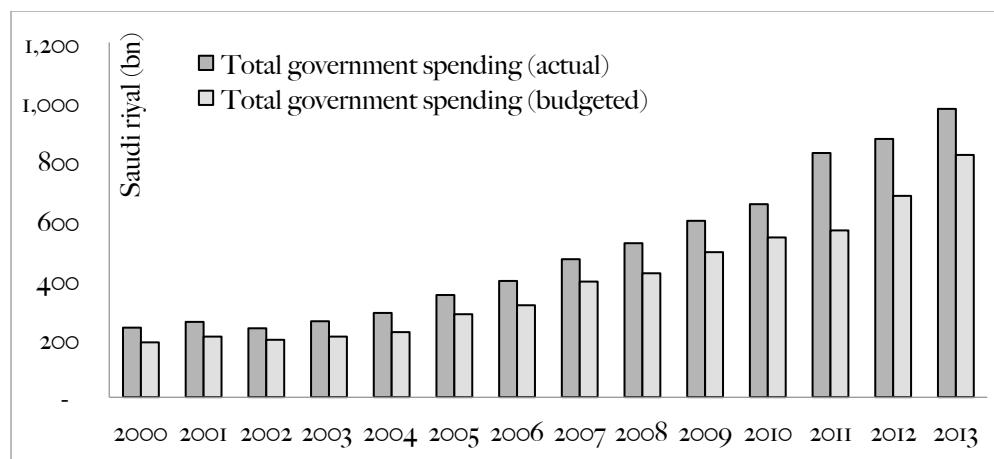
Note that capital spending as a share of total spending fell sharply when oil prices and revenue fell in the 1980s and early- to mid-1990s, and only partially recovered during the significant price- and revenue boom from 2005 onwards. Saudi Arabia's debt dynamics are similarly correlated with cyclical developments in oil prices. From the mid-1980s to the turn of the century, the Saudi Ministry of Finance issued a substantial amount of debt, as oil prices and revenues remained below the levels of the late-1970s. The

debt-to-GDP ratio rose from very low levels to 103% of GDP by 1999. When oil prices and revenues rose again between 2005 and 2013, public debt was aggressively reduced to only 1.6% of GDP.

8.5.1.d. The absence of countercyclical fiscal rules or anchors

The use of assets accumulated during previous booms to smooth out fluctuations in fiscal spending is not the problem – indeed, it is quite common and generally desirable in the context of resource-rich countries, as discussed in relation to the function of Stabilisation Funds in Chapter 4 and as per the contingent, countercyclical nature of the fiscal rule introduced in the previous chapter. However, such a policy requires the consistently applied countercyclical policy. While elements of such a countercyclical fiscal framework are in place, they remain at the discretion of policymakers, rather than predictable and rule based. While the investment arm of the Saudi Arabian Monetary Agency can be described as a “quasi sovereign wealth fund” – its investment strategy and size (at peak) is comparable to that of the sovereign wealth funds of Norway, Abu Dhabi and Kuwait – is not as formally bound in a rule-based fiscal framework, and the majority of its assets are therefore exposed to fiscal pressures. In short, there are no time-consistent savings- and spending rules for the use of oil revenues and the Saudi Arabian Monetary Agency’s assets.

Figure 8.9: Actual versus budgeted total government spending



Source: Official data from the Saudi Arabian Monetary Agency

The degree to which fiscal policy is not countercyclical over the whole cycle, is evident not only in the sharp rise in spending over the course of the last oil revenue boom, but also in *ad hoc* increases in spending of this period. Figure 8.9 shows that actual spending was consistently raised above the budgeted amount in every year from 2000 onwards, as oil revenues exceeded budgeted assumption – suggesting a procyclical and *ad hoc*, rather than countercyclical, response to positive oil shocks. In short, while the Saudi authorities claim to embrace countercyclical spending policies during low-revenue periods, their actions are procyclical in boom periods.

8.5.i.e. Long-term fiscal and demographic pressures

The major Saudi Arabian government spending categories are defense, education, and healthcare and social affairs – together these three categories account for 80% of the 2015 budget. Across various budget categories, the public-sector wage bill is equal to around 40% of public spending, as more than 80% of employed Saudis work for the government. Spending on healthcare, education and unemployment benefits have also been rising steadily, both in absolute and *per capita* terms, while spending on subsidies for the domestic use of fuel and food imports have also risen in line with growing demands and population trends. The composition of current spending, coupled with exceptional demographic pressures⁸⁵, underline the extent significant spending growth is to be anticipated over the coming decades in Saudi Arabia. Spending on defense and security will be difficult to reduce given the threat of regional insurgency, terrorism and political tensions; and while there is scope for stabilising *per capita* spending on public-sector wages and entitlements, Saudi Arabia's demographics make it difficult, if not impossible, to reduce the growth in overall spending on these budget items (even assuming reductions in *per capita* spending on these items). Finally, while reductions to subsidies on fuel and food have long been identified as important areas for fiscal reform; again, Saudi Arabia's demographic profile suggests that even if the government pushes through politically unpopular reductions in *per capita* spending on these items, total spending on these items will be difficult to contain.⁸⁶

⁸⁵ Saudi Arabian demographic pressures due its “youth bulge” have been analysed at length as a major long-term concern. According to official data published by the Saudi Arabian Monetary Agency, more than 70% of the population was below the age of 40 in 2012.

⁸⁶ The rapid growth in the domestic use of oil, in light of subsidies, has been widely studied and is the source of some of the most pessimistic forecasts of Saudi Arabia's long-term fiscal outlook (Lahn and Stevens, 2011).

8.5.2. Saudi Arabia in hindsight: the lost decade

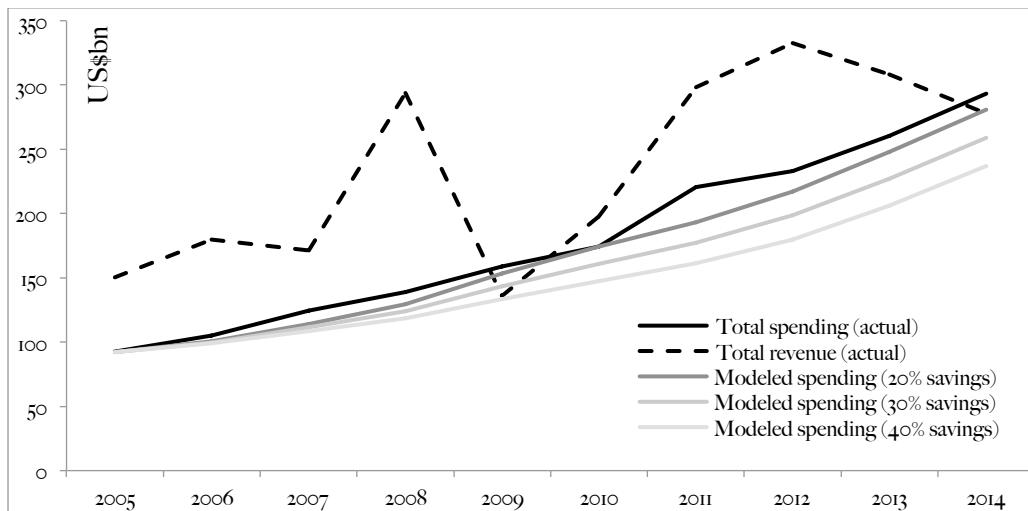
The structural challenges highlighted above underline the importance to Saudi Arabia's long-term fiscal future of establishing a rule-based countercyclical fiscal framework of the kind introduced in the previous chapter. While Saudi Arabia has immense oil wealth and managed to accumulate significant assets during the previous oil boom, it is useful to consider a counterfactual in which the fiscal rule introduced in Chapter 7 was implemented around the start of this boom.

In order to construct this counterfactual, assume that the Saudi Arabian Monetary Agency held \$300bn in assets at the end of 2004, which is in line with reported reserves holdings at the time, split in such a way between the newly established Stabilisation and Investment Income Fund, so that the former receives \$100bn at the end of 2004 and the latter \$200bn. Oil revenues for the 2005-14 period are as described above and shown in Figure 8.6, while the financial returns generated on the Investment Income Fund are proxied by a quarterly rebalanced 60/40 equity-bond portfolio. Recall that the fiscal rule provides for spending from three sources: (i) a fixed percentage (α) based on the previous year's spending, irrespective of the amount of revenues received; (ii) a fixed percentage (β) transfer from the Stabilisation Fund; and (iii) income from the Investment Income Fund, based on its expected long-run real return (δ). Given the high level of initial savings (as of end-2014) relative to spending, the spending rule can be calibrated for Saudi Arabian counterfactual with a high α and β values of 0.8 and 0.1, respectively; with $\delta = 0.05$, based on the expected long-run real return of the Investment Income Fund. The calibration of the parameters of the fiscal rule in this way provides for a level of spending in 2005 (\$92bn) that is exactly in line with actual spending during that fiscal year, establishing a base for comparison.

Figure 8.10 shows the comparison of actual government spending to that implied by the fiscal rule with different savings rates. Note the modelled profile of spending with a 20% savings rate is similar to that of actual spending, although spending growth is slightly more constrained in the former for the last few years of the sample. Total spending under the fiscal rule with 20% savings between 2005 and 2014 was \$1.7 trillion versus the \$1.8 trillion actually spent. A striking difference, however, lies in the much greater

accumulation of assets during what was (with the benefit of hindsight) a very significant, transitory boom in oil prices.⁸⁷

Figure 8.10: Modelled counterfactual versus actual spending for Saudi Arabia (2005-2014)



Given the magnitude of the boom in revenues, it may have been prudent for Saudi Arabia to adopt a higher savings rate during this period, which would have constrained spending growth in the short term, but resulted in a greater accumulation of saved assets (particularly in the Investment Income Fund). Figure 8.10, therefore, also shows the modelled outcome with 30% and 40% savings rates. Under the former, total spending from 2005-14 would have been just below \$1.6 trillion (compared to \$1.8 trillion actually spent) and total savings at the end of 2014 would have totaled \$1.584 trillion. Under the 40% savings rule, total spending would have been \$1.48 trillion from 2005-14, while total savings would have equaled \$1.775 trillion.

A number of conclusions and implications can be drawn from this counterfactual analysis for Saudi Arabia. Over the past decade, Saudi Arabia managed to accumulate savings from exceptionally high oil revenues in certain years, notably 2008 and 2011-13, while at the same time raising the level of spending considerably. The analysis conducted here suggests that the failure to implement a rule-based fiscal policy framework and formal sovereign wealth fund structures has been a missed opportunity. Saudi Arabia

⁸⁷ Under the modelled fiscal rule with 20% savings, Saudi Arabia would have accumulated \$1.393 trillion in total assets between the Savings and Stabilisation Fund by the end of 2014, which is significant more than the \$750bn - \$800 that the Saudi Arabian Monetary Agency did in fact hold by the end of 2014.

could have accumulated considerably more assets under modelled fiscal rule. This greater accumulation would have been due, not only to slightly more restraint on public-spending growth over the period, but also to the compounding effect of a few years' of high financial-market returns (although it should also be noted that the sample period includes the global financial crisis of 2008). To quantify the missed opportunity, the more than \$800bn in additional savings that would have accrued under the fiscal rule with a 30% savings rate, generates an additional \$42bn in permanent annual investment income that can be sustained into perpetuity. In light of the fiscal pressures that emerged in Saudi Arabia in 2015 and 2016, following the collapse of global oil prices, the opportunity cost of these foregone savings are striking.

Finally, note that the adoption of the fiscal rule, even under the most conservative savings assumption in which 40% of oil revenues are transferred to the Investment Income Fund, still permits a significant increase in spending. Indeed, nominal spending more than doubles from \$92 billion in 2005 to \$237bn in 2014 under the most conservative savings rule. This is an important illustration of the fact that the fiscal rule proposed in Chapter 7 does not preclude significant growth in public spending in the face of a sustained resource revenue boom, provided the level of assets in the Stabilisation and Investment Income Fund permits it.

8.6. Policy and institutional implications

The discussion of the underlying dynamics of the framework in the previous chapter, followed by its application in this one, brings several policy and institutional implications to light. The merits of the rule, along with general policy and institutional implications can be summarised as follows.

8.6.1. Analysing trade-offs in the allocation of resource revenues

Trade-offs are pervasive in the allocation of resource revenues to achieving competing aims – as well as between the current and future realisation of those aims. The fiscal rule proposed here helps to frame the trade-offs between current spending, building buffers for stabilisation purposes and creating an endowment for permanent income from a depleting resource source. Saving a portion of current revenue, which is needed both to establish and maintain a buffer in the form of a Stabilisation Fund; and, more fundamentally, build a permanent endowment in the form of an Investment Income Fund, involves trade-

offs that can be difficult to achieve politically. Yet, as a number of country illustrations showed, fiscal rules and sovereign wealth funds do not always imply trade-offs as stark as those implied by their critics. In most cases analysed in this chapter, a significant increase in public spending was a realistic and prudent outcome in the context of rising oil revenue – despite the assumed adoption of a constraining fiscal rule and a sovereign wealth fund. Indeed, in a number of cases, these policy and institutional interventions make the maintenance of spending level through the commodity cycle – and, importantly, beyond the commodity production lifecycle – possible.

In practice, policymakers can build – and have built, in the increasing number of countries with significant sovereign wealth funds and rule-based fiscal policies for managing resource revenues – political consensus and public support for short-term sacrifices by explaining the cost of unstable public spending and the benefits of inter-generational transfers, ensuring the sustainability of resource-based spending and investment, the financing of long-term public liabilities (such as pensions, education and healthcare).⁸⁸ The fiscal rule allows policymakers to frame and quantify the constructive role sovereign wealth funds, fiscal rules and financial income can play in meeting these challenges.

8.6.2. The importance of adhering to rules

The framework presented here is a quintessentially rules-based one. The idea is that public spending is decoupled from the volatility of annual resource revenues and a part of a depleting resource is made permanent through a set of rules. Rules are required to ensure dynamically consistent saving and spending policies; and to constrain policymakers' discretion, particularly when they face incentives for short-term behaviour that is not consistent with long-term goals and principles of prudence. The design of the rules is embodied in the choice of – and adherence to – key parameters. For the framework to work as intended, it is essential not only that the parameters reflect sound dynamics, but also that the government

⁸⁸ Used wisely, the stable and permanent income generated by the sovereign wealth funds framework could create a sense of ownership by the population over resource revenues and rents. Under supportive political conditions, such a stakeholder relationship could serve the positive function of increasing public scrutiny over the funds and resource revenues more generally, and protect them from political grabs and manipulation. A direct way of doing this is by tying the assets and income from the sovereign wealth funds to public liabilities such as pension benefits or educational grants. Of course, a poorly managed and designed transfer system on this kind can also establish a sense of entitlement that prohibits prudent fiscal adjustments to negative revenue shocks in future (see the discussion of Alaska in final section of this dissertation).

is able to stick to the rules during difficult times. Institutional, political and legal safeguards are needed to make the system resilient to changes in the political, economic and financial environment. From an institutional perspective, the “governance” of sovereign wealth funds pertains not only directly to the fund itself or even the institutions managing it, but also, critically, to the rules that govern the flows of funds in and out of the funds.

8.6.3. Distinguishing between technical and discretionary choices

In countries with declining resource revenues, as the size of the Stabilisation Fund decreases, the size of the Investment Income Fund needs to grow, if policymakers wish to maintain spending levels once resources have been depleted. Note that whereas the choice of values for α and β are largely a technical exercise, involving the calibration of the stabilisation component of the spending rule, so as to achieve a reduction in the volatility of spending (compared to that of the underlying resource revenue), the choice of value for θ is more discretionary. The latter parameter is an expression of preferences and choices around one particular trade-off: between current and future/permanent spending. All things equal, a higher θ implies less spending in the near term in favour of higher spending levels in the future, including a higher sustainable permanent level spending that extends in perpetuity, even for countries whose resources have been depleted.

High-saving policies may be appropriate or even required both in countries with declining and increasing revenues. The logic in these two scenarios is, however, different. In countries with declining revenues, unless very significant savings have already been amassed, the country will need to save a portion of revenues in order to maintain and stabilise future spending beyond the lifecycle of the resource. On the other hand, in countries with rising resource revenues, high savings are typically both possible, given that the rise in revenues is supplementary to the existing revenues; and desirable, given that it moderates an unduly rapid rise in spending that can be hard to absorb, while at the same time creating a financial endowment for support spending by future generations.

Of course, as discussed in all the preceding country examples (notably Nigeria), policymakers may choose not to maintain current levels of oil-based spending in perpetuity – either because the required adjustments are too painful and politically unfeasible; or because they argue that current resource revenues need to be invested in order to raise productivity and develop infrastructure that will be needed

to grow the non-resource economy. The fiscal rule allows for such preferences, through the selection of a relatively low percentage transfer to the Investment Income Fund. However, if this approach is pursued from a position of fiscal dependence on resources, coupled with an expected long-term decline such resource revenues, the country will face painful declines in spending if non-resource revenues fail to grow in replacement of resource revenues in the long run. Note also that countries that have grown dependent on resource revenues, have found it both politically difficult and economically unfeasible to raise non-resource revenues, notably through taxes on individuals and companies. As the discussion of Ghana demonstrated, a rule-based fiscal framework with some degree of saving and transformation of natural wealth into financial wealth can help prevent the introduction of resource dependence and volatility in the fiscal framework of countries with new resource discoveries.

8.6.4. Establishing separate investment models and governance

The fiscal rule makes an important distinction between two types of sovereign wealth funds: a Stabilisation Fund and an Investment Income Fund. This distinction raises important institutional issues around how to ensure that the two different funds are mandated and incentivised to pursue investment models that are relevant to their respective functions. The Stabilisation Fund needs to maintain sufficient levels of liquidity, as it needs to partially fund government spending annually. In years of sharp declines in resource revenues, the Stabilisation Fund may need to contribute a significant amount of funding to government and the budget. By contrast, the Investment Income Fund only contributes an annual amount equal to its expected average long-run real return (for example, 5%).

It is more important that the Investment Income Fund employs its long-term investment horizon and other structural advantages in order to capture various risk premiums that raise expected and actual returns. Care should be taken in the institutional design of the sovereign wealth fund strategy to ensure that the Stabilisation Fund is sufficiently liquid to meet anticipated shortfalls; while the Investment Income Fund should be protected from undue criticism for short-term losses and be evaluated and assessed more in terms of its long-term strategy and performance.

Just as the Stabilisation Fund and the Investment Income Fund need different investment models, so too do they require different management and oversight structures. The Stabilisation Fund holds liquid

assets, and can therefore be managed by the central bank (which typically has the capacity and experience to manage such assets in light of its management of the country's foreign exchange reserves) or even directly by the national treasury.⁸⁹ By contrast, the Investment Income Fund is likely to have a more complex and diversified portfolio, which requires dedicated skills, capacity and expertise that most likely extend beyond the experience of the central bank or the treasury. Many governments have, in practice, handed the responsibility for managing such more complex portfolios to accountable, arms-length authorities that report to the government, parliaments and/or the treasury. Delegated authority requires more extensive oversight and reporting structures than the operationally simpler Stabilisation Fund.

Conclusion

This chapter applied the rule-based contingent fiscal framework for allocating resource revenues introduced in Chapter 7 to a number of instructive country cases. The lessons from the application of the fiscal rule in this chapter extend beyond the countries themselves: indeed, the characteristic of these five economies are prototypical of the position other resource-rich countries. As discussed above, the framework clearly underlines the importance of several institutional aspects, notably the merits of an institutional separation between fiscal policymakers and the management of the Investment Income Fund (or similar long-term orientated sovereign wealth) – that is, of operational independence and delegated authority in the area of sovereign wealth fund's investments; as well as the establishment and governance of fiscal rules. The final section of this dissertation is devoted to the analysis of these issues from an institutional perspective.

It is instructive to return to the philosophical arguments in favour of rules. As articulated in Chapter 5 in reference to monetary policy, the modern understanding of rules falls between an earlier dichotomy between “stark” or mechanistic rules and complete discretion on the part of authorities with delegated power. Woodford (2002) described modern policy rules in the area of monetary policy as “principles of systematic conduct for institutions that are aware of the consequences of their actions and take responsibility for them”. Moreover, the modern rules are typically specified in such a way as to take useful

⁸⁹ Many countries, including Kuwait, Botswana, Chile and Nigeria, with a sovereign wealth fund structure that involves more than one type of fund, have preferred to assign responsibility for the management and investment of the entire fund to a single authority.

information on the current and expected future state of the economy into account – that is, they are “contingent” or “state-dependent” rules. The fiscal rule outlined in this chapter and the preceding one is contingent to the extent that it contains feedback loops between the state of resource cycle and the flow of funds between the sovereign wealth funds and the budget, while not placing an unreasonable burden of expectations on the ability of policymakers to accurately forecast future oil revenues.

Appendix to Chapter 8: Simulated evolution of fund values

Figure A8.1: Simulated values of Stabilisation Fund for Kazakhstan (under different savings rates)

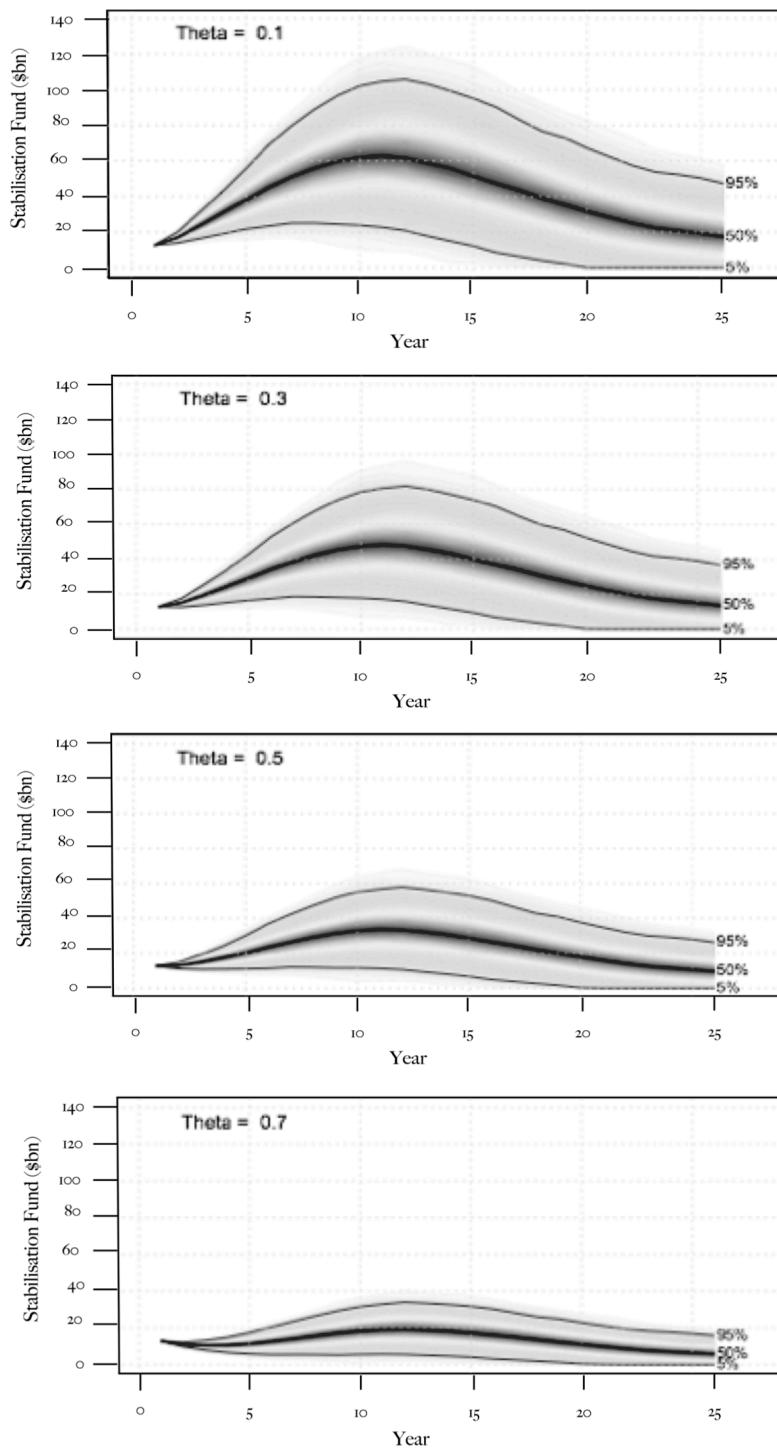


Figure A8.2: Simulated values of Investment Income Fund for Kazakhstan (under different savings rates)

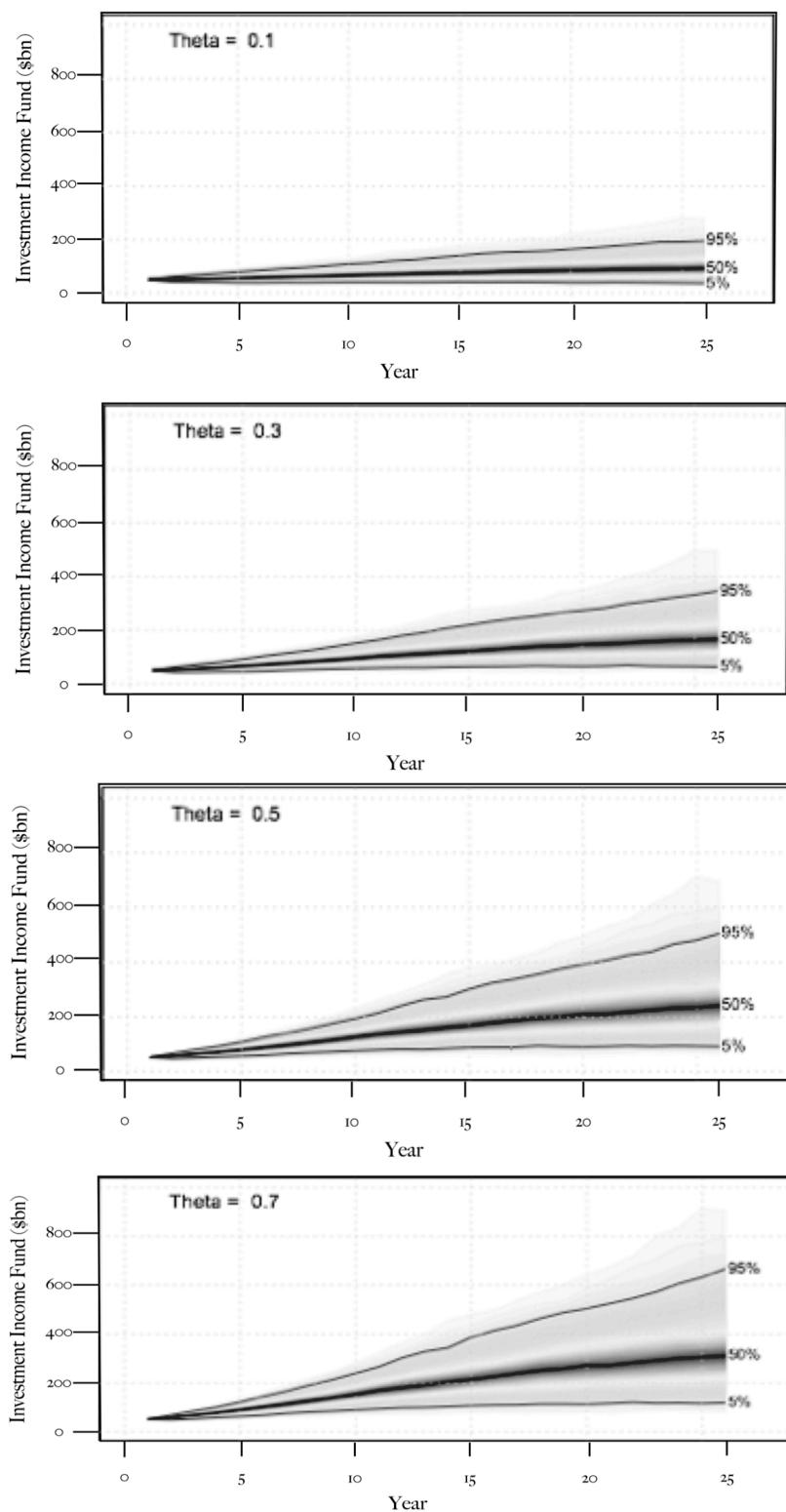


Figure A8.3: Simulated values of Stabilisation Fund for Azerbaijan (under different savings rates)

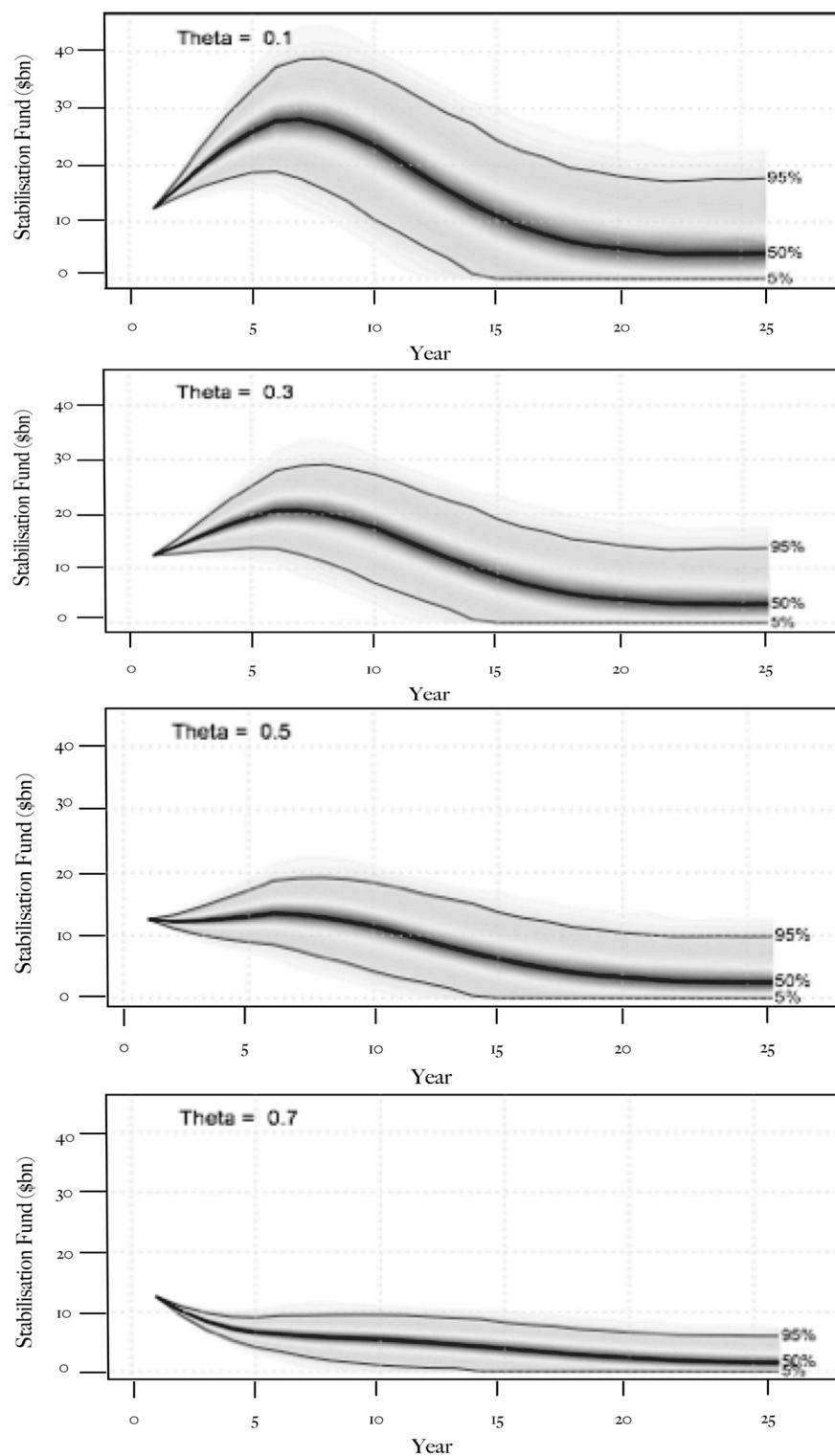


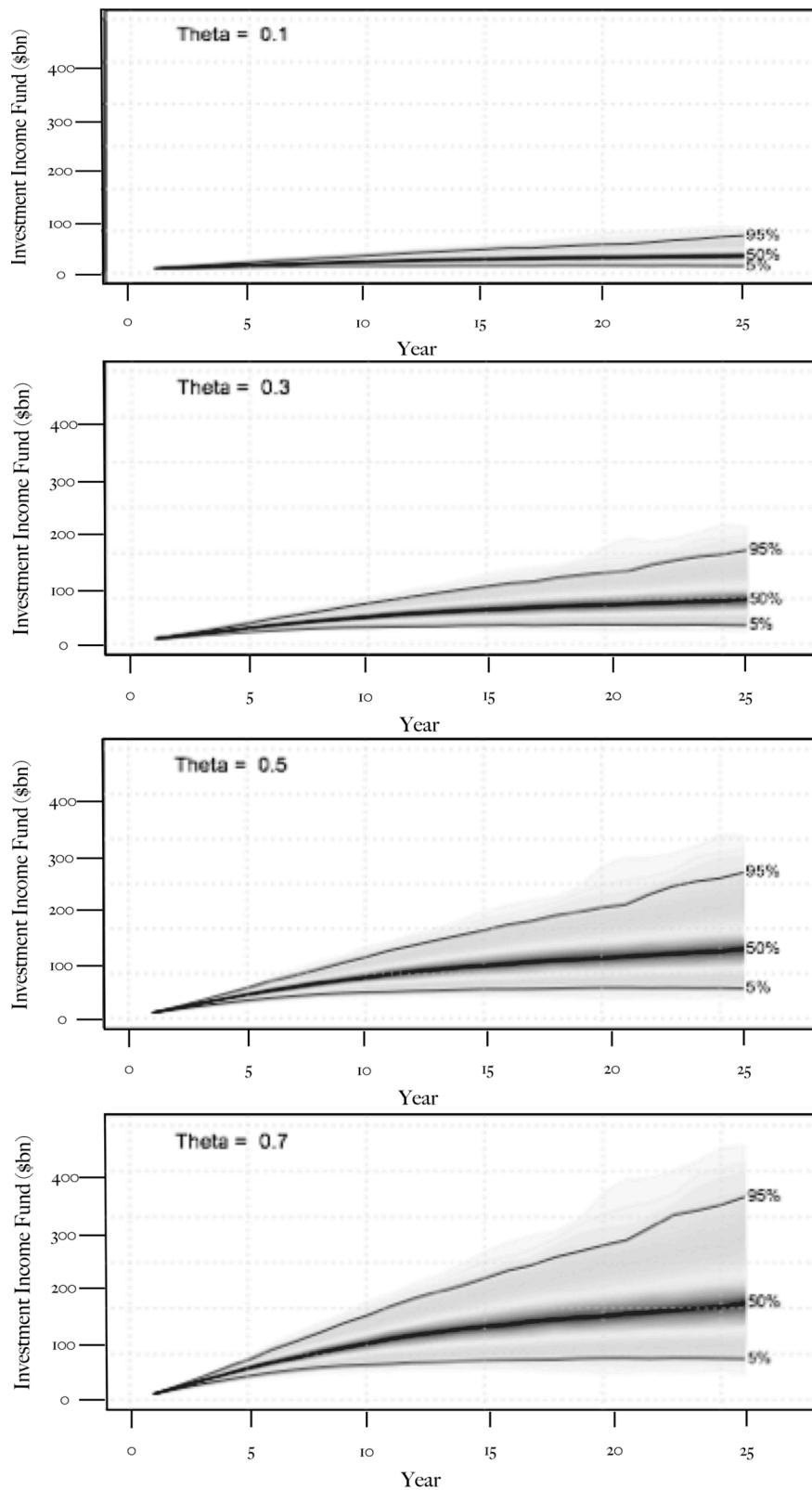
Figure A8.4: Simulated values of Investment Income Fund for Azerbaijan (under different savings rates)

Figure A8.5: Simulated values of Stabilization Fund for Nigeria (under different savings rates)

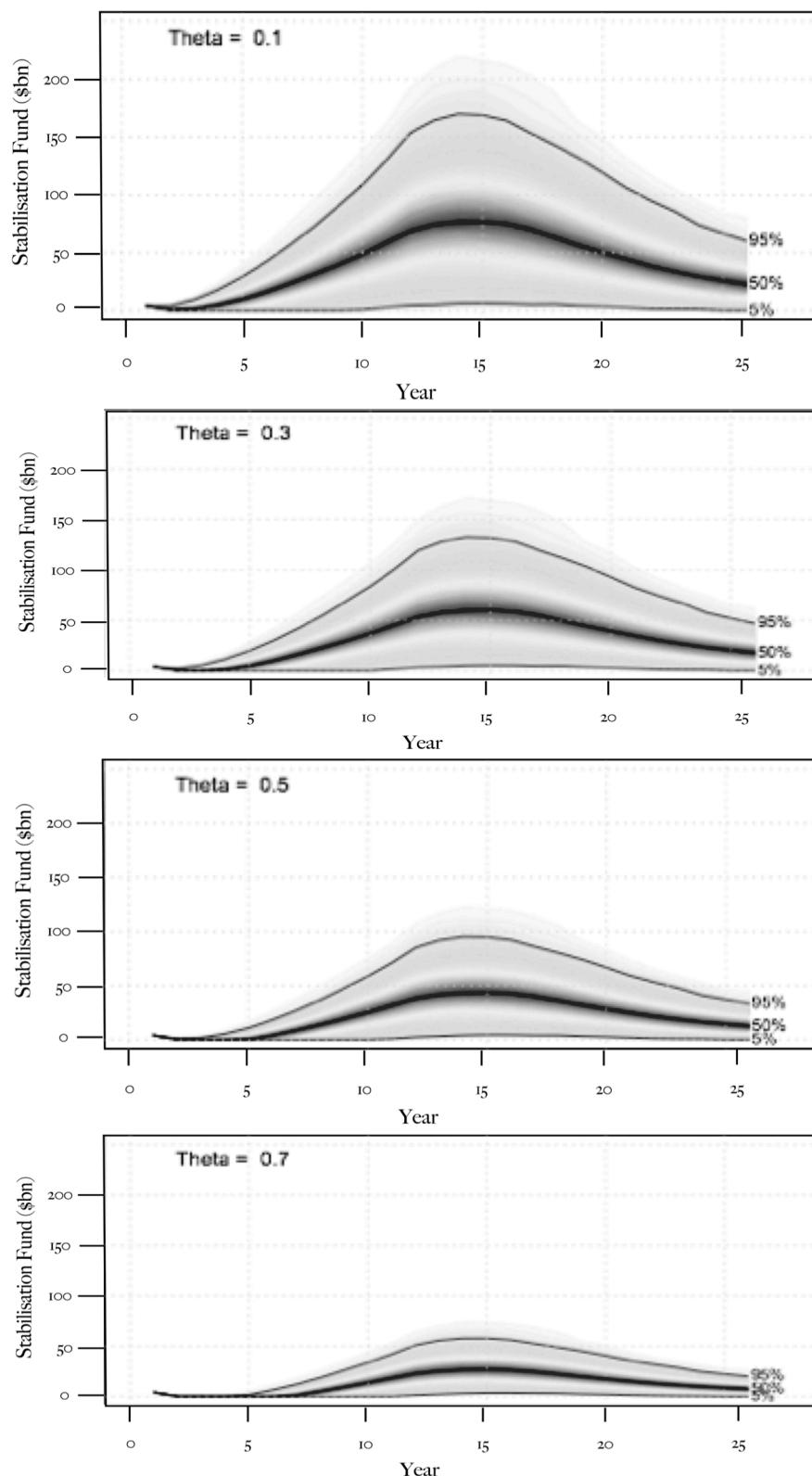


Figure A8.6: Simulated values of Investment Income Fund for Nigeria (under different savings rates)

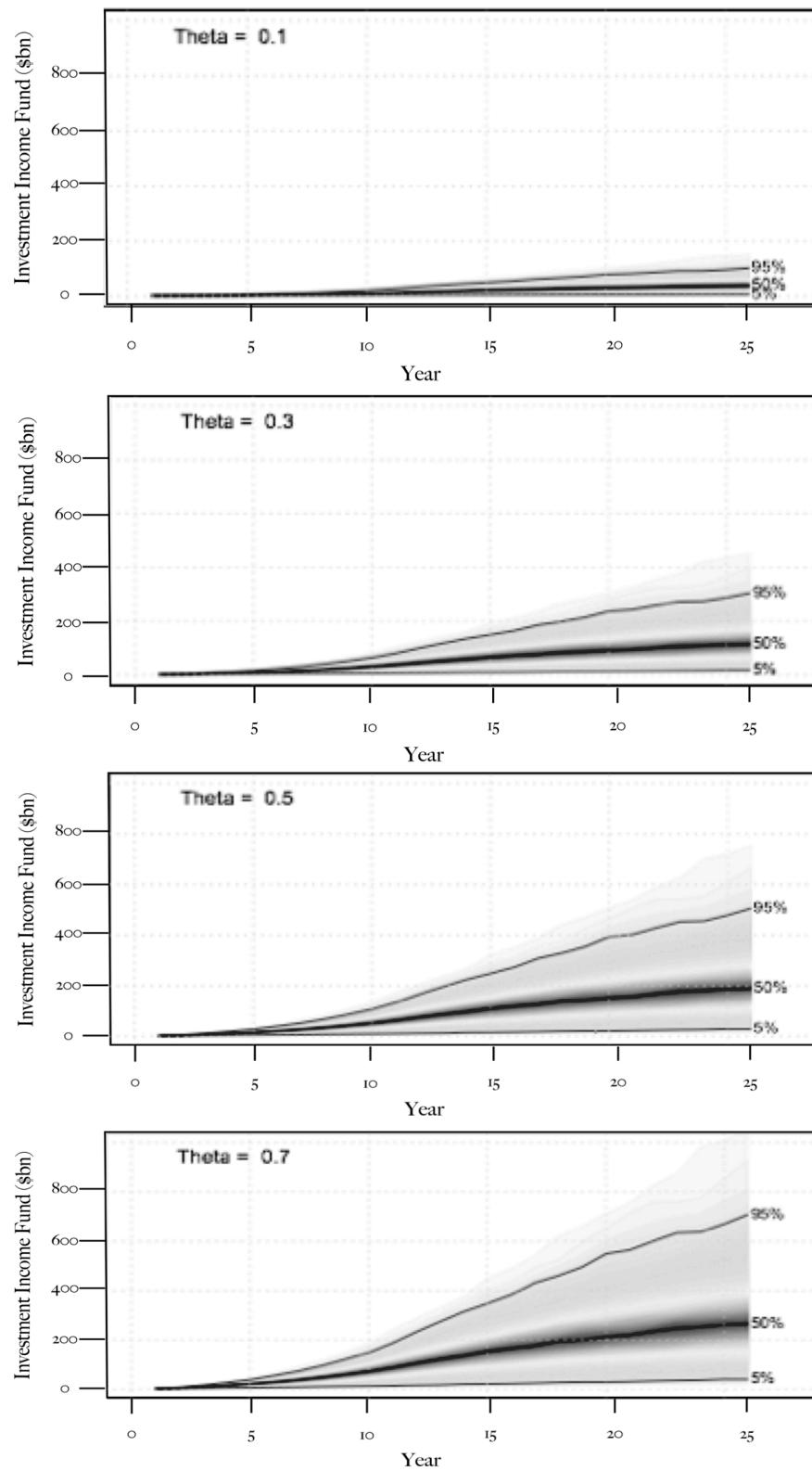


Figure A8.7: Simulated values of Stabilization Fund for Ghana (under different savings rates)

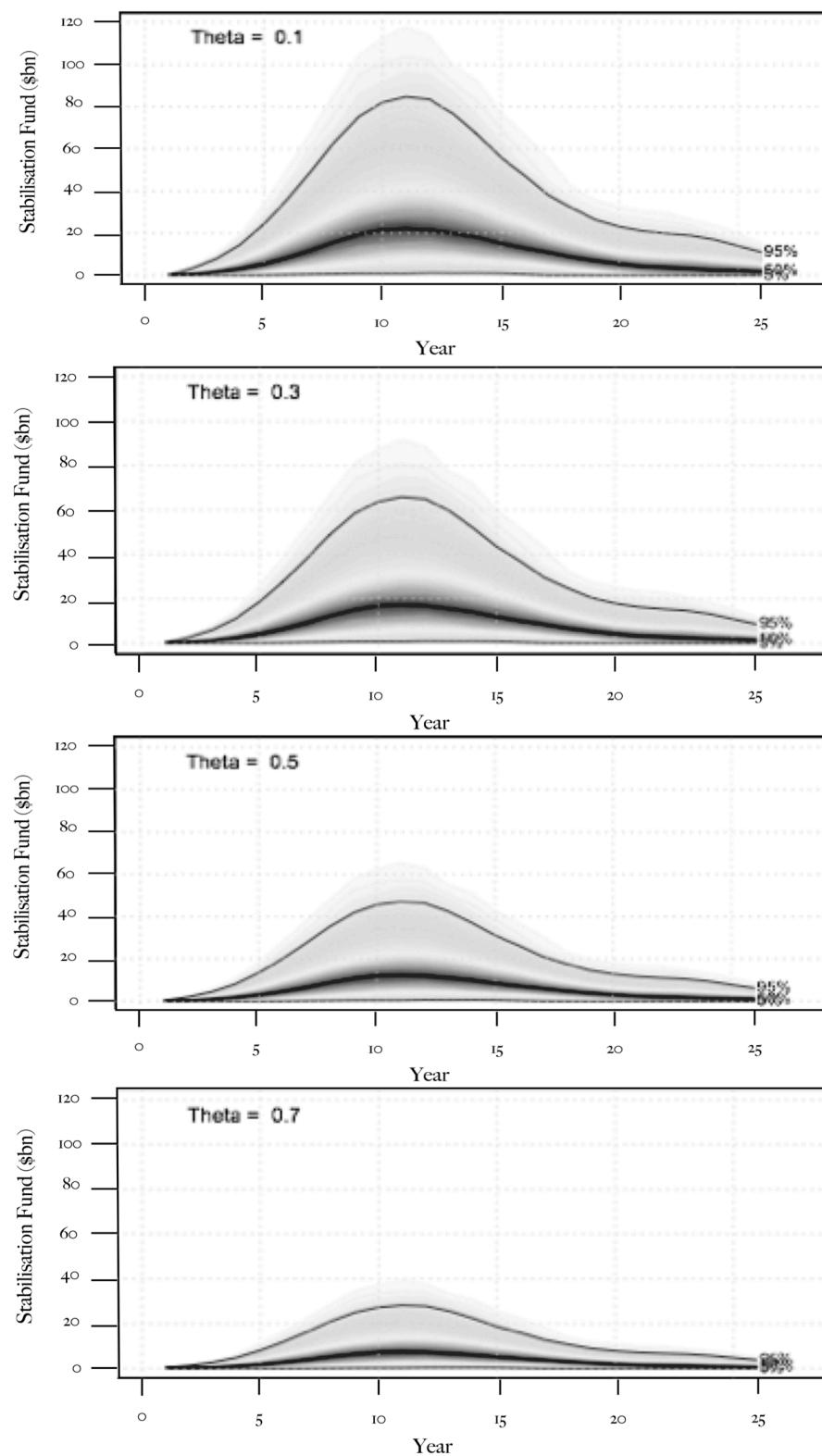
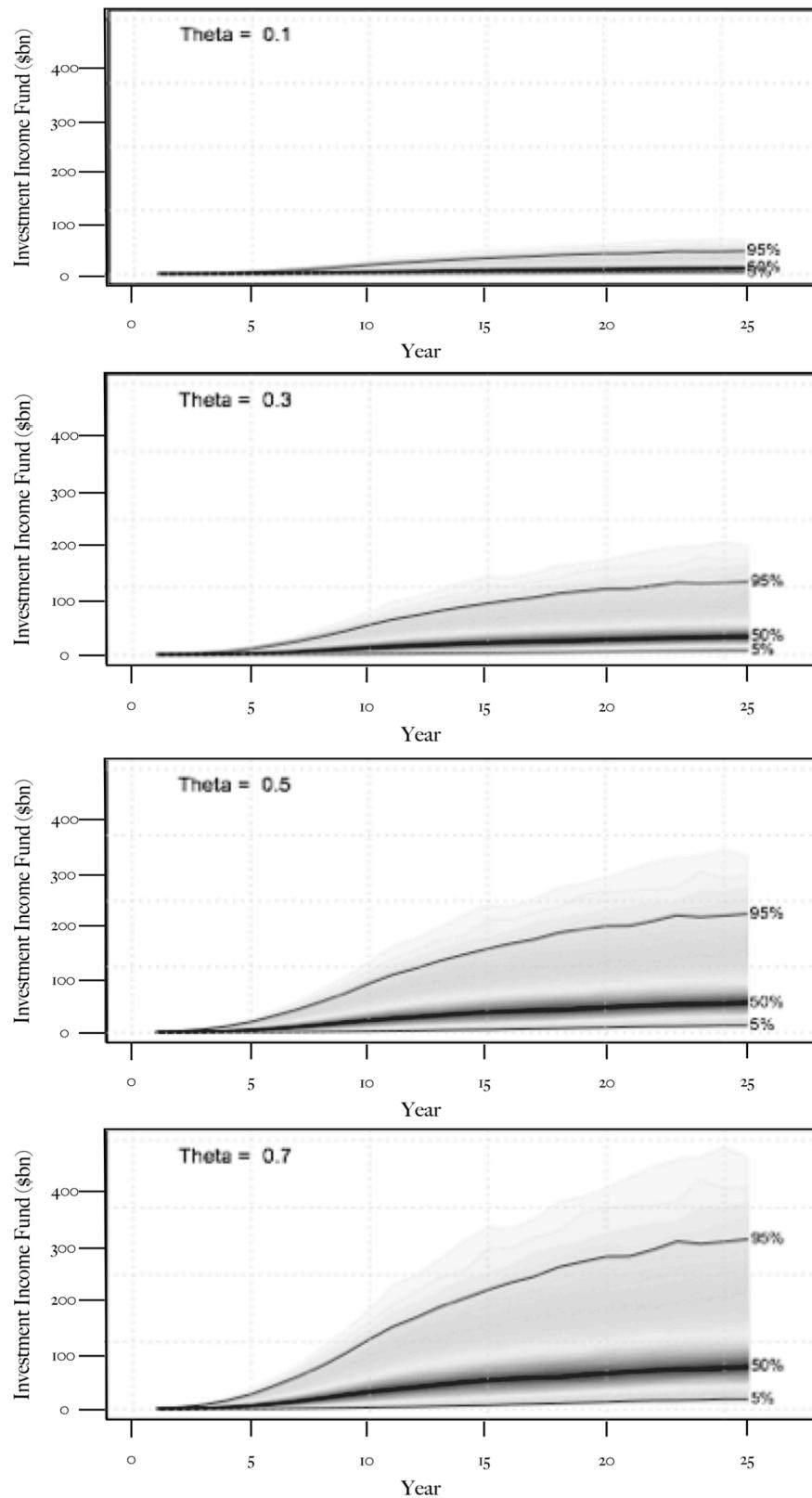


Figure A8.8: Simulated values of Investment Income Fund for Ghana (under different savings rates)



SECTION IV

THE GOVERNANCE OF FISCAL RULES AND INDEPENDENT SOVEREIGN INVESTMENT INSTITUTIONS

Chapter 9

Governing the fiscal rule:

The design and institutional infrastructure of fiscal rules for resource revenues

The October 2015 edition of the International Monetary Fund's *Fiscal Monitor* analysed the boom-bust patterns of economic growth, fiscal policy and public investment observed in resource-rich economies. The discussion of a wide-ranging set of policies to address volatility was cast against the sobering assertion that government actions have historically exacerbated rather than reduced volatility in these economies, and that the "principal transmission channel appears to be through the government budget, especially for oil exporters" (IMF, 2015). Noting that the empirical evidence "suggests that oil price shocks affect growth mostly through public expenditure," the Fund called for "fiscal policies to pay closer attention to the large volatility and uncertainty to which commodity exporters are particularly prone."

Amongst the policy and institutional interventions promoted in the report is the combination of rule-based constraints on the spending of resource revenues during boom periods, and the concomitant accumulation of assets in sovereign wealth funds whose assets and income can help manage the fiscal consequences of commodity-price slumps. As behooves an organisation whose acronym, according to an old joke, stands for "It's Mainly Fiscal", the Fund has repeatedly emphasised that sovereign wealth funds should be viewed as a part of a broader rule-based medium- to long-term fiscal framework for managing resource revenues (Davis, Ossowski and Fedelino, 2001; Das *et. al.* 2009, Baunsgaard *et. al.* 2012; IMF, 2015). This point is well made and underappreciated. This chapter contributes to the literature on fiscal rules for resource revenues, but emphasising their role in relation to a number of existing sovereign wealth funds. The chapter adds to the usual emphasis on the design of operation of fiscal rules a focus on their institutional underpinnings.

Absent fiscal rules and a supportive institutional structure that governs the rules, a sovereign wealth fund will be undermined when policymakers retain discretion in the allocation of resource revenues over the cycle and fail to break the historical tendency toward procyclicality. A rule-based fiscal framework helps ensure that a sufficient portion of windfalls revenues are transferred to the sovereign wealth fund during boom periods, rather than consumed; and guards against an unsustainable depletion of previously

accumulated assets during bust periods. There is a pervasive risk that policymakers in resource-dependent countries believe that the mere establishment of a sovereign wealth fund, capitalised by *ad hoc* transfers of surplus funds, is sufficient protection against the resource curse. As has been argued throughout this dissertation, however, a full embrace of the “sovereign wealth fund model” requires the situation of these institutions within a rule-based fiscal framework.

The institutional arrangements or governance of the fiscal rule is of underappreciated importance. Even the best designed rule-based fiscal framework for resource revenues and sovereign wealth funds can be undermined by weak institutional and governance arrangements. The chapter reveals a wide range of institutional mechanisms for the specification and enforcement of fiscal rules, ranging from constitutional mandates to legislative statutes to presidential decrees to elements of custom (or informal institutions, as per Chapter 2). The examples discussed in this chapter are in no way exhaustive – in fact, they are biased towards systems that have worked reasonably well and persisted, although the chapter does briefly discuss the apparent shortcomings of fiscal rules for sovereign wealth funds in a number of resource-rich developing countries. Three models in particular provide valuable insights into the specification and governance of fiscal rules for managing resource revenues and sovereign wealth fund assets and income: Norway, Chile and the American state endowment model.

9.1. The governance of fiscal rules for resource revenues

There is a vast literature on the governance and institutional arrangements around fiscal rules (Kopits and Symansky, 1998; Persson and Tabellini, 2004; and Debrun and Kumar, 2007). The general theme from this literature (and the practical experience with fiscal rules) is not overly optimistic. Efforts to establish robust fiscal rules have suffered from at least three problems. First, the design of fiscal rules is complex. For example, the literature has identified the difficulty of determining whether optimal rules should bind on budget deficits, debt-to-GDP ratios, revenue, borrowing or spending; whether and how cyclical adjustments should be taken into account; and whether the dynamics between fiscal policy at the federal and sub-national levels undermine fiscal rules. The ability of politicians to resort to “creative accounting” around fiscal measures in relation to the fiscal rule is another common problem (Milesi-Ferretti, 2004). Moving from design to governance, it is clear that the “paradox of power” and dynamic-inconsistency

problems loom large over efforts to enforce and adhere to fiscal rules. Debrun and Kumar summarise the argument of fiscal-rule sceptics in this regard, as follows: “there will always be circumstances in which scrapping or ignoring rules will be preferable for policymakers, suggesting a serious credibility problem. It follows from this argument that a credible solution to biased policies cannot be to suppress discretion but to find mechanisms through which it could be exerted more wisely” (Debrun and Kumar, 2007).

It is useful to think of three stylised mechanisms through to achieve this goal. The first is to move critical elements of the fiscal process that are known to result in deficit biases and inefficient (and procyclical) spending from the realm of “in-period politics” to the “politics at the constitutional level”, as per the language of Buchanan (1987) discussed in Chapter 2. The second is to resort to external or third-party enforcement and expertise – that is, to technocratic (apolitical) opinion and analysis, or “rule by experts”. Third, under specific conditions, the development of an institutionalised “custom”, preferably arrived at through consensus, may work by establishing a sufficiently high costs of ignoring or bypassing a *de facto* rule. Of course, across all three mechanisms deviations from the rule carry (political) costs, and the literature has “emphasizes the role of democratic accountability as one natural mechanism through which deviations from the rule can be made costly”, alongside that of market penalties or sanction (Debrun and Kumar, 2007).

The literature on fiscal rules has more recently focused more narrowly on their application in the context of resource revenues and the saving and spending rules of sovereign wealth funds (Davis *et. al.*, 2001; Ossowski *et. al.*, 2008; Schmidt-Hebbel, 2012; and Baunsgaard *et. al.*, 2012). This chapter contributes to this literature by emphasising the governance and institutional arrangements around fiscal rules for resource revenues, and framing this discussion in terms of the above-mentioned three mechanisms. This chapter identifies the American permanent-fund institutional model as an (incomplete) version of the “politics-at-the-constitutional-level” mechanism; the Chilean model as relying on “rule-by-experts”; and the Norwegian model as being founded on custom and consensus.

In discussing these rules and their institutional arrangements (along with the institutional shortcomings of otherwise reasonably-designed fiscal rules in Kazakhstan, Nigeria, Ghana and Timor Leste), reference is made to the set of criteria for the design and function of good institutions identified in Chapter 2. These features overlap with Kopits and Symansky (1998) list of criteria for fiscal rules, as articulated by Kyle

(2014) in his analysis of Kazakhstan's fiscal rules. According to these criteria, good fiscal rules share the following characteristics (the compatibility of this list with the criteria for the design and function of good institutions in Chapter 2 is apparent):

- i. **Well defined:** policy targets and the institutional set-up to achieve them should be clearly defined. There should be as little room for ambiguity in the operation of the rule as possible.
- ii. **Transparency:** it should be possible to observe how the rule is intended to operate and for stakeholders to monitor its implementation.
- iii. **Adequacy:** the mechanisms envisioned in the rule should be capable of achieving the desired level of the target variable.
- iv. **Consistency:** the rule should be both internally consistent and also consistent with other policies and goals of economic policy.
- v. **Simplicity:** the easier the terms in which the rule is defined, the better.
- vi. **Flexibility:** the rule should be sufficiently flexible to deal with changing economic circumstances by, for example, containing adequate escape clauses, and other built-in feedback mechanisms.
- vii. **Enforceability:** the mechanisms to enforce compliance must be clear, in particular with respect to role of different institutions and public actors.

Clearly these criteria span both policy-design and institutional aspects. While the emphasis and particularly contribution of this chapter lies in analysing the latter, the discussion below necessarily makes reference to aspects of the policy design of the rules themselves, as design and governance elements of fiscal rules are clearly interrelated.

9.2. Fiscal rules for resource revenues using sovereign wealth funds

Countries use a variety of approaches to determine the level and dynamics of transfers of resource revenues to their sovereign wealth funds (savings rules), as well as how to use the assets and income of their sovereign wealth funds (spending rules). In general, the savings rules tend to be better developed and more clearly articulated than spending rules. As with the design of the rules themselves, the institutional arrangements for implementing, monitoring, enforcing and potentially amending rules varies

significantly through the powers assigned variously to constitutions, statutory legislation, political consensus, ministerial/executive policy, or informal customs.

9.2.1. Norway: rule by custom and consensus

The primary sources of funding for the Norway Government Pension Fund Global are taxes and royalties generated from the extraction of oil. The fund also receives tax revenues on CO₂ emissions from petroleum production, and operating income and dividends from Statoil, the national oil company. The fund also retains and reinvests earnings in excess of its mandated transfers to the budget. Accordingly, Norway saves and invests all of its oil revenues, minus a withdrawal equal to the estimated long-run real return of the sovereign wealth fund (4% per year), the latter being the spending component of the fiscal rule.

The process for allocating resource revenues starts with the transfer of all resource revenues to the fund – in the same manner as proposed in fiscal rule introduced in Chapter 7; however, in combination with a spending rule that is more conservative. The spending rule allows for a transfer of investment income to the budget equal to 4% on the fund's total assets, based on what policymakers believe to be the sustainable amount of spending of resource revenues: the expected long-run average real return generated on the fund's capital. To ensure the sustainability of the fiscal framework, Norway formulates an annual budget under the assumption of having zero oil revenue – the so-called the “structural non-oil budget”. This non-oil budget is permitted to run an average long-run deficit equal to the 4% transfer from the sovereign wealth fund. In other words, the sovereign wealth fund's investment income finances the non-oil deficit: the bigger the fund becomes, the larger the value transfer (based on a fixed 4% spending), and the larger the permitted sustainable non-oil deficit.

The most striking design aspect of the Norwegian rule is the large portion of resource revenues that is transferred to its sovereign wealth fund. Norway's level of economic development, quality of existing public infrastructure and access to alternative sources of fiscal revenue – features that less developed and more resource-dependent countries do not share – enable this highly conservative savings policy for oil revenue. Given its limited degree of fiscal dependence on resource revenues (non-oil revenues account for

around 75-80% of revenue), its emphasis on a sustainable non-oil structural deficit and the stable spending rule for sovereign wealth fund income, Norway does not need an additional stabilisation fund and stabilising transfer, as per the fiscal rule proposed in Chapter 7. While the management of volatility is less of concern for Norway, more oil-dependent economies have a greater need for such stabilisation mechanisms.

In terms of institutional arrangements, a fiscal framework introduced in 2001 determines the flow of oil revenues into and investment income out of the Norwegian sovereign wealth fund. An underappreciated aspect of the much-lauded Norwegian model is that neither the savings nor the spending rule are legally binding, but rather emerged through a broad consensus around the need for the prudence in spending oil revenues. The current rule-based approach enjoys the support of the Ministry of Finance, the parliament and Norges Bank Investment Management – however, it is consensual and can, at least in theory, be changed if the relevant parties agree.

The spending rule is the most likely element of such change, as it is based on the expected sustainable long-term real return of the fund. Given that the assets of the fund are invested in a largely passive manner, exogenous factors could lead to changes in expectations around what is a feasible and sustainable long-run real return. The Ministry of Finance, Norges Bank Investment Management and external experts have agreed in recent years that a 4% annual real return is feasible, and is therefore an appropriate amount to transfer (as permanent income) back to government to finance the non-oil structural deficit. However, it remains a topic of debate. In late 2013, for example, the Governor of Norges Bank suggested that it may need to be lowered to 3% due to lower returns in global financial markets (Olsen, 2012). Changing the spending rule in light of revised expected returns on the portfolio would involve external consultation and research, but is likely to be driven by the Ministry of Finance in consultation from Norges Bank Investment Management (possibly further requiring legislative approval, and certainly consultation). Thus far an institutional bias towards preserving the 4% spending rule has been maintained, based on the view that an adjustment downward would establish a precedent to subsequently raise the return target and sustainable draw upwards.

The institutional mechanisms that govern Norway's fiscal rule can, therefore, be described as characteristic of the custom-and-consensus model. In this regard, the governance of Norway's fiscal rule

for resource revenues and the spending/savings rules for its sovereign wealth fund is, in fact, similar to those of various Middle Eastern countries, notably Abu Dhabi and Kuwait; however, the Norwegian model is further buttressed by exceptional levels of transparency and disclosure (which is lacking in these Middle Eastern countries). Consequently, the Norwegian fiscal rule meets all seven of the Kopits-Symansky criteria outlined earlier, as well as the principles for the design and function associated with good institutions in Chapter 2. A possible objection to this assessment is the Norwegian fiscal rule is not particularly flexible, given the transfer of *all* oil revenues to the sovereign wealth fund and the spending of a fixed percentage of investment income. However, the rigidity of the rule should be understood in terms of the country's specific fiscal needs. Resource revenues play a minor role in Norway's fiscal framework, certainly when compared to most other countries and sub-national jurisdictions with sovereign wealth funds. Moreover, the fiscal rule is flexible in the most general institutional sense to the extent that the Norwegian Ministry of Finance frequently invites (publicly disclosed) external assessments of the merits of the fiscal rule, notably the "Thøgersen Commission" that evaluated the rules-based fiscal framework in 2015.

9.2.2. Chilean: rule by experts

The rules governing the flows in and out of Chile's two sovereign funds (and the funds themselves) were established in the Fiscal Responsibility Law, passed in 2006. The legal foundation of the strong rule-based saving and spending procedures means that there is little discretion vested in the hands of the Ministry of Finance to change them, absent a change in the law.

Chile is a prime example of a country that has adopted a two-fund structure of the kind proposed in Chapter 7, although its fiscal rule works differently. The Chilean model combines a short-term stabilisation fund (the Economic and Social Stabilisation Fund) and a long-term savings/income fund (the Pension Reserve Fund). The rules for transferring revenue to and from the Chilean sovereign funds, particularly the ESSF, are inextricably linked to the "Structural Balance Rule", Chile's more general fiscal rule. The structural budget balance is the surplus or deficit, excluding automatic stabilisers – that is, the difference between expenditures and revenues that would be collected if the economy were operating at potential GDP.

Chile targets a balanced structural budget that allows for state-contingent fluctuations based on the output gap in the level GDP and cyclical fluctuations in the price of copper (the country's primary export, which accounts for 10-20% of revenue). If the combination of the output gap and the deviation in the price of oil from expectations is positive, Chile is supposed to run a fiscal surplus, whereas if they are negative, a deficit is permitted. A unique institutional feature of the Chilean model, discussed in greater detail below, is its reliance on two "advisory committees" staffed by technocratic subject experts, who calculate trend GDP growth and the outlook for copper prices, respectively. These estimates are then used to calculate cyclically adjusted fiscal revenue and spending, and ensure that surplus fiscal income that arises due to cyclical factors are deposited into the sovereign wealth funds.⁹⁰ The Advisory Committee for Trend GDP consists of 16 members, appointed by the Minister of Finance, and provides the ministry with medium-term projections for the rate of growth of capital, the labour force, and productivity, which are then used to generate projections of trend GDP and the output gap. Similarly, the Advisory Committee for the Reference Copper Price, consisting of 12 members also appointed by the minister, provides projections of the international long-term copper price (Schmidt-Hebbel, 2012).

While the (averaged) projections of the two committees are inputs into Chile's rule-based fiscal framework, built around the cyclically adjusted structural balance, the ministry "retains significant discretionary power in defining the methodology – equations and parameters – that determines the cyclically-adjusted fiscal balance rule" (Schmidt-Hebbel, 2012). The Ministry of Finance has, however, disclosed much of the details of its model, as well the minutes from the meetings of both advisory committees, which in practice limits the degree of discretion, as the ministry is held to account for any potentially deviations from its models and rules. On the spending-side of the rule, the provisions described in the previous section are established in law, which limits the scope for discretion or abuse of the sovereign funds – although there are provisions in the law for additional, discretionary savings to be authorised by the Minister of Finance in boom periods.

Given Chile's two-fund structure, it is important to understand the rule-based process that governs the allocation of savings not only to the Chilean sovereign wealth funds, but also between them. The two-

⁹⁰ A third advisory committee, the Advisory Financial Committee for Fiscal Responsibility Funds, provides guidance and assessments to the Ministry regarding the investments of the sovereign wealth funds. The role and function of this committee is discussed in subsequent chapters.

fund structure was established in 2007, replacing the Copper Stabilisation Fund, a stabilisation-only fund created in 2000. A minimum of 0.2% of the previous year's GDP must be deposited into the Pension Reserve Fund each year, and if the fiscal surplus exceeds this amount, the deposit amount can rise to a maximum of 0.5% of the previous year's GDP. Additional deposits to this savings fund structure can be financed with funds from the Economic and Social Stabilisation Fund at the discretion of the Minister of Finance. The Economic and Social Stabilisation Fund receives all remaining cyclically determined surplus fiscal revenue (Schmidt-Hebbel, 2012).

Transfers from Chile's Pension Reserve Fund and Economic and Social Stabilisation Fund are governed by different spending rules. The assets and investment proceeds from the Pension Reserve Fund can be used exclusively to pay for pension and social welfare liabilities. Current provisions differentiate between a spending rule until 2016 and a new process after that date. Until 2016, only the previous year's real return on the Pension Reserve Fund may be withdrawn (as per the investment-income fund component in Chapter 7's rule – or the practice in Norway and American state permanent funds); while from 2016 onward, annual withdrawals from the fund cannot be greater than one-third of the difference between that year's pension-related expenditures and 2008's pension-related expenditures (adjusted for inflation). The latter is, thus, simply a "spending cap" imposed on transfers from Chile's saving-cum-income fund. Withdrawals from the ESSF can be made to cover a cyclical budget shortfall, based on the calculations of the two expert committees, or at the discretion of the Minister of Finance to pay down debt ahead of schedule or to increase the asset base of the Pension Reserve Fund. The extent to which withdrawals from Chile's stabilisation fund are governed by the structural-balance rule puts the emphasis of Chilean fiscal policy on the need for counter-cyclicity and long-term sustainability (particularly, the avoidance of unsustainable spending from temporary copper-revenue driven booms).

Two attractive features of Chile's fiscal rule are the manner in which it formally and unambiguously distinguishes between stabilisation and income-generating functions of its sovereign wealth funds, and the extent to which these funds are but a part of a larger, more comprehensive medium-term fiscal framework. The fiscal rule is not strictly constitutional, as it is imbedded in a simple Act of Parliament, which could in theory be overturned through the process of in-period politics. However, Chile's tradition of adhering to the rule and communicating policy to the public (as well as the financial markets) at the hand of that rule has served to move much of the major considerations around fiscal policy to the level of constitutional

politics – much as it has with respect to Chilean monetary policy (the country was an early adopter and leading innovator of central bank independence and inflation targeting).

The use of an independent committee of experts to determine the appropriate counter-cyclical stance of Chilean fiscal policy is laudable, although it is questionable how applicable this approach is to other developing-country and emerging-market contexts. Chile has a long and successful tradition of delegating authority for critical economic-policy decisions to technocratic experts (as noted above, Chile has been an innovator around aspects of central bank independence). Technocratic proficiency – or “rule by experts” – is embraced and respected in a manner that is exceptional not only amongst emerging markets and indeed all countries. While generally positive, the role of subject experts in relation to the fiscal rule in Chile does raise questions around the task of the expert committee that estimates equilibrium copper prices. Commodity prices, especially copper prices, are arguably too volatile and stochastic to expect even subject experts to make accurate assessments around the temporary and permanent shocks to prices.

In terms of the Kopits-Symansky criteria for evaluating fiscal rules, it could be argued that unreasonable expectations around the epistemological capacity of the committee establishes a concern around the rule with respect to its “adequacy”. It is not clear that “the mechanisms envisioned in the rule” – notably the importance of the committee’s findings as a critical input into the calibration of the fiscal stance – are fully “capable of achieving the desired level of the target variable.” Alternative approaches to managing uncertainty around the temporary versus permanent nature of commodity-price shocks on fiscal revenue would include the use of a moving-average based rule (see Chapter 6) or a rule that channels a greater share of volatile copper revenues through the stabilisation fund (see Chapter 7). Finally, clarifications could be made with respect to the clarity and simplicity of the rule (including the transfer of assets between the two components of Chile’s sovereign wealth fund), as per the Kopits-Symansky framework.

9.2.3. American permanent funds: (incomplete) constitutional rules

While permanent funds are used to manage a wide range of state-level revenues in the United States, there are funds investing public revenues arising from natural resources in Texas, New Mexico,

Wyoming, Alaska and North Dakota.⁹¹ These funds all perform the same overarching function of transforming a depleting asset in the resource deposits into a permanent form of wealth (capital held in a financial portfolio) and income (real returns generated on those financial assets). American permanent funds operate as both income- and inter-generational savings funds, in the same manner of Norway's sovereign wealth fund: first, they generate annual income based on the inflation-adjusted returns generated on the financial portfolio; while, second, ensuring that this income-generating capacity is maintained for future generations by protecting the fund's capital (or principal) from both withdrawals and erosion through inflation.

As noted earlier, the savings rules associated with American state permanent funds are typically mandated by the state constitution. The capital or corpus of state permanent funds is similarly protected by the constitution (although rarely in real terms, leaving the process of inflation adjustment, or "inflation proofing" as it is referred to in the American context, open to statutory action or custom). Combined, these constitutional underpinnings establish the most binding and most difficult to overturn commitment mechanisms for savings of all sovereign wealth fund models in existence. The procedures for amending American state constitutions vary, but the hurdle is universally high, requiring a two-thirds or three-quarters super majority vote in both houses of the legislature, plus a popular vote. The governance and institutional arrangements for the use of funds earnings is, however, less binding. Perhaps due to the fact that very few American states can be regarded as fiscally resource dependent, there has historically been much less emphasis on stabilisation funds and stabilisation mechanisms for spending volatile resource revenues than on savings and invest-income funds (permanent funds).

The American permanent-fund model has its origins in Texas in the mid-19th century, which, as argued in Chapter 4, makes the state home to the oldest sovereign wealth fund in the world. The Texas Permanent School Fund and the Texas Permanent University Fund were established under the state constitution in 1876 – only a decade after civilian government was restored in the state, following its cession from Mexico, the collapse of the autonomous Republic of Texas in 1846, and the turmoil of the post-Civil War reconstruction. The Texas Permanent School Fund's predecessor, the Special School Fund, dates back even further, having been established by the State Legislature in 1854. While there are differences in every

⁹¹ This list could also include funds in states such as Alabama, Louisiana, Oregon and Montana. These states are, however, not included in the analysis here, as they are smaller in size, and their funding sources are co-mingled with other forms of state income.

state's application of the model, the key elements of the Texan example are attractively simple and have since been emulated by a number of other states (and indeed by countries). The savings rule is an earmarking of a fixed percentage of resource revenues to the permanent fund – typically defined as 25–30% of royalty- and/or severance-tax income on oil, gas and coal; while the spending rule limits withdrawals from the permanent fund to its real returns (as per the Norwegian example). Both the percentage of resource revenue saved and the preservation of the capital of the permanent fund are typically enshrined in the constitution of the state, establishing high institutional hurdles to change. The savings rule under the typical American permanent fund model can, therefore, be characterised as governed by politics as the constitutional level.

In Texas and New Mexico, the permanent funds are specifically earmarked for spending educational purposes. In the case of the Texas Permanent University Fund, the assets are in fact owned by the public university system; while the Texas Permanent School Fund, the New Mexico Land Grant Permanent Fund (also called the New Mexico Permanent School Fund) and the New Mexico Severance Tax Permanent Fund are part of the budget process, but investment income is dedicated to educational expenses (and, in New Mexico, to a lesser extent to maintenance on state hospitals, government buildings, penitentiaries and water resources). In Wyoming, income from the largest permanent fund, the Wyoming Permanent Mineral Trust Fund, is not earmarked for specific budgeted priorities, but rather flows into the state's General Fund (earmarking would require a constitutional amendment); although the state does have a number of smaller permanent funds that are also funded through mineral royalties and are earmarked for educational purposes, notably the Common School Permanent Land Fund, the Excellence in Higher Education Endowment Fund. In the case of the North Dakota Heritage Fund, no payments from the fund has been made to date (as of 2015), and transfer are only expected to start in 2017 at the earliest, when the fund's interest and income will start to be rolled into the state's general budget. Money from the principal could also be spent in future, if two-thirds of both houses of the state legislature approved (additionally, no more than 15% of the principal could be spent in any two-year period). Again, here, it striking the extent to which the constitutional underpinnings of the fiscal framework for the use of natural resource revenues, channelled through permanent funds, have largely removed the pervasive influence of in-period politics.

The largest American state permanent fund, the Alaska Permanent Fund, has a famous spending policy. Whereas the saving policy and the protection of the fund's capital are guaranteed through a constitutional amendment established in 1976 (when the Alaska Permanent Fund was established), the use of the fund's earnings is a matter of policy, determined by custom and subject to legislative approval. The earnings of the Alaska Permanent Fund are formally separated from the capital (referred to as the "corpus") in the form of the Earnings Reserve. Although the two pools are invested in the same manner, the appropriation of the money out of the Earnings Reserve is subject to legislative approval through a simple-majority vote of 50% in both the State Senate and House of Representatives. Since the early 1980s, an appropriation equal to 50% of the five-year moving average of the fund's earnings has been made to fund the "Alaska Permanent Fund Dividend", a direct transfer to every citizen of Alaska (subject to a minimum age and residency requirements). As a matter of custom, Alaskan State Legislatures have historically transferred part of the remaining balance of the Earnings Reserve back into the corpus to ensure that its capital is inflation protected. In summary, while the saving of part Alaskan oil revenues through the permanent fund is governed by politics at the constitutional level, the spending of the fund's earnings (and the roughly 70% of oil revenues that are not transferred to the fund) are subject to in-period political processes.

This uniquely Alaska spending policy has been a double-edged sword. The establishment of Alaska Permanent Fund Dividend has had the consequence (intended or otherwise) of generating significant civic interest in the Alaska Permanent Fund, making it politically impossible for the legislature to raid the fund (which would require a change in the constitution). The downside is that it has limited the scope for fiscal adjustment, which is often needed in a state that derived more than 90% of state-level revenues from oil in most years since removing state income and sales taxes. In the aftermath of the 2014 collapse in oil prices, for example, the Office of the Governor of Alaska proposed a rationalisation in the size of dividend (which in 2014 equaled more than one-third of the state budget excluding Federal transfers) and the use of part of the earnings to establish a rule-based budget transfer, but encountered fierce public and political resistance (Richards, 2015). The danger is, therefore, that the political economy established by public expectations of an ever-increasing dividend – the situation of the dividend and spending policy at the heart of the in-period political process – crowds out other important public spending priorities, such as education, healthcare and infrastructure maintenance.

It is also important to highlight the merits and problems around the permanent-fund model's saving rules. As noted earlier, the savings-rule component of the permanent fund model is built on a very simple, typically constitutionally enshrined, savings of a fixed percentage of resource revenues through the fund. In terms of the Kopits-Symansky criteria, therefore, this aspect of the rule scores well on the basis of "simplicity" and "consistency". However, the downside is that when such savings rules are not combined with complementary stabilisation mechanisms, it can be procyclical. In terms of the Kopits-Symansky criteria, they fall short with respect to "flexibility" (not being state contingent) and "adequacy" (being procyclical and failing to stabilise revenue volatility). The procyclicality of the fiscal rule is not a major practical problem in states where the budget is not reliant of resource revenues, as in Texas, New Mexico and North Dakota. However, in Alaska (and to a lesser extent Wyoming), where resource revenues account for a major share of revenue – in Alaska, oil revenues exceed 90% of state revenues between 2010–13 – the fixed rule is problematic, given the absence of complementary stabilisation mechanisms.

In Alaska, the component of the Earnings Reserve that is not used to fund the dividend, as well as other "buffer funds" such as the Constitutional Budget Reserve and the Statutory Budget Reserve, should in theory provide some offsetting stability in times of low oil revenues. However, these buffer funds are small in size relative to spending and indeed total saved assets; and the use of their assets is not guided by a rule or established custom, but rather subject to legislative approval, and hence beholden to in-period political calculations and compromise. The above-mentioned fiscal reforms proposed by the Governor in 2015, would adjust both the spending and saving mechanisms in a manner closely comparable to the fiscal rule of Chapter 7 – transferring almost all oil revenue (particularly the volatile components) to the Alaska Permanent Fund in exchange for a stable draw on the fund's investment income in order to fund the budget in stable and sustainable manner (Richards, 2015). However, the proposal has encouraged various path-dependent political obstacles, such as previously mentioned resistance on the part of legislators to reduce the size of the dividend and/or change the customary formula through which it is derived and a reluctance by the legislature to effectively cede some of its *de facto* appropriations powers by being bound by a fiscal rule (Walker, 2016 and Drummond, 2016).

In terms of the Kopits-Symansky criteria, Wyoming and certainly Alaska in particular would benefit from greater – and less politicised – recourse to stabilisation mechanisms. In both states, stabilisation funds do exist: Alaska has the Permanent Fund Earnings Reserve, the Constitutional Budget Reserve and the

Statutory Budget Reserve; while Wyoming has a Budget Reserve Account and the Legislative Stabilisation Reserve Account. However, these funds can only be accessed after clearing various legislative hurdles, involving either a simple or absolute majority in both houses of the legislature.

In Alaska, where uncontroversial, rule-based access to counter-cyclical stabilisation funds is most needed,⁹² the observed reality is exactly the opposite: the use of and access to fiscal buffers are politically contentious, especially when it is most needed – during episodes of fiscal pressure when oil prices collapse. The use of the assets of the Earnings Reserve and the Statutory Budget Reserves, for example, requires a simple majority of 50% in both houses of the legislature, while the Constitutional Budget Reserve can only be accessed through an absolute majority exceeding 75% of votes in both houses – establishing inappropriately high political hurdles to the use of stabilisation funds in times of fiscal crisis. Again, the fiscal rule, therefore, falls short in terms of Kopits and Symansky's criteria flexibility and adequacy.

Meaningful reforms around the role of stabilisation funds, particularly for resource-dependent American states, would focus not only on growing the size of assets held in buffer funds relative to the level of annual spending in the budget, but more fundamentally on establishing clear rules for allocating resource revenues between the budget, the stabilisation fund(s) and the permanent fund(s). The real institutional priority should be to de-politicize the flow of revenues in and out of these stabilisation funds. Ideally, such reforms will be conducted as part the establishment of a more dynamic framework (such as the fiscal rule introduced in Chapter 7), which would improve the flexibility and adequacy of the rule, albeit at the expense of some loss of simplicity.

9.2.4. Incomplete rules in resource-rich poor countries

A number of resource-rich developing countries have introduced fiscal rules for the allocation of oil revenues and sovereign wealth fund assets and income. The governance of fiscal rules is typically challenged in these environments by the combination of pressure to increase public spending rapidly and a

⁹² In recent years, Wyoming has generated around 30-40% of revenue from a combination of oil, gas and coal; and around 30-45% of revenue from sales taxes, and 15-20% from investment income from their Permanent Funds. Alaska is much more resource dependent: in years preceding the collapse in oil prices (2011-14), oil revenues exceeded 90% of the state's fiscal revenues. Even with the collapse in oil prices, oil is still expected to account for 79% of revenues in 2016 and 67% in 2017 (Petek, 2015; Richards, 2015).

weak general institutional environment. Nevertheless, there are some instances in which fiscal rules and sovereign wealth funds have made a clear contribution to the prudent management of resource-revenue windfalls. Moreover, it is instructive to study the frameworks of these countries in order to identify the exact areas of weakness and vulnerability, and to ascertain how poor countries have sought to marry fiscal rules and sovereign wealth funds with the specific developmental and institutional challenges they face.

Kazakhstan

The savings rule for the National Fund of Kazakhstan has changed on three occasions since 2000. The rule that applied between 2000 and 2004 simply stated that the budget surplus should be deposited into the National Fund. This imposed little discipline, as there was no binding mechanism or anchor through which to determine the size of fiscal surpluses (or deficits), even during times of rising commodity prices and oil production. To the extent that savings did occur, it was due to discretion rather than rule-based commitments.

In 2005, a presidential decree specified all revenue from specific sources should be transferred to the fund: direct taxes on approved petroleum corporations, other income from petroleum operations, such as fines, the proceeds from the privatisation of state mining and manufacturing assets, proceeds from sales of agricultural land, and retained investment income generated by the National Fund. While the post-2005 clarification of the source of funds was an improvement on the preceding framework, it still left significant scope for discretion and manipulation by the political leadership of Kazakhstan. For example, the Minister of Finance and the Minister of Oil and Gas annually approve a list of petroleum corporations that pay taxes, a practice that has been the source of unpredictability (OECD, 2012).

Kazakhstan has also made a number of changes to the rule governing withdrawals from the National Fund. Until 2004, there was no spending rule and the fund was simply a depository for discretionary fiscal surpluses. The 2005 decree introduced a spending rule that earmarked withdrawals from the National Fund for exclusive use in financing long-term development programs, rather current budget expenditures. The withdrawal amount was determined according to a formula that included a rolling three-year estimate of the cost of budgeted development programmes, a three-year estimate of the National Fund's real investment income, and an exchange-rate adjustment to denominate the transfer amount back to the local currency, the Kazakh tenge (the National Fund invests exclusively in offshore assets).

Although there is no formal separation between a stabilisation and savings/income component of the sovereign wealth fund, this spending rule bears a degree of resemblance to the fiscal rule introduced in Chapter 7. In both cases, withdrawals are based on a combination of the real returns of the sovereign wealth fund and a component that tries to stabilise spending: in the rule in Chapter 7, this is achieved based on the previous year's spending and a transfer from a stabilisation fund; while in the Kazakh case, it was on a three-year moving average of budgeted development programs. The Kazakh rule took the additional step of denominating the transfer in the local currency, which would be a simple addition to the rule in Chapter 7 (or could be achieved through hedging part of the portfolio).

While this formula-based spending rule required legislative approval, there were a number of ways in which it could manipulated in order to generate larger transfers, such as the classification of expenditure as "development programmes" rather than current expenditure, and inflated cost estimates. Moreover, once-off withdrawals, called "targetted transfers", were also permitted – and indeed authorised in 2008-09 (and again in 2015, despite a more general change in the fiscal rule) in order to finance transactions involving Samruk-Kazyna, a state development fund, and KazMunaiGas, the national oil company. Targetted transfers totaled approximately \$11 billion (Farchy, 2015). Since 2010, following the passage of a new Presidential Decree,⁹³ transfers are anchored around a nominal amount of \$8 billion per year, which legislators can adjusted by 15%, and be used to fund current budget expenditures and development programs. In addition, the balance of the National Fund cannot fall below 20% of GDP in a given fiscal year – if it does, the shortfall has to be covered by cutting the fixed annual transfer by the amount needed to cover the difference.

The Kazakh fiscal rule has the advantage of simplicity; however, it does not provide much contingent feedback based on the state of the economy and the fiscal position and it unclear how the nominal withdrawal amount will be increased to account for inflation in the future. As discussed below, the biggest concern over the Kazakh fiscal rules (saving and spending policies), however, pertain not to the specification of the rule, but rather its governance and enforcement. Given that the saving rule has been changed twice and the spending rule on three occasions, it is also evident that the hurdles to changing

⁹³ Decree of the President of the Republic of Kazakhstan No. 962, April 2, 2010

them are not particularly high and are not likely to prevent further changing in circumstances in which they impose significant short-term restraint during times of fiscal pressure.

Timor Leste

Timor Leste is one of the poorest countries in the world and one of the youngest nation states, having gained independence from Indonesia following a protracted period of violence in 2002. The country persistently ranks amongst the lowest in the world on the Human Development Index, and suffers from extremely low levels of public infrastructure, industry, and basic health and education services (Government of Timor Leste, 2015). The silver lining for the country – or perhaps the nail in its coffin in light of the resource-curse literature – is a significant offshore oil and gas deposit (shared with Australia), production from which has accounted for three-quarters of GDP by the end of the first decade since independence (McKechnie, 2013).

Having met extensively with international development institutions, scholars and other sovereign wealth funds, the country's parliament adopted legislation in 2005 that modelled Timor Leste's fiscal framework and institutions on that of Norway – with one critical exception. Like Norway, the essence of Timorese fiscal rule is an emphasis on the non-oil fiscal balance and spending only a percentage of oil revenues that are deemed to be permanent income, which in the case of Timor Leste is called the “estimated sustainable income”. The critical difference in the Timorese model is that, where Norway follows a so-called “bird-in-hand” approach in which the 4% draw is based on already-received oil revenues deposited in the sovereign wealth fund, the “estimated sustainable income” in Timor Leste is based on a 3% draw not just on actual realised oil revenue, but an assessment of total oil wealth, including estimated, and yet-to-be-received oil revenues under the ground.

Basing the estimate of sustainable or permanent income not just on realised oil wealth, but also potential future oil wealth, has the obvious implication that it allows for significant “front-loaded” spending of oil wealth, but it always requires complicated exercises in forecasting of the size of oil deposits, the implied probability of extraction (that is, the deposits' commercially and geologically viability), and the oil price at which to value that expected future production. Moreover, it requires a discount rate with which to calculate the present value of future cash flows. The methodology established in law bases the price forecast on that contained in the *Annual Energy Outlook*, published by the United States' Energy

Information Agency (EIA), and other sources; while projections of petroleum production are based on the government's own estimates. Total petroleum wealth is calculated as the total assets of the Petroleum Fund at the end of the previous fiscal year, plus an estimate of the present value of future petroleum revenues, using a discount rate based on the 10-year moving average of US Treasury bills (McKechnie, 2013).

While the design of the Timor Leste fiscal framework provides an interesting augmentation of the permanent-income-and-non-oil-budget rule pursued by Norway to the capital-scarce, poor-country context, the burden on accurate forecasting described above is significant – and becomes a means through which to potentially manipulate the rule. In practice, the government of Timor Leste initially assumed prudently conservative estimates of both total oil wealth and prices (for example, using the low-price scenario in the EIA's *Annual Energy Outlook*). However, over time, there has been a tendency to incorporate increasingly aggressive assumptions; and to exploit some of the other “loopholes” in the law – most obviously, a provision to allow non-oil deficits to exceed that suggested by estimated sustainable income calculation “if properly justified and approved by Parliament” (McKechnie, 2013). More recently, government has scaled up public investment so that total spending amounts to more than twice the level consistent with the estimated sustainable income calculation, with total government spending rising from \$70m in 2004 and \$650m in 2009, to \$1.3bn in 2011 (Baunsgaard *et. al.*, 2012; and McKechnie, 2013).

Regardless of these flaws and vulnerabilities in the system, it should be noted that the framework has contributed to some remarkable results in the most challenging of economic circumstances. In the first instance, the country has enjoyed very high growth rates and steady progress on development indicators. Government spending and investment in infrastructure has increased rapidly, while the country has accumulated \$16 billion in the Petroleum Fund – roughly four times the country's GDP (IMF, 2014c).

Ghana

Ghana shares many similarities with Timor Leste: it also registers at the bottom-end of global league tables with the respect to per capita income, Human Development Indicators and infrastructure, and thus has similarly massive demands for current spending and public investment. Like Timor Leste, Ghana is expected to experience a rapid, but short-lived, escalation in the level of oil production and revenue over the coming decade (as discussed in country applications in Chapters 6 and 8). Following the

publication of geological results confirming the size and commercial viability of Ghana's offshore oil deposits in the first decade of the 20th century, the country also embarked on a "front-loaded" ramp up of anticipated oil wealth and revenue – albeit in a less formal manner than Timor Leste's sustainable non-oil budget and estimated sustainable income calculation. Rather, the Ghanaian authorities borrowed on a massive scale. The results of the borrowing binge – which saw the country's debt-to-GDP ratio explode from 26% in 2005 to 72.9% in 2015⁹⁴ – have been disastrous. In April 2015, having registered a budget deficit of 10.4% of GDP the previous year and a depreciation in the cedi of over 60% over the two preceding years, Ghana entered an IMF program to help fund its growing fiscal shortfalls and external debt obligations.

While the growth in oil production and revenues remains largely prospective (and indefinitely delayed by the collapse in oil prices in late 2014), Ghana has adopted elements of a rule-based fiscal framework, combined with stabilisation and savings funds, called the Ghana Stabilisation Fund and the Ghana Heritage Fund, respectively. The rules for the transfer of oil revenues to the sovereign wealth funds allow for a significant amount of upfront direct spending (in addition to the aforementioned debt-financed spending in anticipation of future oil revenues). The process starts with the calculation of each budget's "benchmark oil revenue" by the Ministry of Finance, based on the seven-year average of petroleum revenue. Seventy percent of this benchmark amount can then be transferred to the budget for spending, supposedly for exclusive earmarking to "development-related expenditures" (Parliament of the Republic of Ghana, 2011).

Any additional oil revenues, resulting either from the remaining 30% of benchmarked revenues or actual revenues exceeding the benchmarked amount, is then deposited into the Ghana Heritage Fund and the Ghana Stabilisation Fund, with a minimum of 30% of the transfer amount to be deposited in the Heritage Fund and the remainder in the Stabilisation Fund. Withdrawals from the Stabilisation Fund, however, may support the budget whenever quarterly oil revenues fail to adequately cover 25% of the Annual Budget Funding Amount. As a long-term savings fund, the assets of the Ghana Heritage Fund are better protected from withdrawals, which may only occur once oil reserves are depleted and both Petroleum Funds' assets are merged into a Ghana Petroleum Wealth Fund (to be established at a future date). From

⁹⁴ Ghana's low level of debt in 2005 was not reflective of historic fiscal prudence. Quite to the contrary, Ghana received substantial debt forgiveness under the Highly Indebted Poor Countries Initiative of the IMF and the World Bank. In April 2001 when Ghana joined the programme, its reported debt-to-GDP ratio was 110%.

that point forward, the amount allocated to the Annual Budget Funding Amount shall not exceed the interest on the Ghana Petroleum Wealth Fund's investments (Parliament of the Republic of Ghana, 2011).

The fiscal challenges Ghana has faced in managing its still-largely anticipated oil revenue boom reveal three overriding lessons. First, Ghana's problems underline the danger of "front-loaded" spending of expected future oil income through debt in the absence of a fiscal framework or anchor for borrowing (as per Timor Leste). Second, Ghana's legislation provides for a potentially very small degree of effective saving and wealth transformation, as the Ghana Stabilisation Fund can easily be drawn on. Third, any savings that do accrue over the lifecycle of Ghana's oil future production can be undone by a concomitant increase in debt, as the fiscal rule for oil wealth is not matched by an anchor or constraint on borrowing, such a deficit or debt limit (Baunsgaard *et. al.*, 2012).

Nigeria

Nigeria is another example of an oil-rich developing country that has adopted, at least in theory, a rule-based fiscal framework in to hope of improving on a rather dismal history of resource-revenue management. With considerable proven oil reserves and significant potential for further discoveries, oil will remain a major part of the Nigerian economy for decades to come. Oil accounts for an overwhelming majority of Nigerian fiscal revenues (on average around 90% of budget revenues in recent decades) and foreign exchange earnings. Therefore even if much-needed progress is made on generating non-resource revenues in years to come, the economic returns on improving Nigeria's management of oil revenues will be high.

The establishment of the Nigerian Sovereign Investment Authority, with three sovereign funds under its management, has the potential to improve the country's performance in oil-revenue management; however, it is not the first time that reforms of this kind has been attempted. Indeed, the establishment of the authority – and the particular form that it has assumed - is in large part a response to the failure of the Excess Crude Account, a segregated fiscal account intended to ring-fence volatile oil revenues and provide a stable and equitable basis for sharing oil revenues between Nigeria's state governments, established in 2004. The value of the Excess Crude Account reached \$5.1 billion in its first year, before rising to a peak of over \$20 billion by late 2008 due to rising oil prices. However, a mere year and a half later, the account was depleted to less than \$4 billion (by June 2010), due to the collapse in oil prices

following to global financial crisis, transfers to Nigerian state governments to cover their deficits and a number of unaccounted withdrawals. As of April 2016, the reported balance of the Excess Crude Account was around \$2 billion. The account – in theory a stabilisation fund – is regarded as an instrument of corruption and political patronage (Cocks and Brock, 2012)

In May 2011, parliament passed a law establishing the Nigerian Sovereign Investment Authority to manage three distinct funds: the Nigeria Infrastructure Fund, the Stabilisation Fund and the Future Generations Fund. The Infrastructure Fund is focussed on domestic investments; the Stabilisation Fund invests in highly liquid safe assets to provide a buffer against macroeconomic and fiscal volatility arising from oil dependence; and the Future Generation Fund invests in a diversified portfolio of international assets in order to preserve a share of resource revenue windfalls for future generations (Federal Republic of Nigeria, 2011). The Federal, State and Local Governments contributed an initial \$1bn as seed capital to the Nigerian Sovereign Investment Authority in 2012, in accordance with a distribution formula contained in the separate Allocation of Revenue Act. In February 2014, an additional transfer of \$550mn was made to the authority.

Future transfers of oil revenue to the Nigerian Sovereign Investment Authority will be provided from “surplus revenues from Federation Account,” the primary budget account that receives all oil-related revenues and from which all subsequent distributions are made. The definition of such surpluses is complex, and is referred to as “Residual Funds above the Budget Smoothing Amount”. Residual Funds are defined as revenue received into the Federation Account other than the Projected Federation Hydrocarbon Revenue for the relevant period, while the Budgetary Smoothing Amount is “an amount equal to 10% of monthly Residual funding up to a cumulative maximum amount at any one time of 2.5% of the Projected Federation Hydrocarbon Revenue for the year” (Federal Republic of Nigeria, 2011). The implication of these rules is that State and Local Governments are intended to receive their respective shares of oil revenue in line with the assumed benchmark oil price in a given year’s Federal Budget. All revenues exceeding the budgeted amount, minus the Budget Smoothing Amount, are transferred to the Nigerian Sovereign Investment Authority – the savings rule is, therefore, a reference-price type rule, as per the discussion in Chapter 6.

These rules face a number of obstacles. The complexity of rules leave them subject to political challenges – for example, the specification of an assumed oil price in the budget is critical to the amount of savings to arrive at the Projected Federation Hydrocarbon Revenue amount. The price is established by the Minister of Finance in consultation with the parliament, a practice that has resulted in politicised debates every year, leading the IMF to argue for a more technical rule for benchmark oil prices based on a moving average (IMF, 2016). The specification of the benchmark or reference price is discretionary, the outcome of which can be challenged as being either too conservative or too aggressive (as discussed in Chapter 6, this is common problem with fiscal rules based on benchmark commodity prices). Such controversies are to be expected, given that the intended transfer of surplus revenues to the Nigerian Sovereign Investment Authority is taking funds away from the Excess Crude Account and its primary recipients, the powerful State Governors (unsurprisingly, the establishment of the Nigeria Sovereign Investment Authority was legally challenges by State Governors).

The Nigerian Sovereign Investment Authority Act also contains an unusual provision pertaining to the maximum size of the assets under its management. The law empowers the Board of Director to appoint “recognised professionals and academics” to conduct “actuarial assessment of the demands for the proceeds of the Future Generations Fund”; and determine “infrastructure and capacity requirements” that will require the proceeds from the Nigeria Infrastructure Fund. These assessments, which the law states are to be conducted every two years, will be used to determine a “ceiling percentage of gross domestic product” for the assets under management of both funds (Federal Republic of Nigeria, 2011). A second unusual provision is the degree of discretion for allocating capital between the three funds under the management of the Nigerian Sovereign Investment Authority given to its own Board of Directors. The only legal provision is that each of the three funds may receive no less than 20% of revenues under any allocation. The initial \$1 billion in assets allocated to the Nigerian Sovereign Investment Authority was allocated as follows: \$325 million was allocated to the Nigeria Infrastructure Fund and the Future Generations Fund, respectively; \$100 million was placed in the Stabilisation Fund; while \$250 million remained unallocated. The conclusion from this analysis of the savings-rule elements of the Nigerian Sovereign Investment Authority Act is that savings are likely to be small (as they have been since the funds’ inception) and rely heavily of discretionary exercises of prudence – most obviously and directly through the specification of conservative oil-price assumptions in the benchmarking process. Clearly, the

fiscal rule falls short on a number of the Kopits-Symansky criteria, notably “adequacy”, “simplicity” and the quality of its “definitions”.

The procedures for the transfer of assets and income from the funds managed by the Nigerian Sovereign Investment Authority are less discretionary. The Stabilisation Fund is intended to be a cash balance and is the smallest of the three funds under the management of the Nigerian Sovereign Investment Authority (as of April 2016). The Stabilisation Fund may be drawn upon if the provisioned Budgetary Smoothing Amount maintained in the Federation Account is insufficient to stabilise the budget and the economy due to oil prices falling below the budgeted price. Both the Future Generations Fund and the Nigeria Infrastructure Fund are not intended to provide investment income on a regular basis: the law requires realised profits, interest and dividends to be reinvested in existing or new assets of both funds. The law does, however, allow for the Board of Directors of the Nigerian Sovereign Investment Authority to “declare a distribution out of uninvested and uncommitted” funds. Such distributions can only be made if the Authority: (i) has recorded a profit in each fund for at least five years, (ii) recorded profits in the year of the distribution, and (iii) has sufficient funds to meet its own operational needs. Distributions require a unanimous vote by the Board of Directors of the Nigerian Sovereign Investment Authority, and are capped at 60% of profits (Federal Republic of Nigeria, 2011).

As an independent asset management institution, the Nigerian Sovereign Investment Authority has adopted exemplary governance structures, exhibited high levels of accountability and transparency, and carefully considered investment strategy. The ultimate measure of contribution made by the authority to improving Nigeria’s troubled management of oil revenues will be whether it enjoys steady growth in the size of assets under management. This will require saving (spending restraint) during positive oil-price shocks that result in unanticipated windfalls, and the discipline not to raid the authority through the stabilisation fund in bad times. The fiscal rule is not binding and Nigeria does not have an encouraging track record of adopting and adhering to conservative benchmark oil-price assumptions. However, it is possible that the competence of the Nigerian Sovereign Investment Authority – and the earning power of capital – results in a more informal gravitation of revenues towards the sovereign wealth fund over time (or a strengthening of the law to include more binding saving mechanisms).

Conclusion

This chapter discussed the design and governance of fiscal rules currently used by a number of countries to determine the allocation of oil revenues and the use of sovereign wealth fund assets and income. These countries analysed cover a range of economic and political contexts (from one of the world's richest countries, Norway and the United States of America, to some of its poorest, Nigeria, Ghana and Timor Leste). The analysis of the rules actually used in practice allowed for an instructive comparison with the rule-based framework introduced in the Chapter 7 and 8. In general, the rule-based fiscal frameworks adopted in Norway and Chile come closest in design to the proposed framework: while their operation is different from the rule in Chapter 7 and 8 (and indeed from each other), they both integrate savings decisions with a concept of sustainable income from depleting resources. In both cases, the ultimate goal behind the rule is to constrain the spending of finite resource revenues in such a way that the budget does not become dependent on a depleting source of fiscal revenue.

Clearly, few countries are in the position of Norway in terms of the level of wealth and the quality of its institutions. The Norwegian model is thus applicable in the context of high levels of economic development, strong institutions and the ability to draw on other sources of fiscal revenue outside of commodities. The State of Wyoming pursues a similar model to that of Norway – albeit on a more limited scale given that it consumes the majority of its resource revenues through the budget, transfer only a percentage of resource revenues to its permanent fund. In Alaska, the same limited degree of savings applies, however, the state has to date not used the earnings of the permanent fund to fund the budget (rather just earmarking half of it for a unique citizens' dividend scheme). Both Alaska and Wyoming would be well served by the addition of some stabilisation mechanisms: either directing a greater share of volatile and depleting revenue through their permanent funds, in exchange for a stable stream of investment income; or more directly through the establishment of larger and more rule-based budget stabilisation funds.

In the low- to middle-income countries discussed in this chapter, notably Kazakhstan, Timor Leste, Ghana and Nigeria (Chile is an exception, given the soundness of its rule and institutional set-up), fiscal rules tend to be reasonably well specified in principle. However, a common theme in these countries is apparent blind spots or pressure points in the legislation, such as vague allocations of oil revenues to "development projects", high levels of discretion in the specification of oil-price benchmarks or references,

or the absence of any debt and/or deficit limits (which means the accumulation of assets can be offset by a parallel or subsequent accumulation of liabilities). Given the scale of developmental and institutional challenges in these countries, the risk that these weaknesses are exploited as a means to not adequately fund the sovereign wealth fund, or to raid in it tough times, looms large. Nevertheless, in all these cases, there are indications that the (flawed) fiscal rule and sovereign wealth fund structure has contributed marginally to improvements in the management of oil revenues – in Kazakhstan and Timor Leste a very large pool of assets (relative to GDP and the government spending) has been accumulated, while fiscal stability has been preserved amidst dramatic economic growth and transformation; while Nigeria created a credible independent sovereign investment authority.

The overarching message and purpose of the chapter is to underline the fact that when it comes to the potential contribution of sovereign wealth funds in managing resource revenues and avoiding the resource curse, “It’s Mainly Fiscal”. Without an at-least marginally constraining fiscal rule to govern the flow of money into and from it, a sovereign wealth fund risk becoming little more than a repository of occasional discretionary exercises in fiscal prudence, prone to raids and unruly depletions when resource revenues collapse, as they inevitably do at some point. The chapter also emphasised the importance of the institutional arrangements that govern the fiscal rule (as a distinct issue from the design of the rule itself). Three models of fiscal governance were discussed: the constitutional model (as practiced, incompletely, by most American permanent funds), the rule-by-experts model (as practiced in Chile), and the customary and consensual model (exemplified by Norway).

Once a credible medium- to long-term fiscal framework, governed by rules, has been established – with a sovereign wealth as an integral part of that framework – attention may turn to the key issues in the institutional arrangements around the management of the sovereign wealth fund’s investments, such as how to achieve a degree of operational independence for the management authority, how to clarify the roles and responsibilities of the various principals and agents involved in the delegated-authority model of investment, and how the governance and performance of the investment authority may be strengthened by transparency, accountability and an embrace of rule-based investment policies.

Chapter 10

Public footprints in private markets:

Institutional arrangements in delegated sovereign investment management

On New Year's Day in 2008, *Foreign Affairs* journal published an article on sovereign wealth funds authored by Robert Kimmitt, then serving as Deputy Secretary of the United States Treasury. Writing against a backdrop of increasing regulatory and political concerns in the West about the growing clout of sovereign investors from the Middle East, Russia and Asia (notably China), Kimmit (2008) gave a balanced account of the benefits and concerns around sovereign investment from a recipient-country perspective. "If these investments are economically, rather than politically, driven," Kimmit noted, "recipient countries have a strong interest in providing an open, transparent, and predictable framework for sovereign wealth fund investment."

The article also contained a number of thinly veiled threats, suggesting that evidence of overt political intervention in the investment practices of sovereign wealth funds by their host governments would be met with strong regulatory retaliation. "Foreign governments could conceivably employ large pools of capital in non-commercially driven ways that are politically sensitive," Kimmit argued, citing the concern that a government "could use its intelligence or security services to gather information that is not available to a commercial investor...[and that] a sovereign wealth fund could also obtain or extend financing at interest rates that a commercial investor could not." In addition to some of the specific concerns outlined by Kimmit (and others), it is clear that the rise of sovereign wealth funds as a class of state-owned investors had potentially jarred with the foundational philosophy of free-market capitalism: "the US economy is built on the belief that private firms allocate capital more efficiently than governments", Kimmit noted. The article ran under the evocative title, "Public footprints in private markets".

While Kimmit was articulating the apprehensions of recipient governments about the growth in state-owned investors, specifically sovereign wealth funds, a number of issues raised in the article are also of concern to the societies of host governments. In particular, the suggestion – and well-documented empirical evidence – that political intervention lowers the returns of long-term institutional investors, is a concern; particularly in the context of long-term sovereign wealth funds with the explicit functions of

saving, wealth transformation and income generation. Operational independence and rule-based investing are of particular importance for savings and investment-income type sovereign wealth funds, and potentially less so for stabilisation funds (given their short investment horizons and simple investment models) and sovereign development funds (where there is a case for alignment with political and strategic considerations).

This chapter considers institutional arrangements for the investment function of operationally independent sovereign investment authorities, while the last two chapters will focus on the analysis of asset allocation and rule- and contract-based investment policies. As noted in Chapter 5, the operational independence of sovereign investment authorities establishes a principal-agent problem, and in the context of public institutions, a potential democratic deficit (much as it does in the case of operationally independent monetary, judicial or regulatory authorities). Rule-based investment policies, along with more general governance principles of accountability and transparency, help reduce this deficit. This chapter starts by elaborating on the theoretical case and empirical evidence in the support of operational independence for sovereign investment authorities, already briefly touched on in Chapter 5. The second part of this chapter assumes a more positive approach, identifying how the institutional arrangements for delegated authority, which in the case of most sovereign wealth funds involves not just a simple principal-agent relationship but rather a chain of principals and agents, compares to established arrangements in other areas of institutional investment management.

10.1. The case for operationally independent investment authorities

The most important reason for granting sovereign wealth funds a degree of operational independence from government owners is performance. As discussed in Chapter 5, much as in the area of monetary policy, the independence of the investment authority in the case of sovereign wealth funds rests primarily on a belief that governments do not make good long-term portfolio investors – or, as Kimmitt (2008) noted “that private firms allocate capital more efficiently than governments”. The reasons for this view include misaligned incentives and horizons of politicians relative to the mandate of the sovereign wealth fund, and the need for technocratic expertise in long-term investment management. Again, these two

arguments – political bias and the need for technocratic subject expertise – mirror the case of independent, technocratic policy boards or committees in the area of monetary policy.

As noted in Chapter 5, there is a significant body of empirical evidence to suggest that political pressure and intervention reduces investor returns. The field of public-sector pension fund management, in which the investment policies, operations and institutional functions are closely aligned to those of long-term sovereign wealth funds, provides a rich body of evidence. One of the leading areas of focus in the literature on public pension funds is on board composition and incentives. In the public-pension fund world, boards are typically composed through a combination of elections (typically by plan members and beneficiaries), appointment or *ex officio* status (Useem and Hess, 2001 and Hess and Impavido, 2004). The general concern in relation to public-pension fund board pertains to *ex officio* board members, who are often political officeholders, and politically appointed members, with the assumption that beneficiaries have sufficient “skin in the game” to elect members that serve their best interests.

Political appointees, by contrast, are assumed (and observed) to face a conflict of interests, expressed in a tendency to favour investments with higher political, economic and/or social returns, rather than pure return maximisation. These investment activities run the gamut from favouring politically connected or local fund managers (if the board plays a role in manager selection), to prioritising local or domestic investments with an inadequate or differentiated consideration of their expected risk-return dynamics, to subordinating the fund’s investment performance in pursuit of other (politically rewarding) agendas, such as environmental and labour standards (Hess and Impavido, 2011). More generally, economists have modelled the negative impact on investment performance that arises due to a misalignments of incentives (for example, the pursuit of politically beneficial outcomes, rather than long-term returns), a mismatch in time horizons (with political horizons typically being shorter than that of an optimising long-term investor); and the tendency towards “trend chasing” (De Long, Schleifer, Summers and Waldmann, 1990; Shleifer and Vishny, 1990; and Lakonishok *et. al.*, 1994).

The empirical evidence on the links between board composition, the exercise of political pressure and influence on public pension funds and investment performance provide strong support for the benefits of political independence. Useem and Mitchell (2000) find that an array of governance variables account for more than 20% of the variation in investment strategies pursued by 291 American state and local

retirement plans (accounting for 80% of the country's pension fund assets), which in turn is a strong predictor of subsequent investment performance. More specifically, Mitchell and Hsin (1997) show that having a greater number of beneficiary representatives on the pension board reduces investment returns, which they argue is likely due to a lack of investment expertise.

A landmark study by Romano (1993) identified various conflicts faced by the board of trustees of public pension plans, with particular emphasis on what the literature refers to as "economically targetted investments", which according to a controversial United States Department of Labour definition are "investments selected for the economic benefits they create apart from their investment return to the employee benefit plan" (US Department of Labour, 1994). The seductive argument in favour of economically targetted investments is that they offer rates of return comparable to those of other pension-fund assets, while generating various positive externalities. Romano (1993) found that public pension funds are subject to political pressures to "tailor their investments to local needs, such as increasing state employment, and to engage in other socially desirable investing" and that the most widespread type of political pressure involved "demands to stimulate local economic activity directly by financing development projects that over-extended states cannot fund." The consequences of economically targetted investments on pension funds have been much debated, but largely found to be negative (Mitchell and Hsin, 1997; and Nofisinger, 1998).

The public pension funds included in Romano's paper also demonstrated a tendency towards directing public assets toward companies with lobbying powers and significant campaign contributions. Romano found the percentage of independent trustees directly improve investment performance measured by total return on plan assets, a finding that was robust even when controlling for asset allocation (which itself is widely found to be robustly correlated to board composition, as per Useem and Mitchell, 2000). Overall, "Public fund managers must navigate carefully around the shoals of considerable political pressure to temper investment policies with local considerations, such as fostering in-state employment, which are not aimed at maximising the value of their portfolios assets" (Romano, 1993).

Whereas the initial debate in the academic literature on public-pension fund governance focused on the distinction between (politically) appointed board members, who tended to advance the interests of plan sponsors (politicians); and elected members, who are either assumed or shown to better serve the interests

to fund beneficiaries, the more recent literature has focused more on the respective merits of “representative” versus “professional” boards. The former typically includes non-subject experts representing a range of stakeholders – the point is that, in the case of public pension funds, these may include both elected board members (for example, union leaders and current beneficiaries) and appointed and *ex officio* members. Professional boards can also consist of a combination of appointed and elected members, but are by contrast selected on the basis of the specialist subject knowledge and established professional criteria, qualifications and experience. The former has the alluring ring of democratic representation and inclusivity, while the latter promotes a closer alignment between the functions of a board and the skills required to perform them. The representative-versus-professional board literature suggests that the earlier distinction between elected and appointed boards (and board members) may be too simplistic. There is significant anecdotal and statistical evidence that a greater share of public-pension fund board members drawn from and representing beneficiaries undermines performance; and that the skills and subject competence of the board is associated with improved investment performance (Mitchell and Hsin, 1997, and Stewart and Yermo, 2008).

This development in the literature holds great significance for sovereign wealth funds, where a tendency towards “inclusive” boards may result from understandable democratic concerns. It is easy to see how the goals of inclusivity and representativeness trump board competence and skill – particularly in democratic political environments. Sovereign wealth funds and government-owned public-pension reserves funds, such as the New Zealand Superannuation Fund and the Canadian Pension Plan Investment Board, do not have easily identifiable and organised members or beneficiaries. Consequently, there are no direct representatives of “beneficiaries” that, even theoretically, can promote their interests; and boards are almost always staffed or appointed by political officeholders. In some sense, then, these sovereign investors have an even higher hurdle to clear in ensuring that political pressures are not exerted on the investment authority through the board. The case for professional boards, with arm’s length independence from government owners thus becomes even more compelling.

Recent empirical investigations of sovereign wealth fund investment behaviour have tended to mirror the findings from the public-pension fund literature that political motivated domestic investments and direct political representation in oversight and management structures lower returns. Concerns over the effects of political influence on sovereign wealth funds’ investment decisions have been raised in a more

theoretical sense by a number of scholars (Ang, 2010 and Das *et. al.* 2009), which statistical examinations generally (but not universally) support. Bernstein *et. al.*'s (2013) findings suggest a similar pattern amongst sovereign wealth funds as those observed by Romano (1993), Mitchell and Hsin (1997) and Useem and Mitchell (2000) in relation to public pension funds: exposure to political influences may introduce major distortions from long-run return maximisation amongst sovereign wealth funds, such as "misguided policy attempts to prop up inefficient firms or industries" or investments in industries, sectors or geographies that are deemed to be "hot" (Bernstein *et. al.*, 2013). Their empirical evidence suggests that "the investments of sovereign wealth funds with politically connected managers tend to see a reduction in P/E levels after the investment, while investments of external manager-influenced funds on average experience an increase in the P/E levels."⁹⁵ Moreover, the trend is "particularly pronounced for investments at home, which could suggest that the pressures to invest in hot markets at home are especially strong for politically connected sovereign wealth funds" (Bernstein *et. al.*, 2013).

While the Bernstein *et. al.* (2013) study is the most high-profile examination of sovereign wealth fund investment decisions and performance, a number of other studies raise similar concerns around political influence and biases in the investments of these institutions, as discussed in survey of the literature by Megginson and Votak (2015). Chhaochharia and Laeven (2008) constructs a sample of 29,634 equity investments made by 27 sovereign wealth funds and a comparative sample of 38,880 equity investments by public pension funds in firms from 56 countries to examine whether the former demonstrate systemic biases compared to pension funds. They find that a bias towards investing in countries that share a common culture and religion is "particularly pronounced" amongst sovereign wealth funds compared to pension fund. Chhaochharia and Laeven's (2008) result also suggest that aspects of sovereign wealth fund investment strategies are at odds with portfolio theory and their long-term advantages, as they tend to chase past returns, and hold portfolios that are poorly diversified both geographically and across industries (sovereign wealth fund portfolios are found to be heavily overweight both oil companies and companies with large market capitalisation). Similar results are reported by Dyck and Morse (2011), who also find evidence of portfolio concentration in financial-services firms. Knill, Lee and Mauck (2012) find a strong causal relationship between measured changes in the international political relationships of host and home countries and geographic investment patterns of sovereign wealth funds, to the extent that a deterioration in political relationships result in an increase in sovereign wealth fund investments,

⁹⁵ P/E levels refer to the price-to-earnings ratio, the most commonly used measure for valuing a company. P/E ratios or levels measure a company's current share price relative to its per-share earnings.

suggesting sovereign wealth funds may be used as a political tool (or at least be influenced by changes geopolitical relationships). A contrarian perspective is offered by Avendaño and Santiso (2011), who find that reported sovereign wealth fund investments do not differ greatly from those of privately held mutual funds, and conclude that fears regarding politically motivated by sovereign wealth funds are unfounded.

Regardless of whether political pressure or interventions do actually influence sovereign wealth funds, it is likely that concerns over such perceptions by regulators in host countries have played a role in efforts by home countries to proactively establish a degree of *de jure* independence. Consider, for example, the language around independence adopted in the Santiago Principles: “A sound governance structure that separates the functions of the owner, governing body(ies), and management facilitates *operational independence* in the management of the sovereign wealth fund to pursue investment decisions and investment operations *free of political influence* (International Working Group on Sovereign Wealth Funds, 2008; emphasis added).

A more pragmatic reason for embracing a model of operational independence for the management of sovereign wealth funds include a need for “ring fencing” resource revenues, particularly in the context of corruption and poor institutions, in order to protect against theft. Given their size, complexity and uncertain nature, resource revenues are often a target of theft; while the tendency towards a “lack of transparency surrounding resource revenues...relaxes the disincentives to misappropriate funds” (Collier *et. al.*, 2010). While, of course, not offering any guarantees that the sovereign wealth fund itself will not be raided – or, even worse, become an instrument for kleptocrats to siphon off resource revenues into foreign bank accounts – the establishment of an independently run sovereign wealth fund, subject to detailed disclosure requirements and formal oversight mechanism, can at least increase transparency and introduce a number of logistical obstacles to plunder. One concrete example of the latter may be to have the assets of the fund administered or managed by the World Bank’s Treasury Department or the Bank for International Settlement (BIS), with withdrawals requiring (for example), the signature of the President, the Finance Minister, the Minister for Petroleum, the Governor of the central bank, and the chairman and executive of the sovereign wealth fund; plus a statement of disclosure published by the World Bank or the BIS (similar arrangements may be established in law and in contract with the fund’s private-sector custodial bank).

Finally, another pragmatic reason for establishing an operationally independent investment authority has to do with the limitations and restrictions of public-sector pay scales. The need for hiring “in house” expertise – which can be prohibitively expensive for many sovereign wealth funds – depends to a large degree on complexity, sophistication and degree of “active management” around the fund’s investment strategy (as discussed in the following two chapters). The issue of compensation for human capital in public-sector investment context, particularly relative to the often very high earnings of people working in private-sector finance, has been analysed in detail in the literature (Clark and Urwin, 2008; Bertram and Zvan, 2009; Ambachtsheer, 2011; and Clark and Monk, 2013). For many sovereign wealth funds worldwide that face challenges around attracting and retaining talent – most notably, due to the remoteness of their head offices and the limits of public-sector compensation relative to that of the private sector – the heavy use of external managers and investment consultants becomes a practical necessity, unless the fund invests exclusively in low-cost passive index type investments (Clark and Monk, 2013). One of the hallmarks of the much-lauded Canadian public pension fund model – that has been followed by a number of sovereign wealth funds – is the establishment of independent, professional investment institutions, which are not tied to implicit or explicit public-sector wage scales, but can establish their own compensation schemes to attract and incentivise internal managers.

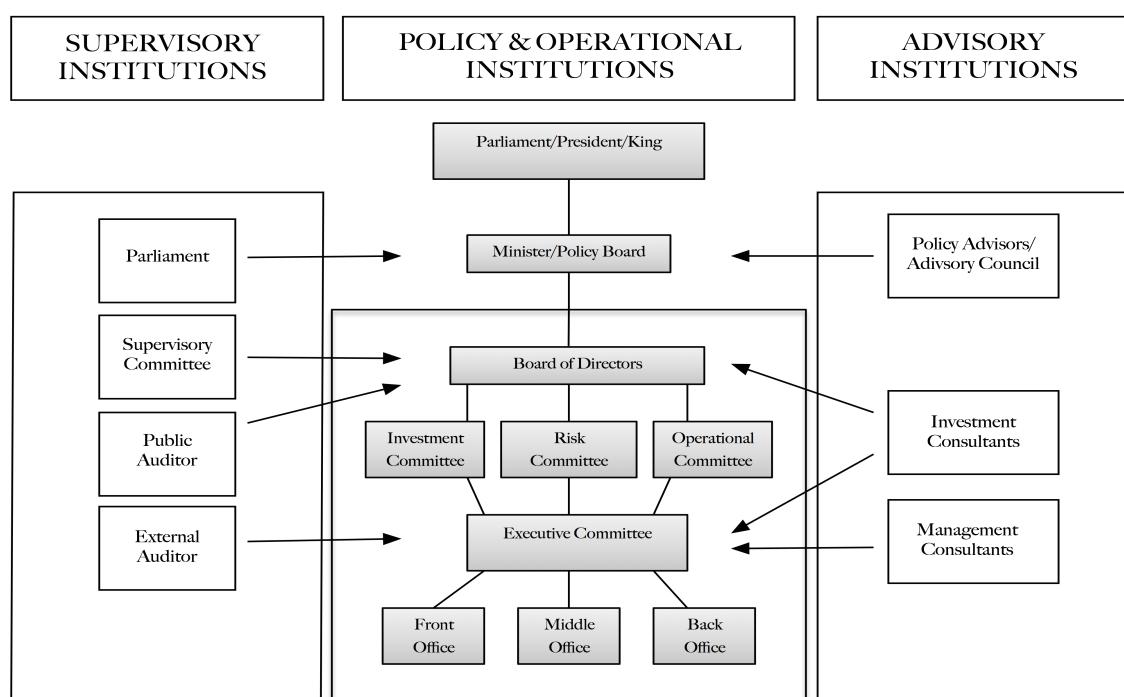
10.2. Achieving institutional separation and operational independence

Having made the case for operational independence in theory, it is insightful to reflect on how an institutional separation between policymakers, legislators and the management authority of sovereign wealth funds is achieved in a number of country cases. In reality, the independence advocated above is never absolute, but rather a question of degree. Moreover, the institutional arrangements between “principals” and “agents” in the case of sovereign wealth funds is not a simple two-way relationship, but are characterised by a chain of delegated authority. Most forms of institutional investing involves multiple layers of delegated authority and oversight; for example, between a board of directors/trustees and the executive, between the executive and internal/external fund managers, etc. In the context of sovereign wealth funds, additional layers are added: an independent appointed board of directors may report to a minister (or a higher “governing council” or “policy board”), which in turn reports to a parliament, a president or a monarch (depending on the political context). Further down the chain of delegated

authority, the often extensive use of investment consultants and external fund managers creates additional principal-agent relationships in the management of sovereign wealth funds, while expectations for public accountability add an often elaborate oversight infrastructure, involving a public auditor, a national regulator, external auditors, and sometimes a separate supervisory board (in addition to the board of directors).

The independence of the authority managing a sovereign wealth fund is therefore never absolute, but rather embedded in an institutional arrangement that enforces oversight and accountability. Naturally, in the context of a myriad of interlocking principal-agent relationships due to various levels of delegated authority, it is important that the institutional architecture provides clarity around the precise powers and responsibility of each principal and agent. Figure 10.1 provides an overview of a stylised institutional set-up for delegated investment management of a sovereign wealth fund, while discussion below outlines the most important tasks assigned to each element. Note that the figure shows the full scope of the most detailed institutional arrangement possible – in practice, as discussed below, it is possible to economise on this structure with some direct reporting lines and operational structures (as the case of Chile, in particular, illustrates).

Figure 10.1. Institutional structure for delegated sovereign wealth fund management



The operational part of the structure, shown in the central box in Figure 10.1, mirrors that of standard practices amongst institutional investors, such as public and private pension funds, endowments and foundations, particularly the principal-agent relationship between the board and the executive, and their intersection through the various committees of the board (which typically includes executive board members). The executive management of the fund then manages internal teams, colloquially known as the front-, middle- and back office, responsible for portfolio management, risk management, and trade execution and processing, respectively.

The sovereign wealth fund simply adds additional layers of political ownership and accountability, and more detailed supervisory or oversight arrangements than what is typically found in non-governmental investment institutions, involving not only external auditors, but also, for example, reports by the public auditor, parliamentary scrutiny of the minister or highest policy board (and sometimes more directly of the board of the sovereign wealth fund itself). In a small number of countries, parliamentary oversight is complemented by or delegated to a supervisory committee. Like most other institutional investors, sovereign wealth funds also make use of external advisors and managers, some providing assistance to the most senior policy institutions, others more directly on investment and operational matters to the board or executive of the sovereign wealth fund.

In practice, there is a significant degree of variation around this framework captured in Figure 10.1. As noted earlier, it is possible to simplify and economise on this elaborate structure, particularly when the sovereign wealth fund is relatively small; and, more importantly, if the investment strategy is very simple (for example, when investments are limited to passive, indexed strategies in liquid public markets) and highly transparent. Recall from the discussion in Chapter 5, that the governance of sovereign wealth funds can be categorised according to external and internal dimensions: the former pertains to the institutional arrangements between the investment authority and its political owners (ministries, legislators, the president or king, and the public at large); while the latter relates more narrowly to the structures operating within the investment authority, such as the distribution of authority and responsibility between the board and the executive, the adoption of rule-based investment policies, etc. Within a more elaborate institutional model, in which delegated authority involves more than simple operational aspects, the two critical areas of differentiation in the overall governance structure are as follows:

10.2.1. “Supervisory councils” versus “policy boards” in external governance

The first major area of differentiation is the extent to which political officeholders exercise their authority over the management of the sovereign wealth fund in a manner that represents either a “supervisory council” or “policy board”. In the supervisory-council model, political representatives set the goals for the organisation in comparatively broad terms, such as the articulation of the fund’s purpose and legal standing; and then resolve to act mainly as an oversight body over the management authority, particularly its board (note, this may or may not be in addition to the supervisory committee, shown in the Figure 10.1 in the left-hand column). The management authority, through a combination of powers and responsibilities divided between the board and the executive, are then granted significant delegated authority to interpret this broad political mandate and articulate an appropriate investment policy (including, most critically, the fund’s asset allocation).

In contrast, the more politically “hands-on” policy-board model sees political officeholders, such as the minister of finance (often only this minister), other members of cabinet, presidential appointees and members of the legislature more directly involved with that articulation process: that is, more directly involved with the specification of the sovereign wealth fund’s return targets, risk tolerance and investment horizon (and, under most direct models, its asset allocation). Clearly, the supervisory-council model assumes a higher degree of delegated authority and operational independence for the investment-management authority of the sovereign wealth fund than the policy-board model, although in practice the process may be more *de facto* consultative, involving the minister of finance (or broader policy board), the board and the executive of the sovereign wealth fund.

10.2.2. Board- versus executive-centric models of internal governance

The second major distinction in the governance models of sovereign wealth funds pertains to the internal dimension – specifically, the distribution of authority and responsibility between the board and the executive. Management structures can be categorised as broadly board- or executive-centric, with the latter again implying a higher degree of delegated authority. The most common model sees the board responsible for the articulation of the fund’s investment policy most critically, the fund’s asset allocation. If

the political body assumes a more supervisory role in the external governance, as described above, the board will typically also have the authority to specify the fund's target return, risk tolerance and investment horizon – as discussed in Chapter 11, ideally through a publicly disclosed “Investment Policy Statement” – which the executive is then tasked with implementing. Most typically, the board is also responsible for nominating or appointing the senior executive (sometimes subject to ministerial and/or parliamentary approval).

In practice, however, the executive does have a role to play in the articulation of these critical aspects of the investment strategy; either through consultation to the board; or, as is more common, by assuming any number of seats on the board. Typically, the Chief Executive Officer will have a permanent seat on the board, but in the case of larger boards with greater executive representation, the Chief Investment Officer and possibly the Chief Risk Officer, Chief Financial Officer, and the Chief Operating Officer also serve on the board. The size of the board often becomes a practical issue in the management sovereign wealth fund (and other public investment institutions), given the executive board members are typically joined by both appointed and *ex officio* board members. In such cases, common practice is to establish separate board-level committees, such as an Investment Committee (chaired by the Chairman of the Board and including the Chief Executive Officer and Chief Investment Officer of the fund), a Risk or Risk-Management Committee, an Audit Committee, and an Operational Committee.

One of the most important factors in the relationship between the board and the executive is the degree of “active” management the board wishes to tolerate or encourage. Under more passive investment models, the executive’s main responsibilities become administrative and operational in the sense that they implement a series of benchmark portfolios. More active investment models assume that the executive management can add value by outperforming a combination of benchmarks or by a low-cost reference portfolio, either through the executive’s management of an internal investment team or its selection of above-average external investment managers. Benchmark- or reference-portfolio specification is the task of the board (occasionally of a higher authority, such as a policy board, governing council or a minister), while active management and manager selection is that of the executive.

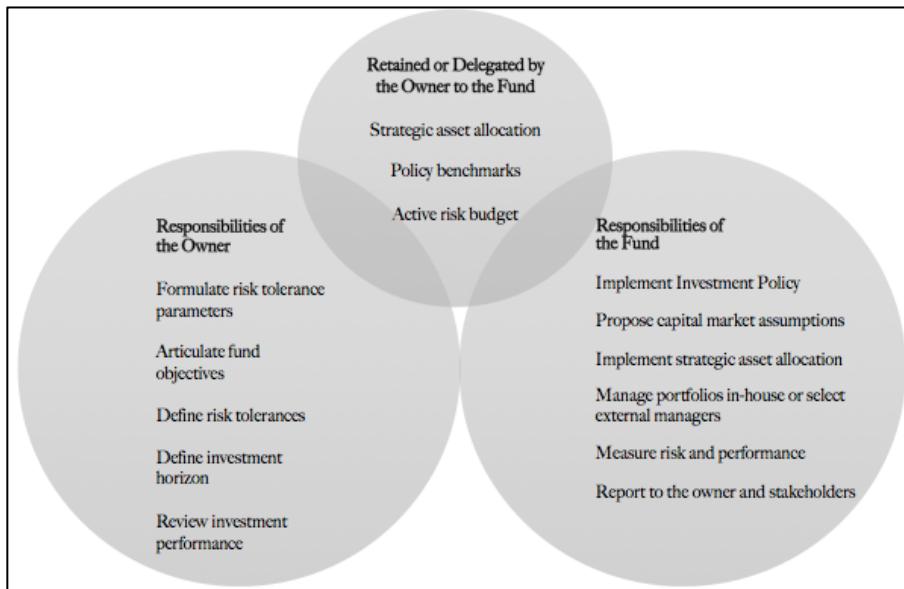
10.2.3. Governance models and the public footprint

Decisions regarding the balance between supervisory versus governing models of political control for external governance, and between board- versus executive-centric models for internal governance, are made in part based on practical considerations around cost efficiency of institutions. However, the outcome of these decisions also have a major bearing on the degree or perception of political influence on a sovereign wealth fund.

Naturally, if efforts are made to greatly reduce the “public footprints in private markets” left by sovereign wealth funds, the overall governance framework might be expected to gravitate towards a more supervisory-council model for external governance (and possibly a more executive-central internal governance model – or least one in which political representation and/or appointments to the board is limited). Alternatively, if political officeholders, such as the minister of finance, retain comparatively high levels of *de jure* authority over the sovereign wealth fund – as, in fact, they do in the case of both Norway and Chile, two widely lauded examples of sovereign wealth fund governance – concerns over the public footprint and political motivations behind the fund can be reduced by a combination of exceptional levels of transparency and disclosure, and simple, largely passive investment models.

The degree of political influence on a sovereign wealth fund can also be depicted as per Figure 10.2, which is taken from an IMF paper on the governance of sovereign wealth funds (Al-Hassan *et. al.*, 2013). The fund’s diagram depicts a stylised relationship between the “owner” of a sovereign wealth funds (that is, generally, the government and political officeholders) and the “fund” (that is, the delegated authority managing the fund). Without controversy, the responsibilities of the owner are depicted in broad terms: articulate the fund’s objectives, define risk tolerances and the investment horizon, and review of investment performance. Similarly, the articulation of the fund-management entity’s responsibilities includes a standard list of technical tasks: propose capital market assumptions, implement strategic asset allocation, manage portfolios in-house or select external managers, measure risk and performance, and report to the owner and stakeholder.

Figure 10.2: Roles and responsibilities in determining SWF investment policy



Source: Al-Hassan, Papaioannou, Skancke and Sung (2013)

However, the key point is that Figure 10.2 depicts the most critical long-term determinants of investment performance as open to being either “retained or delegated by the Owner to the Fund”, with powers and responsibilities for fundamental decisions – strategic asset allocation, the specification of policy benchmarks, and the quantification of the risk tolerance (which Al-Hasan *et. al.*, 2013 refer to as an “active risk budget”). In the governance model depicted in Figure 10.1, the most effective way to ensure and demonstrate limited political involvement in the investment policies of the sovereign wealth fund is for the government (or “owner” in the IMF’s terminology) to delegate, rather than retain these powers (as per the supervisory-council model discussed in Section 10.1.1.).

The “ownership” of the asset allocation decision and process is a critical element of governance process, as long-term allocation (often referred to as “strategic asset allocation” or SAA) is by some margin the most important determinant of long-term returns (as discussed in detail in the following chapter). Al-Hassan *et. al.* (2013) describe the different models and their implications in relation to sovereign wealth fund management, as follows:

“There are alternative approaches as to who ‘owns’ strategic asset allocation decisions. In a more typical set-up approach, the owner of the fund, usually a ministry of finance, decides on the SAA,

approves the benchmark portfolio representing the SAA and sets active risk limits for deviating from the policy benchmark. Operationalisation of the SAA and active management is then delegated to the fund manager (this approach is adopted by Norway and Russia). In a less typical approach, the SAA decision is fully delegated to and owned by the fund manager (this approach is adopted by Singapore). In the former approach, the sovereign wealth fund's owner internalises the total risk of the policy benchmark, which represents on average about 80–95% of the overall risk, while the fund manager is responsible for the residual risk arising due to active management, and is held responsible for excess returns relative to the benchmark. In the latter approach, the fund manager is ultimately responsible for the total return of the fund, as well as for potentially substantial deviations from the stated return targets for long periods of time, with the fund owner not having direct control over investment outcomes" (Al-Hassan *et. al.* 2013: 18–19).

As noted earlier, some of the most celebrated governance models, such as those of Norway and Chile, follow what Al-Hassan *et. al.* (2013) call the "typical model", in which the minister of finance retains *de jure* authority for long-term asset allocation decisions. The advantage of this approach is that it makes the ministry highly accountable for the long-term investment performance, risk and return of the sovereign wealth fund – frankly, the minister has nowhere to hide if the fund underperforms and cannot blame the board or the executive of the fund for poor asset allocation decisions (unless the latter significantly deviation from the policy choices reflected in the minister's asset allocation). The potential downside to this approach is that it suggests an undue degree of political interference. In practice, however, the passive, uncontroversial and consultative nature of the investment process (coupled with exceptional transparency) in cases such as Norway and Chile reduces concerns over the public footprint.

10.3. Existing sovereign wealth fund governance models

The governance arrangements for the management of a sovereign wealth fund depicted in section 10.2 is a stylised model. It is more elaborate than many of the existing models, which in practice economise on this infrastructure. As discussed earlier, within the most elaborate governance model, there is significant scope for both *de facto* and *de jure* variations in the allocation of authority and responsibilities. In particular, the degree of political influence of the fund may be expressed through the choice of whether political officeholder assume a more supervisory versus policy role (discussed previously in relation to the distinction between "supervisory councils" and "policy boards"); although the *de jure* powers of political

officeholders under the latter can effectively be watered down or constrained by exceptional levels of transparency and disclosure, and the adoption of simple, largely passive investment models.

10.3.1. The Norwegian governance model

The Norwegian governance model most closely resembles the arrangement depicted in Figure 10.1. The model is noteworthy for its involvement of a wide range of public institutions, each with clearly defined roles and responsibilities; and its exceptionally high reporting and disclosure requirements and practices. The most important institutions in the model are the Norwegian parliament and Supervisory Council, as oversight institutions; and the ministry of finance, the Executive Board of the central bank, and the senior management of a dedicated operational investment manager (under the auspices of the central bank), as the primary policy institutions. The distribution of core responsibilities and reporting lines around the Norwegian Pension Fund Global are as follows:

- The **Minister of Finance** determines the sovereign wealth fund's broadest strategic orientation – as reflected in its Strategic Asset Allocation. The ministry delegates all operational management and a degree of discretionary authority around the strategy and the selection of external managers to a dedicated investment authority within the central bank.
- The **central bank Executive Board** is the highest authority within fund's operational management. It establishes the guidelines and strategic plans for the management activities of Norges Bank Investment Management (NBIM), a dedicated investment management unit within the central bank. The Executive Board is subject to an internal audit, and is part of separate governing structure for the management of the sovereign wealth fund than for other aspects of the central bank (such as monetary policy and financial supervision). The board consists of eight members, with the Governor of the central bank serving as chairman, and the two Deputy Governors as first and second vice-chairman. The latter has a special responsibility for the sovereign wealth fund.
- **Norges Bank Investment Management (NBIM)** is a dedicated asset management department within the central bank and is the operational fund manager of the sovereign wealth fund (in addition to other public funds, including the central bank's foreign exchange reserves). It implements investment strategy and exercises the small degree of active management that is permitted by the fund's owner. The team also performs significant research and analytical functions around the fund's asset allocation, external managers and operational efficiency.

The above-mentioned three institutions form the core of the policy infrastructure in the Norwegian model. Clearly, the deep policy choices around the Norwegian sovereign wealth fund – notably its strategic asset allocation, but also the decision to pursue an “ethical investment” mandate, which results in

the fund excluding investments in, for examples, companies involved in the tobacco and arms industries, or deemed guilty of human rights violations and severe environmental damages – are the domain of the ministry of finance. The central bank's executive board is less of a policy board, and more of an operational-oversight body. Finally, the operational manager is also a largely operational authority, although it does exercise some limited and constrained discretion in attempt to outperform the ministry of finances' benchmark. Its discretionary powers and responsibilities have risen with the introduction of a difficult-to-benchmark real-estate investment mandate in 2011. In addition to the policy infrastructure, the Norwegian model makes provision for significant oversight and supervisory institutions, as follows:

- The **Norwegian parliament** passes legislation governing the fund, approves the operational manager's annual budget, appoints a Supervisory Council and reviews reports on the fund's guidelines, strategies and performance prepared by the ministry of finance, NBIM and auditors.
- The **Supervisory Council** supervises the central bank's activities (in general, not only of NBIM). It has the right of access to information and investigative powers. The Supervisory Council reports to the parliament, who also appoints its 15 members. Appointments are for four-year terms with the possibility of re-appointment twice. Every other year, up to half of the membership is reappointed or replaced. The chairman and deputy chairman are appointed for two-year terms.
- The **Auditor General** performs an audit of the fund and the operations of Norges Bank Investment Management, and reports to the parliament and the government. In addition, an external auditor is appointed and reports to the Supervisory Council.

As has been widely noted in the literature on sovereign wealth funds, Norway has exemplary governance structures (Monk, 2009; Das *et. al.*, 2009; Ang, 2010 and Frankel, 2010). While other funds may find it difficult to implement similar structures given political constraints and local public-sector practices, the Norwegian governance structure rests on three characteristic features that are worthy of emulation: (i) a profound commitment to transparency and public disclosure that incorporates strategy, operations and intra-governmental oversight; (ii) the separation of powers and responsibilities across various stakeholders and public institutions; and (iii) generating a stable consensus between these institutions through a highly consultative and representative process. Certainly, it cannot be argued that political officeholders are far removed from the investment of the Norwegian sovereign wealth – the minister of finance sets the strategic asset allocation – but, as discussed above, the transparency and simplicity of the fund's investment strategy and governance model allays concerns over undue political intervention.

10.3.2. The Kazakh governance model

The governance model of the National Fund of Kazakhstan is characterised by a high degree of centralised political authority, with the president serving as the highest reporting authority of the fund and as a member of its powerful Management Committee. The lack of independence of the Management Committee means that the political leadership, particularly the President and senior ministers, enjoy a high degree of control and discretionary power over the fund. The National Fund is also relatively non-transparent around key aspects (such as its detailed asset allocation and its external audits) of its operations and performance (although less so than a number of sovereign wealth funds, particularly in the Middle East). The *de jure* governance structure for the National Fund of Kazakhstan is as follows:

- **The President:** officially recognised as the highest reporting authority of the National Fund. The President created the National Fund and the Management Council, on which he sits, through Presidential decrees.
- **The Management Council:** consists of the President, the Prime Minister, key economic policy ministers and other high-ranking officials (including representatives of the legislature). The Management Council sets all key governance, operational and investment policies for the National Fund.
- **The Minister of Finance** and the **Minister of Oil and Gas** jointly approve the list of petroleum sector companies whose taxes are deposited into the National Fund, while parliament passes laws determining small variations in the amounts transferred from the fund annually.
- The day-to-day investment management of the National Fund is the responsibility of the **National Bank of Kazakhstan**. The central bank selects and oversees the fund's external managers of its equity portfolios. In 2012, an independent unit was established within the central bank, called the National Investment Corporation, to manage part of the sovereign wealth funds' money (alongside other public funds).
- The central bank is subject to **external audits**, which includes its activities in relation to the investment of the National Fund's assets. The audits are not made public.

A particular feature of the institutional structure of the Kazakhstan fund is the formal recognition of the President as the highest reporting authority for the fund – something that is typically either strictly avoided, or only implicit, by other sovereign wealth funds. Much of the authority for establishing the National Fund's policies and investment strategy rests with the Management Council, which is headed by

the President. Therefore, while the delegation of operational management to the central bank establishes some autonomy, the power vested in the Management Council – and, moreover, the President’s prominent position on the council – does little to conceal the extent of political influence over the fund. Given the nature of Kazakhstan’s institutions more generally, this structure is not surprising – it is also unlikely that a *de jure* independent or delegated-authority model would make much difference *de facto* (given the degree of centralised political control over various arms of government and state institutions). What is noteworthy, is the fact that despite the formal authority of the President and other senior political officeholders over the National Fund, it appears that little actual intervention in the investment process has occurred (the strength of this observation is, however, weakened by the lack of transparency and independence around the fund – it is possible that fund has made a number of politically-inspired investments that are not disclosed externally).

10.3.3. The Chilean governance model

The Chilean governance model is noteworthy for three reasons: first, it is very simple; second, it is extremely transparent; and third, while the minister retains essentially all the *de jure* policy authority, there is a high degree of *de facto* reliance on the insights and expertise of an expert advisory committee. Both of Chile’s sovereign wealth funds, its stabilisation and savings funds, are under the jurisdiction of the ministry of finance, which develops investment policies and publishes monthly, quarterly and annual reports on the funds’ activities and performance. The Central Bank of Chile acts as the operational investment manager of the funds, but its role is relegated to an essentially operational one, given the ministry of finance’s decision to pursue a low-cost, passive investment strategy focused exclusive on tracking leading global stock and bond indexes. There are a number of other public institutions involved with the funds, particularly in advisory and oversight capacities. The roles, responsibilities and reporting lines of these institutions are established in law for the ministry of finance, and by ministerial decree for the central bank (issued in 2006) and the Financial Committee (issued in 2007). The key institutions in the Chilean model are as follows:

- The **Ministry of Finance** determines investment and internal management policies for the sovereign funds, including their respective asset allocations, benchmark indexes, investment horizons and risk budgets, while the General Treasury, Chile’s revenue service, is responsible for accounting and preparing audited reports on the funds.

- The **Advisory Financial Committee for Fiscal Responsibility Funds** is a panel of experts, appointed by the ministry of finance, which provides advice on the funds' management and investment policies. The six members of the committee are selected by the ministry, and consist of local macroeconomists and financial experts, with overlapping tenures of two years. The committee meets on average every six weeks and its members are remunerated for their attendance of these meetings. A Secretariat for the committee is provided by the ministry, which also prepares technical reports on international financial conditions and financial performance of sovereign wealth fund investments. The Advisory Financial Committee releases its own annual reports and minutes from meetings, separate from those of the ministry. The transparent use of a technocratic advisory structure for the investments of the Chilean sovereign wealth funds mirrors that of the fiscal rule (as discussed in Chapter 9, the fiscal rule draws on inputs from expert panels on trend GDP growth and the future copper prices). Unlike the inputs (projections) from those two fiscal committees, the recommendations of the Advisory Financial Committee are not binding for the minister of Finance (Schmidt-Hebbel, 2012). However, the public release of the committee meetings' minutes, their annual report and the frequency of their meeting schedule creates a high degree of public and political accountability, against which the policies and actions of the ministry of finance can be assessed.
- The **Central Bank of Chile** manages the funds' investment portfolios, with a portion delegated to external fund managers (around 35% of all assets of the Pension Reserve Fund, the country's savings fund). The central bank appoints and monitors the performance of external fund managers, who have little discretionary powers in deviating from the established index benchmarks. The central bank manages fixed-income assets internally, while outsourcing some index-benchmarked investment mandates to external managers.

The simplicity and economy of the policy and operational dimension of the Chilean governance model is mirrored by a basic supervisory infrastructure. Given the passive, indexed investment strategy for both sovereign wealth funds, their operational management by the credible central bank, and the ministry of finance and Financial Advisory Committees' transparency and accountability around policy and strategic decisions, there is little need for an extensive arrangement of supervisory and oversight institutions, outside of the following:

- The **Chilean Congress** passed the legislation authorising the Funds and receives monthly, quarterly and annual reports from the ministry of Finance.
- The **Comptroller General** performs an audit of the ministry of Finance's activities (including the fiscal rule and sovereign funds), and reports to the Congress. Independent **external auditors**' reports are included in the report of the General Treasury.

The prominence of the ministry of Finance in the institutional arrangements around the Chilean funds is in some respects an exception to the general tendency towards and desirability of autonomy for sovereign

wealth funds, particularly long-term savings funds (in the Chilean case, the Pension Reserve Fund). However, this high degree of ministerial control is counter-balanced by exceptional transparency and disclosure, a very simple and non-discretionary investment strategy, and a sovereign wealth fund strategy that is embedded in a rule-based fiscal framework. In the Chilean case, it could be argued that discretionary powers are not delegated to an independent authority, exactly because the rule-based framework and investment strategy does not permit much discretion in the first place – effectively, there is no power to be delegated, and no discretion to the constrained.

The Chilean example is the prime example of the keep-it-simple approach to sovereign wealth fund management and governance. It greatly economises on the cost of operating and governing the country's sovereign wealth funds. The simplicity, built-in transparency and accountability, and integration of the sovereign wealth funds with a broader rule-based fiscal framework are all highly attractive institutional features – indeed, it is a model with great relevance to other resource-rich developing countries, looking to establish policy, governance and operational frameworks for their sovereign wealth funds.

10.3.4. American permanent fund governance models

While there is a great deal of commonality in the funding rules and institutional objectives of American resource-based permanent funds, there is greater divergence with respect to the operational models and governance structures around their investment management function. There are essentially two models for managing American permanent funds: in most cases, the funds are managed (alongside other public funds) by an Investment Board within the State Treasurer's office; while there is also limited use of dedicated independent investment authorities. The two most established and successful examples are the Alaska Permanent Fund Corporation and the University of Texas Investment Management Company. Both entities have well-developed governance structures, with a clear delineation between the Board and the Executive to the organisations, and their respective areas of authority and responsibility. In both cases, the comparatively large size of assets under management is a motivating factor behind the decision to incur the costs of a dedicated, independent management authority: the Alaska Permanent Fund, at roughly \$52bn in assets under management (as of December 2015), is the largest sovereign wealth fund in America, while the University of Texas Investment Management Company manages \$35 billion in assets (as of November 2015).

The more prevalent model for smaller American permanent funds is to retain investment management authority within a branch of the State Treasury, typically through structures such as a State Investment Board or State Investment Council. The model has the advantages of simplicity and cost: the State Treasurer typically has an existing investment infrastructure in place to manage the state's cash flows, alongside existing debt and surplus asset structures (often including public-sector pension and benefit schemes). Adding the management administration and investment oversight of new permanent fund to these entities' list of responsibilities may therefore be a logical step, although potentially temporary (until the assets under management are large enough to justify a dedicated investment authority).

State Investment Boards or Councils are typically staffed by a small team of financial experts with a track record of prudent management of state assets. Given the complex asset allocation of most permanent funds (see below), State Treasuries typically do not manage investments themselves, outside of passive cash and fixed income portfolios, but rather make extensive use of the external managers and investment consultants. At first glance, this arrangement is at odds with the standard – and otherwise sensible – mantra on the governance of sovereign wealth funds: namely, that their investment operations should be removed, as far possible, from executive officeholders (in this case, State Treasurers). However, as in Norway and Chile, there are a number of mitigating factors that justify the choice of retaining the management oversight of permanent funds within the State Treasury:

- First, the placement of these funds with the State Treasuries has not come at the expense of transparency: rather, given American standards and expectations of accountable government, State Investment Boards and Councils report frequently and extensively on their activities, investment performance and internal decision-making. Transparency helps offset potential concerns over undue political interference.
- Second, State Investment Boards and Councils are staffed with officials that enjoy a high degree of public credibility, investment expertise and specialist skills; and their appointment generally requires broad-based legislative approval (although of course there are no guarantees that this tradition will be adhered to at all times).
- Third, while the extensive use of external assets managers and professional investment consultants have the downside of costs (paid to in fees to fund managers) and governance (undermining true ownership of asset allocation decisions), it does protect against bad decisions and abuse, as these private companies are very reputation-sensitive and bound by Federal regulatory requirements to act in the best interest of their clients.

The placement of investment responsibility of permanent funds within the State Treasury can be viewed as a pragmatic, second-best solution, which has certain governance (and cost) drawbacks, but at the same time brings the benefit of simplicity and insurance against really bad outcomes. In the coming years, some of the larger and more established American permanent funds may approach a size and level of maturity where consideration should be given to the establishment of dedicated investment authorities.

Irrespective of whether the funds are managed by the State Treasury or dedicated independent authorities, a number of observations can be made about the common features of American permanent funds' investment models and governance processes. With the exception of the North Dakota Heritage Fund, which is still in its inception, American permanent funds have highly diversified portfolios (compared to, for example, the Norwegian and Chilean sovereign wealth funds). American permanent funds have significant allocations to illiquid alternative asset classes, such as infrastructure, private equity, real estate, high-yield credit and hedge funds. While these asset classes can generate high returns and add portfolio diversification benefit, they are complex to manage, involve considerable risks and incur high management fees when accessed through external managers.

Indeed, a defining characteristic of the American permanent fund landscape is the extensive use of external asset managers and investment consultants. Partly, the explanation for this is the observation that most American permanent funds face significant challenges around attracting and retaining talent, most notably due to the remoteness of their head offices in small state capitals, such as Juneau (Alaska), Cheyenne (Wyoming) and Bismarck (North Dakota).⁹⁶ Other challenges include the aforementioned limits of public-sector compensation relative to that of the private sector (Clark and Monk, 2013). As with their actual investment operations, American permanent funds tend to transfer a considerable amount of power and authority over asset allocation to external entities in the form of professional investment consultants.

⁹⁶ An obvious solution to this purely geographic problem is to establish in-house investment teams outside the state in major global financial capitals, such as London and Singapore – or even just in other American locations, such New York, Chicago, Boston or San Francisco. Indeed, most sovereign wealth funds and large public pension funds – notably the sovereign wealth funds of Norway, Singapore, Korea and the Middle East; as well as the largely internal managed Canadian pension plans – have done this to great effect. However, proposals to do so by American state permanent fund have generally met with fierce political and public opposition.

As discussed in detail in the following chapter, academic research and past experience incontrovertibly demonstrate that strategic asset allocation, rather than short-term, “tactical” decisions, market “timing”, security and manager selection drive long-term portfolio returns. Asset allocation decisions are therefore at the heart of the policy choices around sovereign wealth fund investments, and the allocation of powers to determine asset allocation is at the heart of the governance structure. A potential downside to American state permanent funds’ heavy use of investment consultants in asset allocation decisions is that it potentially dilutes the degree of ownership of these critical decisions by the entities ultimately charged with managing these funds – whether it be the boards of independent management authorities or investment councils housed within State Treasuries.

10.3.5. The New Zealand governance model

New Zealand’s sovereign wealth fund, the New Zealand Superannuation Fund, is a pension-reserve savings fund. It invests funds specifically earmarked from current fiscal surpluses in anticipation of growing future pension-system liabilities. In recent years, the fund has assumed an increasingly prominent leadership position within the global community of sovereign wealth funds, with an exemplary governance structure, exceptional levels of transparency and public disclosure (exceeding that of the much lauded Norwegian sovereign wealth fund), and stellar investment returns – in October 2015, the Chief Executive Officer of the fund was named as the chairman of the International Forum of Sovereign Wealth Funds.

There are many lessons to be learned from the New Zealand sovereign wealth fund, notably from the comparison to the other sovereign wealth funds studied in this chapter, it is managed by the most independent investment authority (its use of a Reference Portfolio and risk-factor premiums to assess the fund’s underlying risk-return exposure and the value added by active management is discussed in the following two chapters). The primary means through which this separation is achieved is the establishment of a powerful board, which itself delegates significant powers to the executive; and the depoliticised process for the appointment of the board, which established what the fund calls “double arms-length independence”.

The fund is managed by an independent investment authority, the Guardians of the New Zealand Superannuation Fund, which is established in law as an “independent Crown entity”, which means that

while the government has a controlling interest - for example, by owning a majority of the voting shares or through having the power to appoint and replace a majority of the governing members, the management authority is “legally separate from the Crown”. The assets managed by the Guardians, however, belong to the Crown, that is, the government (New Zealand Superannuation Fund, 2015).

As the operational manager, the Guardians is overseen by a Board of Governors, which according to the New Zealand Superannuation and Retirement Income Act of 2001, is appointed by the Governor General on the recommendation of the Minister of Finance. Critically, the Minister’s recommendation follows nominations from an independent nominating committee (which the minister appoints) and consultation with representatives of other political parties in Parliament. The role of the independent nomination committee for board appointments is significant here, as it establishes the “first arm” of the double arms-length independence of the Guardians of the New Zealand Superannuation Fund. Board members are selected based on a detailed set of professional criteria – such as experience in corporate governance, senior management, risk management, global investments and academic qualifications. Each board member is appointed for a term of up to five years and is eligible to be reappointed. There are no direct political appointees and no *ex officio* political officeholders on the board, which is designed by law to be small - consisting of five to seven members (New Zealand Superannuation Fund, 2015: 31). In short, the board of the Guardians of the New Zealand Superannuation Fund is the embodiment of the “professional board”, as opposed to the representative board model, referred to earlier in the chapter.

The Guardians’ governing legislation and the Board Charter define board responsibilities and matters delegated to management. Formally, the Board is responsible for: (i) supervising the management of the Guardians and the investment of the fund; (ii) establishing the Guardians’ objectives, corporate strategy for achieving those objectives, the overall policy framework, and for monitoring management’s performance; (iii) ensuring the Fund’s assets and the Guardians’ assets are maintained under effective stewardship; and (iv) ensuring that decision-making authorities within the Guardians are clearly defined and that all applicable laws are complied with. (New Zealand Superannuation Fund, 2015: 31). In the model of delegated authority, the most critical task of the board (outside of a generic role in supervising management and acting as an institutional buffer between management, the ministry of finance and legislators) is that it specifies the fund’s Reference Portfolio – which, as discussed in Chapter II, is simultaneously the articulation of the board’s view on the appropriate balance between risks and exceptions.

returns and the benchmark against which the added value of the Guardians is measured and assessed (the Reference Portfolio is a low-cost alternative to active management by the Guardians). This delegation of power from the government to the board for determining the reference portfolio is the second-arm of New Zealand's double arms-length independence governance structure.

The final aspect of the New Zealand governance model is an extraordinary commitment to transparency, disclosure and accountability. The list of policy and operational disclosures made by the fund is truly astonishing, including (but not limited to): quarterly, annual and long-term benchmarking of active management performance by the Guardians against its Reference Portfolio (broken down in terms of risk factors and asset classes); a full list of the names and mandates of external managers; external consultant reviews (and the Guardians' response to these reviews); regular testimony before the legislature and frequent public presentations; a detailed breakdown of the fund's actual portfolio holdings; granular information of operational expenses, remuneration packages (including, for example, the Chief Executive's Officer base salary and the calculation of his/her bonus) and travel expenses of the members of the board and the executive; audits and financial statements. As mentioned earlier, the detail, quality and frequency of disclosure and accountability by the New Zealand Superannuation Fund, its board and its management authority establish a benchmark that not even the Norwegian sovereign wealth fund can match.

Conclusion

The chapter considered the ways in which countries have resolved a familiar tension in public policy: balancing the need or desire for operational independence for manager or investor of sovereign wealth, while at the same time preserving a degree of government control and oversight of such delegated authority. While the case for operational independence is based on a number of compelling reasons – performance, fears of a regulatory backlash, a desire to escape from public-sector pay scales, and the ring fencing of assets – this chapter has indicated that such independence is typically a matter of degree. In all cases discussed in this chapter, with the exception of the New Zealand Superannuation Fund, the ministry of finance (or other political officers) retains at least *de jure* power to establish the most important determinant of the fund's investment policy, namely its asset allocation.

When the institutional arrangements of sovereign wealth funds are compared to those of monetary authorities (as per the framework established in Chapter 5), an interpretation of the afore-mentioned observation could be that while governments are willing to give the investment authorities responsible for sovereign wealth fund a high degree of operational independence, the principle of “goal dependence” is typically preserved. In the same manner that governments retain the power to establish the goals of monetary policy and explicit policy targets (such as a numeric inflation target), they generally wish to preserve the power to establish sovereign wealth funds’ return targets, risk tolerance and asset allocation. In some cases, powers to exercise some degree of constrained discretion around those targets are delegated down to the board and the executive; while the New Zealand example is comparatively extreme in that the government delegates major policy-setting powers to the board (which it, moreover, does not directly appoint).

Regardless of the exact institutional configuration of these powers, the examples discussed in this chapter show a generally high degree of public accountability from both entities responsible for major policy choices (target returns, risk tolerance, asset allocation and reference-portfolio selection) and entities responsible for investment implementation and operations. In a number of cases where the former remains under the control of the ministry of finance, such as Norway and Chile, concerns around potentially damaging political intervention into the investments of the sovereign wealth fund are reduced by the full transparency of the ministry’s policy choices, a high degree of public and expert consultation, and the adoption of uncontroversial investment policies. In the case of Kazakhstan, a lower level of transparency and the centralised concentration of power over the fund, provide less comfort around the potential for political intervention in the fund’s investment decisions. Finally, while the American permanent fund model has delivered positive results over a number of years, the heavy use of consultants and external funds is not only potentially problematic from a cost perspective, but also risks a dilution of institutional ownership of key decisions around these funds’ asset allocation policies (which are typically fairly complex and risk orientated, with significant allocations to illiquid alternative asset classes).

Ultimately, there is a degree of cross-country variation in emphasis between delegated and centralised control over the investment policies and operations of sovereign wealth funds. The country-specific balance between political ownership of policy and delegated authority for investment operations is not only a function of the political system and characteristic of the countries, but also of the degree of

discretion permitted by the investment strategy – if the investment strategy itself is highly non-discretionary, the discussion around the degree of delegated authority becomes less important, as there is essentially less power to delegate in the first place. For long-term investors, such as investment-income and savings type sovereign wealth funds, asset allocation (and its more sophisticated extension in the form of risk-factor allocation) is the fundamental determinant of long-term investment performance, and hence the most critical investment-policy choice. The following chapter addresses the analysis of this policy choice, while the final chapter considers the use of various rule-based policies by accountable public investment authorities that potentially add value beyond the fundamental policy choices reflected in asset and risk-factor allocations.

Chapter 11

Shadows and siren calls:

Rules and contracts in delegated sovereign wealth fund investment management

In Homer's *The Odyssey*, Ulysses invents a cunning plan to resist the charms of the sirens. Upon learning that their song drove sailors temporarily insane, Ulysses instructes his men to tie his hands to the mast of the ship and for wax to be poured into his sailors' ears, to ensure they cannot hear the sirens' song. Ulysses, however, is able to listen to sirens, safe in the knowledge that, being bound to the mast, he is incapable of leading his ship astray. Although Ulysses faces a moment of crisis, as he too goes momentarily mad upon hearing the sirens, and attempts to break free from the mast, the plan ultimately works and the ship proceeds safely on course to Ithaca.

Pre-commitment devices of this nature have come to be known as Ulysses contracts or Ulysses pacts, and have wide-ranging applications. In medical practice, advance directives (or "living wills") are a form of Ulysses contract, established to avoid confusion around whether decisions made by a patient during an initial state of health still apply when the patient has entered a different state of health. The use of Ulysses contracts is also common in the area of portfolio management as a means to "protect the portfolio from *ad hoc* revisions of sound long-term policy...when short-term exigencies are most distressing and the policy is most in doubt" (Ellis, 2013). Financial planners often force their clients to sign Ulysses contracts to avoid behavioural errors and irrational reactions to losses. Institutional investors similarly tie their hands to the mast through a set of publicly disclosed investment rules.

In matters of public policy, rules serve an additional function beyond pre-commitment: they are institutional devices that promote the accountability of public institutions that exercise delegated authority. Chapter 5 discussed the notion that transparent rules are a way through which to distinguish between "normal" and "discretionary" decisions by public authorities with delegated powers (Du Plessis, 2003). This second function of rules assumes a degree of transparency (if not to the broad public, then to a selected non-democratic audience or constituency, such a ruling elite) around both the nature of the rule and discretionary policy actions that deviate from it. The rule gives practical meaning to the concept of

accountability, as it provides a benchmark against which to monitor and assess discretionary actions that differ from the rule.

Chapter 5 discussed this function of rules in reference to monetary policy. An example from the practice of public investment can be found at the New Zealand Superannuation Fund, the country's sovereign wealth fund. The fund's "reference portfolio", established by its board, is the primary means through which the incremental contribution of its independent investment-management team (the Guardians) is measured and assessed. In communicating this function of the reference portfolio, the fund's management refers to it as a "shadow portfolio", which they need to outperform in order for the investment-management team to demonstrate "the value we are adding through our active investment strategies" (New Zealand Superannuation Fund, 2016).

The shadow or reference portfolio establishes a high hurdle: not only is it specified so as to be capable of meeting the fund's objectives over time (with an aggressive 80% allocation to equities), but it consists entirely of passive, low-cost and listed investments that match the fund's long-term investment horizon and risk profile. The implication is that the reference portfolio is a notional low-cost, rule-based alternative to the more elaborate institutional structure that exists in practice, involving a board and an independent investment-management institution. The fact that the shadow portfolio would still get the job done establishes clarity "on the 'hurdles' for active investments" by those exercising delegated authority (New Zealand Superannuation Fund, 2016). The well-paid and well-resourced team investing the fund's assets needs to demonstrate its worth by emerging – at least in the long run – from the shadow of their reference portfolio.

This chapter will consider a number of critical institutional arrangements that can be employed to govern the agency relationship between the "owners" of a sovereign wealth fund (the principal, such as a Minister of Finance or its own agent, the board) and an independent investment-management authority (the agent). The discussion starts by framing these institutional arrangements in terms of the content of the most critical document – described here as a contract between the principal and agent – governing this agency relationship, namely an "Investment Policy Statement", before proceeding to discuss the design and implementation of three specific rules that should form of this document.

II.I. The Investment Policy Statement: a contract between principals and agents

An number of uncontroversial principles in the resolution of agency problems are to reduce information asymmetries between the principal and the agent, to clarify the expected actions of agents and to establish mechanisms for monitoring and measuring performance – ideally, in the form of a contract (Bolton and Dewatripont, 2005). In delegated asset-management relationships in the field of institutional investment, the most common contract is an “Investment Policy Statement”. This form of contract is used in a range of investment relationships, including private wealth management, when portfolio managers attempt to bind their clients to time-consistent policies (a Ulysses contract). They are particularly appropriate for long-term public investors, where there are established expectations of transparency and accountability.

The establishment (and periodic review) of a sovereign wealth fund’s Investment Policy Statement is usually an extension and clarification of a governing law. A number of foundational concepts – the function and purpose of the fund, the governance of the investment process, and possibly the articulation of the expected return of the fund through a numeric long-term return target, risk budget and investment horizon – are really the domain of the principal. More granular elements of the Investment Policy Statement can be arrived at through a more collaborative and iterative interaction between the principal and agent (most commonly through the Board’s Investment Committee, which includes representatives of both the principal and the agent). No matter how interactive the process is, good governance demands that the “buck stops” with the principal (or, specifically, the Board) with respect to the approval of the Investment Policy Statement. The more collaborative elements include the long-term asset allocation, the specification of benchmarks or reference portfolios, and a periodic rebalancing rule.⁹⁷ The most important elements of any sovereign wealth fund’s Investment Policy Statement are as follows.

- **Function and purpose:** as noted in Chapter 4, clarity is required around whether the fund serves a stabilisation or saving function; and beyond this whether it is a fiscal or currency stabilisation fund, and a future-generations or investment-income fund.
- **Governance of investment process:** the Investment Policy Statement should clarify the distribution of powers and responsibilities of all the policy, operational and supervisory

⁹⁷ If the investment model is comparatively simple, permitting limited discretion by the agent, the principal may author the majority of the Investment Policy Statement, as it reduces the agent’s role to a largely administrative one.

institutions involved in the governance of the sovereign wealth fund, as per the various models discussed in Chapter 10.⁹⁸

- **Return objectives, risk tolerance and investment horizon:** the most basic building blocks of any investor's investment strategy are a statement of the owner or principal's expectations of the fund's return, which cannot be contemplated without a concomitant statement of the fund's risk tolerance and investment horizon. These elements (particularly the latter two) are often missing from sovereign wealth fund's governing framework, but agents benefit from having them clearly articulated. Asymmetric information and incomplete contracts are in neither the principal nor the agent's best interest.
- **Long-term asset allocation:** Chapter 10 identified that the allocation of power for these fundamental decisions generally serve as a litmus test for the degree of delegated authority in sovereign wealth fund management. The inclusion of the asset- or risk-factor allocation in the Investment Policy Statement is a useful device for managing agency relationships: based on historic data and/or capital-market assumptions, the operational manager (and external advisors) can promote an asset- and risk-factor allocation that is appropriate in light of the owner's return expectations. The principal may specify the asset allocation or reference portfolio in terms of low-cost, passive and tradable asset classes, leaving the agent to design and implement a more complex (and more costly) investment strategy in response.⁹⁹
- **Benchmarks or reference portfolio:** under a conventional strategic asset allocation approach, asset-class benchmarks are included as a means to measure and monitor the performance of the agent. For example, if the strategic asset allocation is expressed at 60% global equities and 40% global fixed income, the respective benchmarks for delegated management may be the MSCI World Index (equities) and the Citigroup World Government Bond Index. A more sophisticated risk-factor allocation approach – which looks through conventional asset-class labels – are best suited to the specification of a low-cost reference portfolio.
- **Rebalancing rule:** periodic portfolio rebalancing is an essential part of long-term portfolio management. It can be achieved through a rule-based approach. As the principal, the owner or

⁹⁸ The Investment Policy Statement might include an articulation of what is expected from external managers and how they will be selected, monitored and evaluated. External managers may be selected due to the operational and budget constraints of the agent, a belief in the existence of investment talent, or because the external management fee structure is sufficiently low to justify external reliance over building internal investment capacity and infrastructure. The Investment Policy Statement can be used to clarify these issues, and establish a ranking of factors that enter the selection, monitoring and evaluation process (for example: fees, performance, track record, human resource and capacity building).

⁹⁹ An increasing number of investors include an articulation of "investment beliefs" into their Investment Policy Statement. The reason for this is that beliefs around the efficiency versus occasional irrationality of financial markets, the value of external asset managers and their ability to generate "alpha" (excess returns over the benchmark), and the degree of predictability and mean reversion in assets and asset classes have implications for the strategies pursued by the operational manager (for example, a belief in mean reversion bolsters the case for periodic rebalancing, much as a belief that certain markets behave [predictably] irrationally bolsters the case for pursuing active management strategies around market timing).

Board of the sovereign wealth fund may simply insist on having a rebalancing rule, while giving the operational manager a degree of discretion in designing the rule.

Given the principal-agent relationship between the owner and the manager of a sovereign wealth fund, the Investment Policy Statement serves as a contract between the principal (owner or the Board that it appoints) and the agent (manager). The focus of this chapter is on the last three (the more interactive – and potentially controversial) items of the Investment Policy Statement

II.2. The importance of long-term asset allocation

The literature on long-term portfolio choice distinguishes between strategic and tactical asset allocation (Cochrane, 1999b, Ibbotson and Kaplan, 2000 and Ang, 2014). Strategic asset allocation is the process through which investors determine their long-run holding or weights to different type of assets, and is an articulation of an investor's desired exposure to expected risk and return. Strategic asset allocation can be described as a top-down, low-frequency decision *between* asset classes in contrast to bottom-up, higher-frequency choices *within* asset classes, based on attempts to select superior assets and avoiding inferior ones ("asset-" or "stock-picking") or to time the purchase and sales of specific assets based on perceived predictability in cyclical or mean-reverting asset price movements ("market timing"). An intermediate step is called tactical asset allocation, which makes annual or semi-annual "over- and under-weight" deviations from the strategic asset allocation, but still understood in terms of choices between, rather than within, asset classes (Ang, 2014).

The empirical literature on portfolio management has long underlined the overwhelming explanatory power of strategic asset allocation over observed investment returns. The seminal study in this literature, by Brinson, Hood and Beebower (1986), found that more than 90% of the variation in investment performance is explained by strategic asset allocation. Since then, the discussion has evolved to examine the robustness of this finding to different sample periods, clarifying that it pertained to the variation in returns (rather than their levels); and a decomposition of cross-sectional and time-series dimensions of variation. Ibbotson and Kaplan (2000) unpacked the evidence across these two statistical dimensions. They found that 90% of the variation in investment performance within a single fund over time (a time-series question) and around 40% of the variation in investment performance between funds (a cross-

sectional question) was explained by strategic asset allocation. Three-quarters of the variation in time-series returns is found to be due to market movement (“general asset allocation”), with the “remaining portion split roughly evenly between the specific asset allocation and active management” (Ibbotson, 2010). If the decision to be exposed to market volatility – which, for Ibbotson, 2010, essentially amounts to holding stocks rather than cash – is interpreted as part of the asset allocation decision, the basic insight of Brinson *et. al.* (1986) stands: asset allocation is the dominant determinant of long-run investment performance for any particular fund.

Strategic asset allocation choices reflect deeply held policy preferences, whose importance to the long-term investment performance of a sovereign wealth fund are of a different magnitude than, for example, the ability to predict short-term movements in financial markets or select the “best” fund managers. There are two major conceptual frameworks through which the ultimate “owner” of a sovereign wealth fund’s long-term investment policy may assess asset and risk-factor allocation choices. The simplest, and most widely used, way to arrive at a target or “strategic” asset allocation is based on conventional (liquid, publicly traded) assets classes, in which the variance of expected returns is the measure of the only source of risk: general, undiversifiable market volatility. Following this, many institutional investors add a range of alternative (illiquid, private-market) asset classes to the portfolio mix.¹⁰⁰ The bottom-line of the risk-factor approach is that asset returns are rewards for exposure to a combination or “bundle” of risks, and that investors with an ability to be exposed to a number of well-identified risks have a myriad of ways to capture the rewards associated with them.

11.2.1. Simple strategic allocation models based traded asset classes

A useful starting point for a sovereign wealth fund is to focus on the efficiency that can be achieved by simply diversifying between stocks and bonds – described by Benjamin Graham (1949), the intellectual progenitor of long-term investment theory, as “the two major investment mediums”. The allocation decision between stocks and bonds has been a mainstay of institutional and personal investors for at least a century – leading sovereign wealth funds, including those of Chile, Botswana and Norway, are simply

¹⁰⁰ The term “alternative assets” covers many different types of assets of which the common characteristic is that they are traded in private, not public, markets.

diversified stock-bond investors.¹⁰¹ A simple stock-bond allocation incorporates the theoretical insights of Modern Portfolio Theory following Markowitz (1952), its subsequent expansion into the Capital Asset Pricing Model or CAPM (Treynor, 1961; Sharpe, 1964; Lintner, 1965; and Mossin, 1966); as well as the empirical evidence captured by the likes of Ibbotson and Kaplan (2000) and Ibbotson (2010).

The case for the simple model rests on both analytical and pragmatic grounds. Analytically, stock-bond allocations achieve a high degree of efficient diversification. Stocks confer equity rights to asset owners, with returns largely determined by profits and earnings; while bonds are debt instruments, with returns largely determined by interest payments and creditworthiness. Consequently, investors often distinguish between other types of assets having either bond- or equity-like returns (or some combination thereof). Empirically, leading bond indexes historically have amongst the lowest correlations of returns to leading stock indexes: emerging-market equities, absolute-return strategies, hedge funds, private equity and real-estate investment trusts all have higher historical correlations to US equities than US government bonds or a broad-based US bond index (Leibowitz, Bova and Hammond, 2010: 10). So dominant are stock and bond allocations that a leading authority on factor investing classifies stocks and bonds as factors in their own right, and notes that “even without adding alternative asset classes, the equity-bond factor decision is the most important one... (as) it explains the majority of the variation in performance” (Ang, 2014: 445).

Strategic asset allocation decisions are also influenced by more pragmatic constraints, which can be fruitfully analysed through the lens of institutional economics. As public investors managing citizens’ money, sovereign wealth funds may have limited appetite for “headline risk”. Default risk, which is a significant driver of returns on assets such as emerging-market credit and corporate bonds, are a major source of headline risk, and hence unsuitable for most sovereign wealth funds. Another practical consideration is whether the fund has sufficient institutional capacity to either manage operationally complex asset classes (for example, real estate, private equity and infrastructure) in house or through external managers (fees on alternative asset classes are much higher than those for liquid, traded assets).

Investments in private equity, real estate and infrastructure, in particular, are operationally complex and expensive. They require, for example, direct engagement with the management of entities invested in and legal expertise to establish and negotiate contracts – in both instances due to the fact that the assets are

¹⁰¹ Norway’s sovereign wealth fund in 2011 diversified beyond stocks and bonds into real estate to a maximum of 10% of its portfolio, but is yet to increase its effective weight to the asset class to the target level as of 2016.

not traded on public markets or exchanges. These features raise the transaction costs associated with investing in private assets, which are much higher than those possible for investors in public assets, particularly with the proliferation of low-cost passive, index-based alternatives to active management in public markets.¹⁰² Finally, to the extent that stocks and bonds are traded on public markets, they enhance transparency. Particularly for new sovereign wealth funds still in the process of establishing credibility, investments in private assets for which information on prices, risk and performance is not easily scrutinised can be problematic. In contrast, publicly traded stocks, bond and indexes can be valued and monitored in real time, both by the fund and by external observers.

The normative prescriptions of Modern Portfolio Theory and the CAPM is that all investors should hold the same efficient market portfolio, arrived at through a simple optimisation based on expected means, variances and co-variances of stock and bond markets. A less risk-averse investor is *not* advised to hold a greater allocation of stocks, but rather to increase risk exposure by borrowing cash and investing it in the market portfolio – the same portfolio held by more risk-averse investors, only in smaller proportion relative to cash. Under Modern Portfolio Theory asset allocation only shifts when the investor believes that some permanent change in the covariance between stock and bond returns has occurred. The more challenging, and introspective, decision lies in determining how much exposure to market risk is suitable, given the investor's risk tolerance and risk-bearing capacity.

The efficient “market portfolio” is a theoretical construct. Its closest real-life approximation is the 60/40 portfolio (60% allocation to stocks and 40% to bonds), which is widely used as either an actual portfolio or benchmark – it is, for example, the benchmark of the Norwegian sovereign wealth fund (Chambers, Dimson and Ilmanen, 2011). Cochrane (1999a) attributes the prominence of the 60/40 portfolio to the proximate market-capitalisation weighting of the traded financial system: “The overall market is about 60% stocks and 40% bonds, so average levels of risk aversion, whatever they are, wind up at this value.” In that sense, 60/40 portfolios serve as a proxy for the market portfolio, and is also described as a balance portfolio.

¹⁰² Public exchanges for trading in debt and stock instruments emerged as means through which to reduce transaction costs. More recently, passive index products for public stocks and bonds, including exchange-traded funds, serve a similar function.

Few investors strictly follow the recommendations of Modern Portfolio Theory. Canner, Mankiw and Weil (1997) described an “asset allocation puzzle” according to which more risk-tolerant investors do not borrow to invest in the market portfolio, but rather simply increase their exposure to risk assets (equities); and vice versa. However, these deviations from theoretical advice have been explained at the hand of credit frictions, borrowing constraints and the correlation of non-portfolio income to either stocks or bonds. In practice, a number of sovereign wealth funds – again, Botswana, Chile and Norway are clear examples – have started with a bond-heavy balanced allocation and gradually increased their equity weighting (with maximum allocations of 70% to either asset class).

II.2.2. Advanced asset allocation through risk-factor models

Mean-variance analysis treats risk in a narrowly defined way. Risk is volatility, measured by the standard deviation or variance of an asset or a portfolio of assets. In reality, other risk dimensions enter the equation. A multi-dimensional understanding of risk assumes that not all risks are the same to all investors. Once risk is defined across a range of dimensions, a more granular perspective on the different kinds of risk that investors either want exposure to or, alternatively, cannot afford to be exposed to (and are therefore willing to pay in order to avoid), can be gained.

An insurance fund with contingent short-term liabilities (claims) has to assume a relatively short investment horizon and a preference (or need) for liquidity, on at least part of its portfolio. If the fund is sufficiently capitalised and has the prospect of stable funding contributions over the long-run, it may be willing to assume some degree of traditional volatility risk, as long as the assets are liquid and can be sold in the event of a large contingent payout. In contrast a long-term sovereign investor, with a ten-year investment horizon, does not need as much liquidity – and can therefore demand compensation for exposure to that risk through an illiquid asset, such as real estate or private equity. The insurer, meanwhile, effectively “pays” or foregoes the additional illiquidity factor premium. A similar illustration can be made based on oil-price exposure. Certain assets and asset classes have an inherent factor exposure to oil – for example, the currencies of oil-exporting countries (ranging from the Canadian dollar to the Nigeria naira), the stocks of oil-producing and -servicing companies, and the bonds of the same countries and companies. This factor exposure drives at least part of the return on these assets is the oil price – and is distinct from the market-volatility factor. The sovereign wealth fund of an oil-importing country (Korea)

is better placed to gain compensation for exposure to the oil-price factor than a counterpart from an oil-exporting country (Kuwait).

The bottom line in the factor approach is that investors are rewarded for holding assets that are going to perform poorly under certain conditions, which Ang (2014) describes as “bad times”. However, factor theory differs from the CAPM-inspired mean-variance approach to the extent that it recognises that “bad times” or “risk” means different things to different investors. Whereas the CAPM has a single risk factor, market volatility (one beta), multi-factor theory assumes a range of risk factors (multiple betas). Multi-factor theories have been gaining ground in terms of both academic theory and practice since a landmark paper on Arbitrage Pricing Theory by Ross (1976) and the subsequent three-factor model of Fama and French (1992 and 1993). Ross’ contribution were mostly of a theoretical nature, while Fama and French’s work added empirical support for and a parsimonious model of factor returns.

Multi-factor theory extends the CAPM theory, rather than revolutionising it. Ang (2014) argues that the CAPM is a factor theory, albeit one with a single (which happens to be the single most important) factor. The following stylised list of lessons for the asset owner from the CAPM and multi-factor, following Ang (2014: 205) and Cochrane (1999a), underlines the similarities between these two workhorse theoretical models of portfolio theory – as well as the areas in which factor theory has introduced new subtleties.

Lesson #1: Diversify – assess exposure to a factor, not individual assets

The most important lesson of Modern Portfolio Theory and the CAPM is that diversification is efficient. Combining assets that are not perfectly correlated in a portfolio provides the best possible return for a given level of risk (volatility), as it gets rid of the inadequately rewarded idiosyncratic risk of individual assets. A diversified portfolio is still exposed to the most fundamental driver of returns: market (sometimes called “systematic”) risk, which cannot be diversified away. Investors need to determine how much exposure to market risk they are willing and able to bare.

Multi-factor theories also conceive of the returns as compensation for bearing bundles of underlying risk factors. In competitive markets, the return on underlying factor-based drivers of asset returns are priced in equilibrium by the interaction of “buyers” and “sellers” of that particular factor exposure. Again, investors

should avoid thinking about a portfolio's return in terms of individual assets, but rather as compensation for exposure to a range of risk factors, most efficiently accessed (or hedged against) through combining a variety of assets.

Lesson #2: Risk tolerance is defined relative to the average investor

The CAPM makes provision for heterogeneous agents. Investors have varying degrees of risk aversion, which determines the degree of exposure they hold to the market portfolio. The supply-and-demand of risk appetite determines the return on market volatility in equilibrium. The same logic applies in a multi-factor world. Now the price of assets are determined by the balance of supply and demand for a range of risks, not just volatility. The different risk tolerances of heterogeneous investors - interpreted not just in terms of volatility but a range of risks – is what creates a market for trading assets that bundle together a number of fundamental, underlying risk factors.

In the CAPM, the “average investor” holds the market portfolio and the market portfolio only. Investors that are more risk tolerant than the average investor increases exposure to the market portfolio (through borrowing), and the more risk averse investor reduces it (by holding more cash). Multi-factor models apply the same logic across a range of risk factors: most investors do not want to hold large exposure to stocks that are highly cyclical, because their own wealth and income is correlated with the same risk factor. Hence, cyclical stocks tend to carry an additional risk premium over the broad index. If you differ from the average investor in terms of your willingness to hold cyclical assets, a healthy premium is (or should be) on offer. The task of the asset owner is not so much to about finding great individual investments, but rather to understand its multi-dimensional nature of risk tolerance and sensitivity relative to the rest of the market: “figure out what risks you do not face, but that give rise to an average return premium in the market because most other investors do face these risks.” (Cochrane, 1999a).

Lesson #3: Returns are rewards for bad outcomes - capture them if you can tolerate bad outcomes

In both traditional and multi-risk factor models the expected return on assets are the reward for the fact that they expected to perform poorly under certain circumstances – or as Ang (2014) refers to it, “bad times”. The CAPM has a single definition for bad times: volatility. All investors dislike volatility, they just

have differing degrees of willingness and ability to handle it. In multi-factor models, “bad times” is more complicated – importantly, what one investors regards are really bad times, might only be somewhat bad (or even positive) for another. It follows that assets that continue to pay off during periods widely regarded as bad times (that is, most investors dislike them strongly) will have lower expected returns. This goes back to the average-investor point above: most investors prefer assets that are expected to be relatively stable for the economic cycle (such as high-dividend stocks and investment-grade sovereign bonds), rather than recession-exposed ones (high-yield credit, value stocks and emerging-market equities). Hence, the expected return on the former is relatively low, as the demand for such assets are high.

Lesson #4: Risk-factor exposures dominate long-term returns

The general consensus, even amongst prominent advocates of exposures to a variety of risk factors (Ang, 2014, Leibowitz *et. al.*, 2010, and Swensen, 2000), is that the market-risk factor is the dominant determinant of returns (which is why a simple stock-bond allocation is a good starting point). Empirical investigations of long-term investment performance using “factor screens” have found that additional factors explain the majority of returns that are left unattributed to the market-volatility factor (see Fama and French, 1993; Ang, Goetzmann and Schaefer, 2009; Asness, Moskowitz and Pedersen, 2013; and Ang, Brandt and Denison, 2014). Risk-factor decomposition is merely a more sophisticated way of thinking about asset allocation than the traditional approach based on asset classes only.

There are a number of reasons why established sovereign wealth funds, in particular, should assess their return potential in terms of risk-factor exposure. The first is the above-mentioned emphasis on the long term: while idiosyncratic, non-factor explanations for returns may be evident over short time periods, these tend to disappear and cancel each other out in the long run. Second, to the extent idiosyncratic, non-factor returns exist, they are typically exploitable only by a small number of fast movers in the market (before they are arbitrated away) and only on a relatively small scale. Sovereign wealth funds are typically comparatively slow-moving investors (with deliberately rule-based decision-making and execution processes, given their public nature), managing large portfolios, limiting the scope of exploitable non-factor based opportunistic investments (Ang and Kjaer, 2012).

Lesson #5: Focus on risk-factor premiums that have a reason to persist

There are sharply diminishing returns to attempting to uncover new factors. The market-volatility factor is dominant; and that beyond this, the literature initially focused on only two additional factors to explain stock returns, “size” and “value” (Fama and French, 1992 and 1993); and later added a more contested fourth factor, “momentum” (Carhart, 1997). These studies resulted in the so-called three- and four-factor models, that enjoy considerable academic support. Even for more complex global portfolios that include emerging markets and additional asset classes, Ang (2014) suggests that there no more than 10 academically supported factors in total. The most famous and uncontroversial tradable risk factors¹⁰³ are summarised in Table II.1. The discussion here is largely focused on the analysis of factor in equity markets, but factors exist across asset classes – indeed, as discussed below, the full embrace of the risk-factor approach calls for looking through traditional asset-class categories.

Note from Table II.1 that there are competing explanations for risk factors, ranging for those based on rational foundations to ones that require the assumption of behavioural irrationality. Moreover, it is not always clear if risk-factor labels are accurate: are the purported risks really independent of one another – for example, is the purported size factor, simply compensation for illiquidity and/or default risk? A general implication from the literature on factor theory is that the value factor enjoys the most support, and is (along with the illiquidity premium) the most naturally applicable to long-term investors. Ang (2014) suggest criteria that investors can apply in identifying factors: First, factors should be supported by academic research. This threshold includes both theoretical underpinnings – which may be rational or behaviourally founded – and robust empirical evidence. Research may conclusively identify new factors, but this an extremely low-frequency event, that should be subjected to a significant burden of proof. It is important that the sample includes significant period of “bad times”, when assets loaded with the factor in question perform poorly.

¹⁰³ The literature has distinguished between two broad types of factors, although the difference can become blurry. The first group of factors is called “fundamental” or “macro” factors that are based on macroeconomic developments, such as economic growth, demographics and productivity, that affect all assets albeit in varying degrees. The second group is called “dynamic”, “tradable” or “style” factors that can be actively traded in market, by going long or short different groups of assets, and for which there typically exists a supply-demand relationship based on differing abilities and appetites for exposure to the underlying risk (Ang, 2014).

Table II.1: Established tradable risk factors in addition to market volatility

	Description	Logic & explanations
Value	Difference in returns between “value” stocks (low price-to-book and earnings growth) and “growth” stocks (high price-to-book and earnings) stocks	Arguments in the rational paradigm include that firms with low price-to-book ratios have less flexible investment structures, and are hence more exposed to shocks (Cochrane, 1996 and Zhang, 2005). Behavioural explanations include that investors overestimate or extrapolate from positive earnings momentum on growth stocks, and vice versa for value stocks (Lakonishok <i>et. al.</i> , 1994); or make mental accounting and framing errors around past losses on value stocks (Barberis and Huang, 2001).
Momentum	Captures effect of going long a cross-section of stocks with past high returns and short stocks with past low returns	Momentum is largely explained on behavioural grounds. However, rationalist theories suggest that momentum is related to (and dependent upon) monetary-policy regimes and liquidity cycles – that is, “momentum” may in fact be concealing other factors, notably liquidity and macro factors (Pastor and Stambaugh, 2003). Behavioural arguments include trend-chasing investor behaviour and irrational exuberance (or irrational panic); or “overreaction”, as per Barberis, Schleifer and Vishny (1998).
Size	Difference in returns between small- and large-market capitalisation stocks	Rational explanations suggest that companies with small market capitalisations tend to be less liquid, at higher risk of default, and possibly more exposed to market and economic downturns – again, factor the small-cap premium may in fact be a proxy for other risk factors. Behavioural arguments suggest that investors overemphasise large-cap stocks due to headline effects and benchmark inclusion.
Credit	Differences between yield on bonds by AAA and sub-Investment Grade issuers	Explanations are largely rational: excess returns are compensation for the risk of default, which is a risk distinct from market volatility and other risk factors.
Liquidity	Additional returns on less liquid stocks and bonds, and other assets.	Explanations are largely rational: excess returns are compensation for the fact that less liquid securities and assets may not be tradable at will and have higher transaction costs.

Second, factors should be expected to persist based on economic logic. Sustainable factors emerge as an equilibrium outcome due to the preferences (multi-dimensional risk tolerance) of heterogeneous investors: some investors, for example, are willing to have greater-than-average exposure to the economic cycle, and

can consequently capture the value-factor premium by investing in value stocks that are undervalued relative to their long-term value, but more exposed to economic downswings. Others are less able to do so, and are hence willing to forgo premiums by eschewing value stocks. This supply-demand relationship can be assumed to persist in perpetuity, thereby preserving the value factor.

Finally, exposure to the factor must be achievable and cost effective. Typically, this means that a factor must be tradable and, all things equal, this criteria strongly favours liquid markets. Ang (2014) points out that investing in illiquid, private-market instruments (such as private equity) is not the only way to capture the illiquidity premium: investors wishing to gain exposure to the illiquidity factor premium can also “overweight” less liquid stocks in a benchmark or index, while short-selling more liquid ones. This may prove to be a more tradable and cost effective way of capturing the illiquidity factor than investing in private-market assets. Most factors can be harvested (or hedged against) in a variety of manners, not least through increasingly popular, low-cost factor indexes.

II.3. Specifying benchmarks and reference portfolios

The case for active management – the argument that investors can “outperform” the market through the expression of various forms of “talent”, such as a persistently superior market, the ability to identify pricing anomalies (mispricing) *ex ante*, and security selection (picking “winning” securities) – enjoys limited academic support. Many unresolved controversies remain between adherents of efficient markets, for whom the appearance of above-benchmark returns are really just the result of luck or disguised (factor) risk taking; and those who believe markets exhibit not only periodic episodes of irrationality, but that those episodes are systematically exploitable in order to generate excess returns. Despite these philosophical differences, there is significant agreement on two empirical facts around the degree of efficiency in financial markets and the costs involved with trying to outperform them: (i) the most liquid and well-researched markets that approach efficiency and gains from active management are rarely, and certainly not reliably, realised over successive of periods (over and above returns on risk factors); and (ii)

when excess returns are indeed generated in a liquid market, it is generally eroded by management and performance fees.¹⁰⁴

Despite this evidence, most asset owners – and their agents – continue to believe in investment and expenses in pursuit of outperformance. If the asset allocation process is simple, based on leading asset classes (most public assets, as per the stock-bond portfolios described earlier; but also permitting allocations to alternative asset classes, such as real estate and private equity), the common practice is to simply select any one of a number of published country-specific and cross-country aggregate benchmarks per asset class. As with the underlying asset allocation process associated with this approach, the use of common public asset-class benchmarks is sub-optimal, but defendable on the basis of simplicity and pragmatism.

More established sovereign wealth funds should, however, do better. Multiple risk-factor models suggest that the traditional focus on asset-class labels, while not exactly flawed, can paint an incomplete picture about the true sources of risk and return in a portfolio. The ability to look through asset-class labels and identify the combination of underlying risk factors associated with an investment improves investors' ability to assess the risk-return implications of an investment. This has implications for the way in which the performance of operationally independent operational managers (and their own external manager) are evaluated; and for the way portfolio decisions are made across asset classes, using a reference-portfolio approach.

A practical application of factor theory in the context of delegated asset management is a recognition that third-party managers should not be allowed to simply harvest established factor premiums (that are not captured by leading market-capitalisation based indexes), and claim the ensuing outperformance of the index benchmark to be the evidence of the purported benefits of active management. This is not a hypothetical concern, but one that cuts to the core of the practice of delegated asset management. In the largely positive evaluation of the Norwegian sovereign wealth fund, Ang *et. al.*'s (2009) empirical analysis,

¹⁰⁴ The articles contained in the symposium on “The Growth of the Financial Sector” in the Spring 2013 edition of the *Journal of Economic Perspectives*, particularly Cochrane (2013) and Malkiel (2013), provide excellent summaries of the consensus around the empirical literature on the value of pre- and post-fee active asset management. The previously mentioned disclosure of “investment beliefs” by long-term institutional investors, such as the New Zealand Superannuation Fund, typically reflects these points.

for example, found that the fund pays external managers for capturing a series of factor premiums that could be accessed at a fraction of the cost through factor-adjusted indexes:

“Overall external equity management has enjoyed a modest level of success, but the active returns of external fixed income funds have been very poor...large exposures of active external returns to systematic factors suggest that active external management has not reflected a large component of unique management ability...much of the behaviour of the Fund’s small active return can be explained in terms of systematic factors. Our recommendation is that these exposures are, in general, appropriate but that they should be brought into the benchmark and that the Fund’s average exposure to these factors should be a “top-down” decision rather than emerging as a byproduct of “bottom-up” active management (Ang *et. al.*, 2009).

The bottom line from the ascent of risk-factor theory, and the concomitant proliferation of low-cost factor indexes, for large asset owners is that the decision to own a risk factor is a deeply introspective decision, taken at the top of the institution, based on a fundamental assessment of multi-dimensional risk tolerance, rather than something the asset owner should pay for through active management. Active management and investment talent, if it does exist and claims added value, needs to do so *in excess of* risk-factor exposures. Practically, this means active mandates need to be assessed relative to factor-adjusted benchmarks, rather than generic, broad market index benchmarks. As Ang noted in an article, co-authored with the former head of the Norwegian sovereign wealth fund, Knut Kjaer, “factor indices are the best way to benchmark active portfolio managers: if momentum or volatility risk can be done cheaply, then why should we pay 2-20¹⁰⁵ for a hedge fund manager to do it?” (Ang and Kjaer, 2012).

The multiple risk-factor approach can be used to analyse specific investments and assess if the (expected) return is commensurate with the asset’s underlying risk exposures. The example of private equity is instructive, not least because it is one of the most popular methods of diversification for long-term investors (often through extremely expensive third-party funds and delegated managers). Private equity has higher expected returns than listed equity, although the dispersion of private-equity returns is much wider than that for liquid assets. But what are the risk factors underlying this higher return expectation? Even less risky leveraged buy-out style private equity (as opposed to venture capital) bundles together an extraordinary combination of risk factors. At a minimum, it includes the traditional CAPM market-risk factor (which is pervasive – and in this case directly impacts the asset due to the valuation of “exits” from

¹⁰⁵ The term is industry jargon for the widely used fee structure of 2% flat fee on assets under management, plus 20 basis points on returns over the benchmark.

private holdings), interest-rate risk (private equity structures are typically levered), the size premium, default risk and illiquidity risk (private equity funds typically have multi-year holding periods).

Given their long investment horizons, sovereign wealth funds may be well positioned to capture a number of these risk premiums. Private equity may indeed be a suitable investment. However, a factor-based decomposition of returns enables the investor to answer four interrelated and fundamental questions in an informed way: (i) what are the underlying risk factors that determine an investment's expected return?; (ii) how am I placed (relative to the average investor) to be exposed to these risk – how am I different?; (iii) are the expected returns on a particular investment sufficient compensation for exposure to its bundles of underlying risk factors?; and (iv) are there other, more cost-effective ways of capturing these premiums?

In order to assess the merits of a range of assets through a multiple risk-factor lens, some of the world's most sophisticated institutional investors have adopted the so-called reference- or total-portfolio approach. Under this approach, long-term asset allocation and the incremental contribution of active management are assessed through a reference portfolio (or policy portfolio), rather than a combination of rigid asset-class specific benchmarks.¹⁰⁶ As stated earlier, a reference or policy portfolio is a low-cost portfolio, based on passive exposure to liquid assets, which would still be expected to meet the fund's target returns at an acceptable level of risk. It serves as an alternative or shadow portfolio to the more active and discretionary one managed by the operational manager.

Using this approach, the case for a private-equity investment needs to be made in the context of a reference portfolio – that is, against investments in other asset classes, rather than against other rivalling private-equity investments alone. The proposed private-equity investment has to be broken down into its underlying risk-factor drivers of expected return. It is clear that the investment will contain, at the very least (for ease of exposition) an equity component (private equity is still equity) and a debt component (private equity transactions are levered, for argument's sake by 30%). Typically, private equity will not be included in the reference portfolio (which is a low-cost passive shadow portfolio that the fund's managers is trying to outperform), which means the board needs to break the private equity deal down into equity

¹⁰⁶ The pioneering formal adoption of this approach is credited to the Canadian Public Pension Investment Board, and has since been pursued (to varying degrees) by other sovereign wealth fund investors, including the New Zealand Superannuation Fund, the Alaska Permanent Fund and Singapore's Government Investment Corporation; along with other venerated long-term investors, such as the United Kingdom's Universities Superannuation Scheme.

and bond components. A \$100m private-equity investment mimics a “long” equity position valued at \$130, combined with a “short” \$30m bond position (to account for borrowing). The addition of the private-equity asset will increase the equity exposure of the total portfolio and reduce the bond component of the actual portfolio relative to the reference portfolio (Ang, 2014). Consequently, the approval of the private-equity investment by the board would require selling a significant share of the fund’s liquid equity positions in order to restore the portfolio’s balance of equity and bond exposure in line with the reference portfolio (it could also combine selling equity with buying more bonds, if new cash is available).

The factor-based reference-portfolio approach has both analytical and governance implications. Analytically, all investments are broken down into underlying risk factors and matched to the exposures reflected in the reference portfolio. The governance implication is that the board assesses the merits of each investment, not within the narrow confines of a private-equity silo (which operates independently of the equity or bond silos), but rather in cost-benefit terms in relation to the overall portfolio. The board has to determine whether funding a private equity investment is justified based on the fact that it has to be funded by selling exposure to the asset classes reflected in the reference portfolio.

Finally, the reference portfolio approach is also an effective tool through which to assess the value added (or not) by the discretion granted to the operational manager – and to keep the manager accountable in an intelligible way. Returning to the example of the New Zealand Superannuation Fund, it is insightful to note the central role its reference portfolio plays in public accountability of its operational manager, the Guardians of the New Zealand Superannuation Fund. The Guardians have argued that the “reference portfolio approach is first and foremost a governance construct designed to facilitate clear decision making and accountability of decisions” (Brake, Iverson, Cheung and Worthington, 2015).

The fund has one of the longest *de facto* and *de jure* investment horizons in the world, given its complete absence of liabilities: it is simply trying to maximise a pool of assigned capital by a target date, well into the future when the portfolio will be used to fund future pension liabilities. Consequently, the fund has an aggressive “equilibrium” reference portfolio, established by its board, consisting of 80% exposure to equities and 20% to fixed income. Again, the reference portfolio is a low-cost, passive portfolio that contains only traditional asset classes and reflects an appropriate risk level for the fund, given its function (Brake *et. al.* 2015).

The Guardians may (and do) deviate from the reference portfolio using a number of rule-based active strategies, but it needs to show that it is adding value (net of the human-capital and operational costs associated with having the Guardians in the first place). The most noteworthy of these active strategies is the embrace of a top-down dynamic asset allocation, called “strategic tilting”, which is based on two of the Guardian’s stated investment beliefs: (i) there is a (small) degree of predictability in asset returns due to mean reversions, and (ii) investors with a long-term horizon can outperform more short-term focused investors (because they have the patience to wait for mean reversion to occur over an uncertain horizon).

Strategic titling, which is similar to “tactical asset allocation” discussed earlier but operates at a lower frequency, implies “tilting” asset class holdings relative to their weights in the reference portfolio, according to their relative expected returns over near- and medium-term horizons. The strategy involves the use of modelled and statistical inputs, overlaid with discretionary judgment by the Guardians. The strategy is not for the faint of heart – or not for the type of investor whose board or underlying owner does not have the patience to wait for the strategy to pay off. The Guardians note:

“Strategic tilting is a ‘contrarian’ strategy that may imply an extended period of losses relative to long-run benchmarks. Being underweight an asset class in a bull market or overweight in a bear market can bring enormous pressure to unwind the strategy. Perhaps the worst possible outcome for a fund would be to abandon a position when valuations for an asset class prove to be extreme after the fact. For this reason, it is imperative that the Fund’s board is committed to the strategy – both from the perspective of buying into the investment beliefs behind the strategy, and being willing to defend the strategy in periods when it underperforms. Having consistent investment beliefs bolsters the collective courage to stay the course” (New Zealand Superannuation Fund, 2014).

Strategic tilting, combined with investments in asset classes not captured in the reference portfolio that the Guardians believe are subject to a degree of inefficient pricing, and effective trade execution (which the Guardians call “portfolio completion”) are the three “value-adding strategies” the Guardians employ in an effort to outperform the reference portfolio. The fund’s 2015 *Annual Report* reflected on the fund’s performance over the five years since it moved away from a conventional strategic asset allocation approach with asset-class based benchmarks towards the reference-portfolio approach: they found that 70% of the Guardians’ actual portfolio mimics that of the reference portfolio, implying a 30% discretionary deviation. Whereas the reference portfolio generated an average annual return of 13.2%, the discretionary

actions of the Guardian contributed an additional 3.65% per year on average – equal to NZ\$4.55bn or more than US\$3bn (New Zealand Superannuation Fund, 2015: 53). Clearly, at least over the five-year period in question, the gains associated with the delegated discretion granted to the Guardians, assessed relative to its reference-portfolio alternative, have outweighed the costs.

II.4. Rule-based rebalancing

Strategic asset or risk-factor allocations are the *target* long-term weighting of different asset classes or risk factors in a portfolio. In reality, the constantly diverging returns on the various assets in the portfolio mean that the target weight is rarely achieved, absent interventions by the investor. For example, without periodic adjustments back to the target asset allocation, the long-run outperformance of equities over bonds will result in a higher effective allocation to equities over time than that of the original target weight in the strategic asset allocation. If the strategic asset allocation is indeed appropriately specified at the outset, this upward drift in the portfolio's equity holding would be undesirable – for example, reducing diversification and increasing the risk of the portfolio. Portfolio rebalancing ensures that the fund's overall portfolio is periodically returned to its targets. In doing so, a rebalancing rule pre-commits the investors to counter-cyclical investments that prevent “arbitrary actions of changing asset allocations in response to short-term noise” (Ang *et. al.*, 2009), and earns a rebalancing premium if asset prices revert to mean.

Rebalancing rules are an example of a Ulysses contract applied to portfolio management. Rebalancing institutionalises countercyclical investing that will result in additional investment returns when asset-class returns revert to mean, a proposition for which there is qualified support over the long run (Cochrane, 1999b and Barberis, 2000). Ang (2014: 145) argues that rebalancing is related to the idea of the benefits of diversification, which is often described as a rare “free lunch”, as applied to long-term investing: “diversification gets you a benefit in one period, but this diversification benefit dies out if you do not rebalance.” Rebalancing enjoys considerable academic support of both an empirical and theoretical nature, as well as being widely adopted by practitioners (Samuelson, 1969; Merton, 1969; and Ang, 2014: 144-147). There are a number of technical considerations in the process of portfolio rebalancing, such the frequency (rebalancing is not costless, as it requires both the buying and selling of assets and hence trading costs).

To illustrate the benefits of rebalancing and the implications of various specifications of such rules, consider a portfolio invested in liquid stock and bond indexes, with two possible approaches to rebalancing: (i) contingent on percentage thresholds for the deviation or drift from the target asset allocation; and (ii) a more naïve calendar-based rule, with either quarterly, annual or bi-annual returns to the original allocation. In this exercise, historic returns for global stock and bond markets are proxied by the MSCI World Index and Citigroup World Bond Index, respectively; over a sample period from January 1988 to February 2013. In all cases, the portfolios are indexed to an initial value of 100.

While the calendar-based approach is self-explanatory, the threshold-based approach requires some clarification. Under a 10% rebalancing rule, the allocation to either asset class is allowed to drift a maximum of 10% from the original target allocation, before a rebalancing episode is triggered. For example, for a 50/50 equity-bond portfolio with a 10% drift rule, the allocation to either asset class can drop as low as 45% and as high as 55%, beyond which rebalancing restores the original 50/50 allocation. Table II.2 shows the results for five portfolios (30/70, 40/60, 50/50, 60/40 and 70/30 equity-bond portfolios), using six different rebalancing rules. The six rules considered include: (i) two threshold-based rules, allowing for 10% and 5% deviations from target allocations, respectively; (ii) three calendar-based rules, with quarterly, annual and bi-annual rebalancing; and (iii) a no-rebalancing rule, implying a naïve buy-and-hold approach.

The most striking observation from Table II.2 is that for all five portfolios, the two threshold-based rules and the three calendar-based rules all outperform a no-rebalancing/buy-and-hold strategy over the sample period. Across all five portfolios, the rebalanced-portfolio returns (expressed as a compound annual growth rate) are higher using any of the rebalancing rules. Looking at returns only, there is little to choose between the two threshold-based rules and the quarterly and annual rebalancing rules. However, in weighing up the merits of different rebalancing rules, a number of factors beyond returns need to be considered. Following the criteria established in Section 1 for sound institutional design, the efficiency, robustness and clarity of different rebalancing rules should be used to assess their respective merits.

Table II.2: Summary of results for different rebalancing rules

	10% drift	5% drift	Quarterly	Annual	Bi-annual	No rebalances (buy and hold)
30/70 Portfolio						
Final value	480	480	486	493	473	451
Return	6.43%	6.44%	6.48%	6.55%	6.37%	6.17%
Number of rebalances	22	62	100	26	13	0
<hr/>						
40/60 Portfolio						
Final value	473	468	475	483	460	436
Return	6.37%	6.33%	6.38%	6.46%	6.25%	6.02%
Number of rebalances	19	50	100	26	13	0
<hr/>						
50/50 Portfolio						
Final value	463	460	460	469	445	421
Return	6.28%	6.25%	6.25%	6.34%	6.11%	5.87%
Number of rebalances	13	45	100	26	13	0
<hr/>						
60/40 Portfolio						
Final value	444	434	442	451	428	405
Return	6.10%	6.01%	6.08%	6.17%	5.95%	5.72%
Number of rebalances	20	51	100	26	13	0
<hr/>						
70/30 Portfolio						
Final value	414	415	421	429	409	390
Return	5.80%	5.82%	5.88%	5.96%	5.76%	5.56%
Number of rebalances	19	61	100	26	13	0

12.2.1. The efficiency of rebalancing rules

Table II.2 also shows the number of rebalancing episodes required by each of the rules. Rebalancing is not a costless exercise: it incurs trading costs from both “buying up” and “selling down” on portfolio weights.

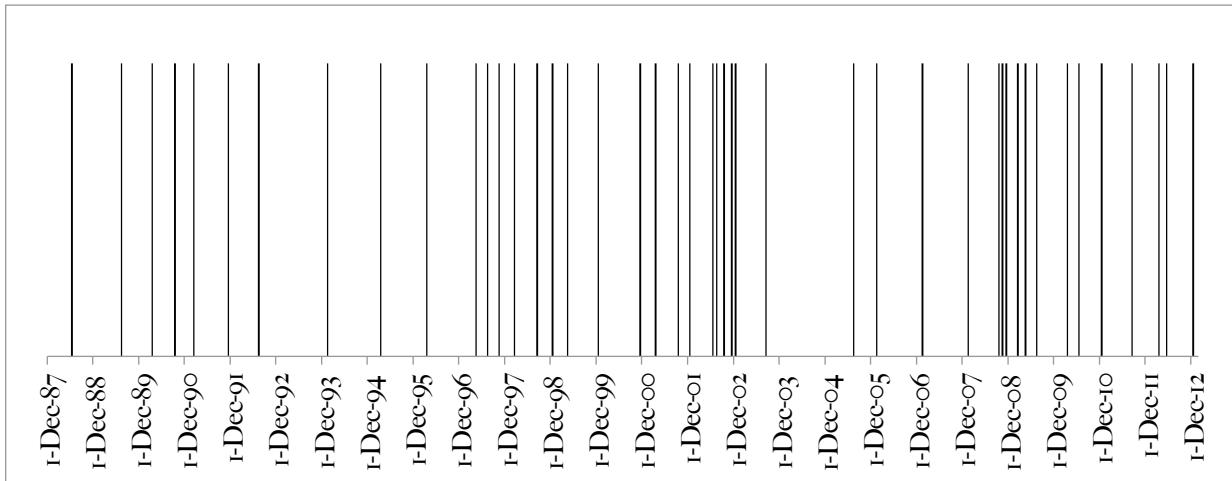
All things equal, investors should favour a rule that requires relatively fewer rebalancing episodes. Comparing the results for the two threshold-based rules in Table II.2 only, the rule that more narrowly constrains the drift from the target allocation naturally triggers a greater number of rebalancing episodes. In the case of the 50/50 equity-bond portfolio, the 10% drift rule results in 13 rebalancing episodes over the sample period, while the 5% drift rule results in a much larger number of 45 such episodes. This difference in the frequency of rebalancing between the two rules is also shown graphically in Figures II.1 and II.2, where the vertical lines indicate a rebalancing episode.

Figure II.1: Rebalancing episodes under a 10% drift rule (50/50 portfolio)



With this in mind, a reconsideration of the findings in Table II.2 suggests that the threshold-based rebalancing rule with 10% drift and the annual rebalancing rule are roughly comparable: the annual rebalancing rule happens to marginally outperform in this sample period and with these asset-class proxies. However, the 10% threshold rule requires less rebalancing episodes (note that under this rule, years can pass without the need for rebalancing – for example between 1990 and 1996, as per Figure II.1).

In practice, the cost of rebalancing will be affected by the nature of the portfolio's allocation to various asset classes (for example, do the respective stock and bond allocations include less liquid securities than need to be part of the rebalancing; are the funds managed through passive indexes, are they managed internally or through third-party managers; in the case of the latter, is there a large number of managers?) – and, moreover, whether rebalancing occurs across a range of asset classes, and potentially within sub-segments of asset classes, such as emerging-market or small-cap stocks, in an equity allocation.

Figure II.2: Rebalancing episodes under a 5% drift rule (50/50 portfolio)

12.2.2. The robustness of rebalancing rules

Threshold-based rebalancing rules are contingent on market valuations as opposed to the mechanistic calendar-based rule. The outperformance (in terms of returns only, ignoring trading costs) of the annual rebalancing rule reported in Table II.2 requires an element of luck: for the purposes of the exercise, the automatic annual rebalancing takes place in January - however, if the annual rebalancing date is June each year, the rule underperforms the threshold-rule based on 10% maximum drift in most cases. An interesting contrast is evident when Figure II.1, which shows the spacing of the rebalancing triggers under the 10% drift rule, is reconsidered. The rebalancing episodes triggered by this rule are not evenly distributed through time. There are long periods where no rebalancing is required (such as 1990 to 1996), as well as periods with relatively frequent rebalancing episodes (such as in 2000 to 2001 and particularly 2008 to 2009). This is intuitive, as allocations are more likely to deviate from target allocations during volatile periods, such as those around the stock market correction in 2001 and the onset of the global financial crisis in 2008. A contingent rule, such as the threshold-based rule, which uses information on market prices and asset-class movements to inform when to rebalance is more robust than a calendar-based rule, which introduces the risk that arbitrarily chosen rebalancing dates do not coincide with appropriate rebalancing periods based on valuations. That said, many investors adopt a calendar-based approach for its simplicity (another attractive institutional characteristic).

12.2.3. The clarity of rebalancing rules

Implementing a rebalancing strategy is not as easy as designing one. Rebalancing goes against behavioural tendencies: it requires the investor to sell assets that have performed well over the most recent period in memory and buy assets that have done poorly. Public perceptions of asset-class performance are typically formed with a lag, meaning that a rebalancing sovereign wealth fund could be selling certain assets exactly at a point in time when public enthusiasm for them is growing or near its peak; and buy assets that appear in the public mind to be a losing bet. These challenges are not trivial – they affect the most experienced and sophisticated investors in the world.

Rebalancing will not pay off every single time it is done, but it is a proven strategy for implementing a counter-cyclical investment policy and generating excess returns in the long run. But precisely because it does not work every time and requires a conquering of behavioural bias, it is best that rebalancing policies are encapsulated in rules, rather than rely on discretion. Investment committees and boards at large public investment institutions confront significant risks of dynamic inconsistencies in implementing rebalancing, absent the bounds of a rule: the siren calls are likely to direct them in exactly the opposite direction than the rebalancing rule.

Both for the purposes of internal decision-making and to promote accountability and transparency (particularly in the context of public investment institutions), it is useful to have rules and institutional arrangements that are clear in and of themselves and advance clarity around the actual policymaking process and objectives of the institutions. The rules discussed above have the advantage of clarity and ease of communication. Norway's sovereign wealth fund has been active in explaining the merits and mechanics of its rebalancing rule to the public and key constituents, testifying on it before parliament and publishing white papers and notes. Holding a diversified portfolio and implementing dynamic rebalancing are rare “free lunches” that have a significant effect on long-run investment returns. As Mark Wiseman, the Chief Executive Officer of the Canadian Pension Plan Investment Board, noted:

“We consistently rebalance our portfolio to 65% equities and 35% fixed income. This is a brilliantly simple methodology that all investors, in my view, should employ...We don't know when [the equity markets] are going to rally or turn bearish, so we just say what we want is to be consistent in keeping that 65% equity weighting through the cycle. That is a very, very

powerful self-leveling mechanism. You're buying on the way down and selling on the way up...(this) creates fantastic discipline" (quoted in Zawalsky, 2012)."

Rebalancing should be a fundamental part of any long-term sovereign wealth fund's strategy, regardless of its level of sophistication and expertise. Rule-based rebalancing does not require great skill – it "merely" requires a sound rule and conviction to ensure adherence to the rule when the pressure mounts. An investor who cannot stomach diversified exposure to market volatility and cannot specify and adhere to a rebalancing rule, should not attempt more elaborate investment strategies – such as investments in illiquid alternatives (private equity, hedge funds and infrastructure) and active market-timing or security-selection strategies.

Conclusion

This chapter has identified how a number of rule-based policies and contractual arrangements can be employed to manage the agency relationship established between the owner and the manager of a sovereign wealth fund. The rules and contracts discussed in this chapter – the collaborative establishment of an Investment Policy Statement as a governing contract between the principal and the agent, a long-term asset allocation framework, the adoption of asset-class benchmarks or reference portfolios, and finally dynamic portfolio rebalancing rules – all enjoy considerable academic and practitioner support. They are essential elements of institutional arrangements for the delegated nature of sovereign wealth fund investment management.

Rules perform two functions in the execution of investment mandates by sovereign wealth funds. First, in the spirit of a mast-bound Ulysses, rule-based investment strategies are voluntary pre-commitments to charting a steady course through periods when incentives and behavioural tendencies might lead to actions that are inconsistent with long-term objectives. Long-term investors should take advantage of the benefits for their extended investment horizon (compared to that of the average investor) by capturing the rebalancing premium, in addition to more complex and uncertain factor premiums. Periodic rebalancing is a way of establishing a degree of counter-cyclical investment, as it avoids "arbitrary actions of changing asset allocations in response to short-term noise" (Ang *et. al.*, 2009) and helps "protect the portfolio from

ad hoc revisions of sound long-term policy...when short-term exigencies are most distressing and the policy is most in doubt" (Ellis, 2013).

The second function of rule-based investment strategies is to promote and give substance to the accountability of sovereign wealth funds as public institutions managing assets on behalf of the citizenry. The Investment Policy Statement, rebalancing rules, and a reference portfolio or asset allocation framework with associated disclosure of benchmarks establish observable counterfactuals to the actual, discretionary portfolio management decisions of the sovereign wealth fund's delegated manager. While many sovereign wealth funds have failed to adopt – or at least publicly disclose – such rules and contractual arrangements, a small number of them are at the vanguard of global best practices around the governance of delegated investment authority, providing institutional benchmarks other sovereign wealth funds can aspire to emulate.

Chapter 12

Summary

This dissertation offers an institutional analysis of the sovereign wealth fund model for managing resource revenues. The discussion proceeds from a reading of the literature that, first, underlines the massive historic and cross-sectional variation in economic performance of resource economies; and, second, emphasises the central importance of institutions in determining whether resource wealth promotes or undermines economic growth in the long run. At the same time, it is argued that the understanding of “institutions” in this context remains rather general, and that a fruitful line of enquiry there focuses on a more concentrated cluster of institutional reforms located around the management of the fiscal revenues generated from the extraction of natural resources. The increasingly popular “sovereign wealth fund model” is presented and analysed as exactly this type of targetted institution.

Throughout this dissertation it is maintained that the sovereign wealth fund model should be conceived as more than the mere establishment of a portfolio of financial assets funded from resource revenues – or even an institution to manage such a portfolio. Rather, the sovereign wealth fund model is best understood as a component of a credible, counter-cyclical rule-based fiscal framework. The sovereign wealth fund model stands the best chance of contributing to improved economic performance if it is complemented by, or embedded in, a system of rules that governs the flow of resource revenues into the fund, the flow of assets and income out of the sovereign wealth funds (variously designed), and the principal-agent relationships involved in the delegated authority around the management of sovereign investment institutions.

The relationship between natural resources and economic prosperity is complex. Today, the list of the world’s top ten producers of oil includes some of the poorest and some of its richest countries. Moreover, it is ahistorical to suggest that an abundance of natural resource wealth implies an inevitable disposition to poor economic performance, given the critical role such forms of wealth played in the historic economic emergence of the West. That said, the so-called “resource curse” phenomenon enjoys significant empirical and theoretical support – albeit conditioned and qualified in a number of ways. The erstwhile uncritical acceptance of the resource-curse hypothesis, which emerged in the 1980s and early 1990s, has been

replaced by a more nuanced and conditional understanding of the average relationship between resources and economic performance. This has resulted in a more fruitful emphasis on country- and context-specific factors that promote either success or failure in harnessing resource wealth. The role and quality of institutions and political-economy factors feature prominently in this discussion, as do notions of “resource dependence” rather than “resource abundance”.

Section 1: Resources, economic performance of the role of institutions

Whereas the early resource-curse literature was particularly sceptical about the role of the quality of institutions in explaining the differentiated economic performance of resource economies – preferring instead institutions-free economic models, notably the Dutch disease – the institutional argument has gained prominence and support in recent years. Scholars have identified the quality of institutions *at the time of resource discovery* as particularly important to the successful management of resource wealth. Today, institutions-centric explanations for the resource curse are no longer presented in direct opposition to more fundamentally economic ones (such as the Dutch disease), but rather attempt to account for the interactions between resource windfalls, the quality of general institutions, specific institutions relating to the management of resources and the quality of economic policies.

Chapter 1 provides an account of the historic ambivalence economists have demonstrated about the economic benefits and potential disadvantages of natural resources. The chapter discusses in detail the emergence of the Dutch-disease and resource-curse literatures in the 1980s and early 1990s. The chapter concludes with a discussion of the manner in which institutions-centric explanations for the observed divergence in economic performance of resource economies have gained prominence. The understanding of “institutions”, particularly in the empirical literature, is however a deliberately general one, focused on what is often described as “meta” or “macro” institutions, such as the rule of law, the specification and enforcement of property rights and the extent of corruption. The emerging frontier of the literature is bringing more narrowly defined and resource-specific institutions into view – a development to which this dissertation contributes.

Chapter 2 proceeds with a general discussion of the theory of institutions, including principles around their common forms and functions. Chapter 3 focuses more narrowly on the political economy challenges around the management of resource windfalls, and the role of institutions in this regard. These chapters form the theoretical backbone for the central argument advanced in this dissertation: that sovereign wealth funds, if embedded in an accompanying rule-based system for fiscal policy and rule-based and contractual principal-agent relationship, provide a promising – if only partial – institutional solution to widely observed failures in the management of resource windfalls. An important overarching theme in the first section of this dissertation is an appreciation of the slow-moving nature of institutions and the extent to which arguments in favour of the primacy of institutions in economics tend to pertain to long-run relationships. This is particularly important for any argument linking institutions to the resource curse, because the latter is also best understood as a set of arguments around long-term economic relationships.

A practical implication of this long-term, institutions-centric perspective is that it calls into question the wisdom of many policy prescriptions for the resource-dependent developing countries, particularly as it applies to potential contribution of sovereign wealth funds. A powerful and seductive intellectual tradition, which started with Rosenstein-Rodan's big-push model in the 1950s, suggests that governments in resource-dependent poor countries should use commodity windfalls to promote rapid and dramatic economic transformation. Leading development economists, notably Paul Collier and Jeffrey Sachs, are the intellectual heirs of Rostenstein and Rodan in arguing that resource windfalls are a means through which to achieve such a transformation, economic diversification and development. This tradition typically argues for the strong hand of the state in the escape from a number of perceived “development traps”, with resource revenues providing otherwise scarce capital through which to achieve it.

The institutionalist argument in favour of sovereign wealth funds presented in this dissertation takes a different view of resource-based economic development. This view suggests that big-push models in the spirit of Rosenstein-Rodan, Sachs and Collier, particularly as they assign such an aggressively activist role for the state in investing resource revenues, tend to underestimate the institutional and political-economy constraints on efficient and sustainable public investment financed by resource revenues. The contribution of sovereign wealth funds proposed in this dissertation regards these institutional and political economy constraints as fundamental to resource-dependent economies. Consequently, the institutional perspective

on sovereign wealth funds calls for them to be embedded in a set of rules, and supports a more gradualist view of how resource revenues should be used in the process of economic development.

Section 2: Sovereign wealth fund definitions, types and institutional models

The second section of this dissertation introduces the sovereign wealth fund model, and discusses various approaches to defining and categorising these institutions. The section identifies the key elements of the institutional framework that underpins the sovereign wealth fund model. It draws a series of parallels and lessons from the modern monetary consensus, with its support for operationally independent monetary authorities, explicit policy targets and contingent rules, amongst other elements of the institutional framework. Chapter 4 starts by underlining the significant variation in the landscape of sovereign wealth funds, and provides a typology of the different kinds of sovereign wealth funds based on the various functions they perform. An important distinction is made between stabilisation funds, with short-term investment horizons and the function of macroeconomic and fiscal stabilisation, and more long-term savings vehicles, which diversify the fiscal base of resource-dependent economies and transform depleting assets into permanent wealth in the form of a financial endowment.

As with most institutions, sovereign wealth funds are neither normatively nor positively “one-size-fits-all” entities: there is significant scope for tailoring sovereign wealth funds’ functions, policies around savings, spending and investments, and intra-governmental and internal governance arrangements to meet local requirements, based on the economic (and political) realities. Criticisms of sovereign wealth funds tend to underestimate this degree of flexibility; as well as the extent to which resource-based sovereign wealth funds are designed to directly and indirectly address common afflictions associated with the resource curse (identified in Section 1, particularly Chapter 3).

Chapter 5 finds that the central tenets of the modern monetary consensus can be applied in aid of the construction of an institutional framework for sovereign wealth funds. The first area of overlap is the importance of clarifying institutional mandates and objectives, which are not only important for accountability, but also defines the appropriate scope of specific institutions: emphasising their optimal contribution and clarifying which social objectives lie beyond their reach. Particularly as there is currently less agreement around the appropriate objectives and mandate of sovereign wealth funds than there is for

monetary policy, it is critical to define, both positively and negatively, exactly what the functions, mandates and objectives of sovereign wealth funds are.

The management of sovereign wealth funds further share with modern monetary policy institutions the characteristics of a classic agency relationship, established by the granting of operational authority to independent institutions in order to avoid well-known political biases and incentive problems. Operational independence has gained a particular understanding through the theory and practice of modern monetary policy – notably, it is typically accompanied by goal dependence, and an elaborate set of complementary institutional arrangements that promote accountability and transparency. A similar understanding appears warranted in the area of sovereign wealth funds (further explored in the final section of the dissertation). Further parallels to and lessons from modern central banking for the sovereign wealth fund model are drawn in Chapter 5, including the emphasis on institutionalised credibility, and the adoption of explicit targets and contingent rules as a means to reduce the costs associated with achieving credibility (while also promoting public accountability). The institutional framework established in the second section is used to evaluate fiscal rules and the management of the agency relationships around sovereign wealth funds in the remainder of the dissertation.

Section 3: Fiscal rules

Having argued that a full and meaningful understanding of the sovereign wealth fund model requires that they be understood as a part of rule-based fiscal framework, Section 3 is devoted to normative and positive assessments of saving and spending rules. These rules govern the flow of resource revenues into sovereign wealth funds, and the transfer of these funds' assets and investment income to the budget (or other earmarked purposes). With a few notable exceptions, there is significant scope for improving the fiscal rules surrounding sovereign wealth funds, and achieving greater integration of sovereign wealth fund savings and spending policies with a broader counter-cyclical fiscal framework. A more typical arrangement is to combine either *ad hoc* or highly mechanistic savings rules with simple spending rules for investment-income funds and poorly designed (or, again, *ad hoc*) transfers from stabilisation funds.

Chapter 6 discusses a number of simple rules for saving a share of revenues arising from natural resource revenues through transfers to a sovereign wealth fund structure. These rules – variously based on a fixed

percentage of resource revenues, deviations from a set reference price for the underlying commodity, or a similar deviation from a moving average of prices or revenues – are simple to the point of being crude. While they therefore have the attraction of simplicity and ease of communication, they make no attempt to distinguish between the use of accumulated assets for stabilisation, saving and income-generation purposed in particular; or, generally, how savings in the sovereign wealth fund may be integrated with a broader fiscal framework, as discussed above. They are, therefore, best understood as accumulation rules, most relevant to a potential period prior to the establishment of a more comprehensive fiscal framework. Another reason for studying these simple saving rules is that, while clearly suboptimal, they are closer to current practice amongst global sovereign wealth funds than more complex, integrated fiscal rules (while, as the chapter demonstrates, a number of resource-dependent countries have failed to even implement even such basic savings rules or processes during the most recent oil boom).

Chapters 7 and 8 respectively introduces and applies a more integrated fiscal rule that combines spending, stabilisation and saving decisions for oil revenues in a single framework. The framework is based on a spending rule that anchors oil-derived spending – or, more precisely transfers from the sovereign wealth fund to the government – on a function of the previous year’s spending and the balance of assets in the sovereign wealth fund, consisting of a stabilisation- and investment-income fund component. The rule can be characterised as contingent or state-dependent, as it incorporates automatic feedback loops between fluctuations in resource revenues and the level of oil-derived spending (that is, transfers from the sovereign wealth funds): when oil revenues increase, the rule permits a gradual upward adjustment in spending, permitted due to an increase in size of the sovereign wealth fund (and *vice versa*).

The fiscal rule underlines the trade-off between a rapid ramp-up in public spending financed by resource revenues (“front-loaded spending”) and the accumulation of a significant pool of financial assets in the Stabilisation Fund and the Investment Income Fund, which transforms a depleting natural asset into a source of permanent wealth and income. The trade-off between current spending and the creation of a Stabilisation Fund is not that acute (beyond the initial accumulation with which to establish the fund); but the establishment of an Investment Income Fund involves more substantial reduction in the level of short-term spending in order to establish the endowment and maintain permanent spending. A number of resource-rich countries have already accumulated such assets during previous commodity booms – these countries essentially already have the financial building blocks in place to successfully implement the fiscal

rule. For countries that are yet to build up these initial capital buffers, the challenge of implementing the rule is more substantial and, in some cases (such as Nigeria in the examples analysed in this dissertation), simply unfeasible. The lessons from the application of the fiscal rule in Chapter 8 extend beyond the countries themselves, as the characteristics of the five economies used are representative of the position of other resource-rich countries.

Section 4: The governance of fiscal rules and delegated investment authorities

The final section starts with a discussion of the design and governance of existing integrated fiscal rules. These countries analysed cover a range of economic and political contexts, including some of the world's richest countries, Norway and the United States of America, and some of its poorest, such as Nigeria, Ghana and Timor Leste. The analysis of the rules actually used in practice allowed for a revealing comparison with the rule-based framework introduced in the Chapter 7. In general, the rule-based fiscal frameworks adopted in Norway and Chile come closest to the proposed fiscal rule: while their operation is different from the rule in Chapter 7 (and indeed from each other), they both integrate savings decisions with a concept of sustainable income from depleting resources. In both cases, the ultimate goal behind the rule is to constrain the spending of finite resource revenues in such a way that the budget does not become dependent on a depleting source of fiscal revenue. Wyoming pursues a similar model to that of Norway – if on a more limited scale given that it consumes the majority of its oil, gas and coal revenues through the budget, sending only a percentage of resource revenues to its permanent fund. In Alaska, the same limited degree of savings applies; however, the state has to date not used the earnings of the permanent fund to fund the budget (rather just earmarking half of it for a unique citizens' dividend scheme). Both Alaska and Wyoming would be well served by the addition of some stabilisation mechanisms: either directing a greater share of volatile and depleting revenue through their permanent funds, in exchange for a stable stream of investment income; or more directly through the establishment of larger and more rule-based fiscal stabilisation funds.

In the low- and middle-income countries discussed in Chapter 9, notably Kazakhstan, Timor Leste, Ghana and Nigeria (Chile is an exception), fiscal rules are reasonably well specified in principle. However, a common theme in these countries is apparent blind spots in the enabling legislation and

institutional framework, such as the allocations of resource revenues to vaguely defined “development projects”, high levels of discretion in the specification of oil-price benchmarks or references, or the absence of debt and/or deficit limits (which means the accumulation of assets can be offset by a parallel or subsequent accumulation of liabilities). Given the institutional challenges in these countries, the risk that these weaknesses will be exploited as a means to inadequately fund the sovereign wealth fund, or to raid in it tough times, looms large. Nevertheless, in all these cases, there are indications that these (flawed) fiscal rules and sovereign wealth funds have contributed to improvements in the management of oil revenues – in Kazakhstan and Timor Leste a very large pool of assets (relative to GDP and the government spending) has been accumulated, while fiscal stability has been preserved amidst rapid economic growth and transformation; while in Nigeria a world-class independent sovereign investment authority has been created (albeit with a currently small asset base). The overarching message of the section is that in the absence of a constraining fiscal rule to govern the flow of money into and from it, a sovereign wealth fund risk becoming little more than a repository of occasional discretionary exercises in fiscal prudence, prone to subsequent raids and depletions when resource revenues collapse, as they inevitably do at some point.

The final institutional aspects of the sovereign wealth fund model discussed in this dissertation pertain to various elements of sovereign wealth funds’ investments and the delegated investment institutions involved in this part of the model, including why and how to achieve a degree of operational independence from government for the management authority, how to clarify the roles and responsibilities of the various principals and agents involved in the delegated-authority model of investment, and how the governance and performance of the investment authority may be strengthened by transparency, accountability and rule-based investment policies.

Having restated and elaborated on the case for operational independence in the management of long-term sovereign investment portfolios, Chapter 10 considers the ways in which countries have resolved a familiar tension in public policy: balancing the desire for operational independence on the part of an investment authority of sovereign wealth with a degree of government control and oversight of such delegated authority. While the case for operational independence rests on compelling foundations – investment performance, fears of a regulatory backlash, a desire to escape from public-sector pay scales, and the ring fencing of assets – Chapter 10 indicates that independence is typically a matter of degree. In all cases discussed in this chapter, with the exception of the New Zealand Superannuation Fund, the ministry of

finance (or other political officers) retains at least *de jure* power to establish the most important determinant of the fund's investment policy, namely its asset allocation.

When the institutional arrangements of sovereign wealth funds are compared to those of monetary authorities (as per the framework established in Chapter 5), an interpretation of this observation could be that while governments are willing to give the investment authorities responsible for sovereign wealth fund a high degree of operational independence, the principle of "goal dependence" is typically preserved. In the same manner that governments retain the power to establish the goals of monetary policy and explicit policy targets (such as a numeric inflation target), they generally wish to preserve the power to establish sovereign wealth funds' return targets, risk tolerance and asset allocation. In some cases, powers to exercise some degree of discretion around the establishment of those targets are delegated down to the board and the executive; while the New Zealand example is comparatively extreme in that the government delegates all major policy-setting powers to the board (which it, moreover, does not directly appoint).

In a number of cases where major investment-policy decisions remain under the control of the ministry of finance, such as in Norway and Chile, concerns around potentially damaging political intervention in the investments of the sovereign wealth fund are reduced by transparency around the policy choices of the ministry (or other political owners), a high degree of public and expert consultation, and the adoption of uncontroversial and rule-based investment policies. In the case of Kazakhstan, a lower level of transparency and the concentration of power over the fund provide less comfort around the potential for future political intervention in the fund's investment decisions. Finally, while the American permanent fund model has delivered positive results over a number of years, the heavy use of consultants and external fund managers is not only potentially problematic from a cost perspective, but also risks a lack of clarity around the ultimate institutional ownership of critical policy decisions, notably the funds' long-term asset allocation.

There is a significant degree of observed cross-country variation in emphasis between delegated and centralised control over the investment policies and operations of sovereign wealth funds. The country-specific balance between political ownership of investment policies and delegated authority for investment operations is ultimately not only a function of the political system and institutional characteristics of the

countries, but also of the degree of discretion permitted by the investment strategy in the first place: if the investment strategy itself is highly non-discretionary, the discussion around the degree of delegated authority becomes less important, as there is essentially less power to delegate.

A number of rule-based policies and contractual arrangements can be employed to manage the agency relationship established between the owner and the manager of a sovereign wealth fund, under governance models that assume the delegation of discretionary powers from the principal (government) to an agent (the delegated sovereign investment authority). Rules and contracts perform two functions in the execution of investment mandates by sovereign wealth funds. First, rule-based investment strategies are voluntary pre-commitments to charting a steady course through periods when incentives and behavioural tendencies might lead to actions that are inconsistent with long-term objectives. The second function of rule-based investment is to promote and give substance to the accountability of sovereign wealth funds as public institutions managing assets on behalf of the citizenry.

The chapter proposes the collaborative establishment of an Investment Policy Statement as a governing contract between the principal and the agent. For long-term investors, such as investment-income and savings-type sovereign wealth funds, long-term asset allocation – and its more sophisticated extension in the form of risk-factor allocation – is the fundamental determinant of investment performance, and hence the most critical investment-policy decision. Whether determined by the minister of finance, a governing board of political officeholders or an independent board, this long-term target weighting lies at the heart of the policy decisions pertaining to the investments of sovereign wealth funds, and is an articulation of deep-seated policy preferences for the balance of risk and return.

Chapter 11 suggests that many existing sovereign wealth funds have mirrored other long-term institutional investors by keeping it simple and adopting the tried and tested balanced-portfolio approach based only on exposure to traded (or listed) stocks and bonds. As their risk tolerance increased over time, a number of sovereign wealth funds gradually increased the share of equities in their portfolios – in a manner that matches the workhorse benchmark portfolio for long-term institutional investors, namely the 60/40 equity-bond portfolio. This basic, if limited, approach to long-term asset allocation achieves a high degree of portfolio diversification, and provides long-term capital a near-efficient allocation to the most pervasive determinant of portfolio returns: market volatility. It is a simple investment-policy model for sovereign

wealth funds to follow, particularly during their inception phase, when the focus is more typically (and appropriately) on the aforementioned fiscal framework.

More established sovereign wealth funds might embrace increasingly sophisticated and multi-dimensional asset allocation models and analytical tools. An emerging frontier in asset allocation is the risk-factor approach, which has been cautiously adopted by the world's most sophisticated and established sovereign wealth funds. The risk-factor approach attempts to look beyond the most basic specification of the fund's strategic asset allocation in terms of the asset classes to one that focussed on underlying risk-factor allocation. The basic logic is that investors are compensated for their exposure to a wide range of risk factors (in addition to the market-volatility factor of traditional portfolio theory); or, conversely, pay a premium (or an opportunity cost in terms of foregone return premiums) for holding assets that effectively hedge against these risk factors.

A risk-factor approach serves a number of important institutional functions in the context of long-term investment. First, it is a complete and comprehensive way of analysing the long-term return potential of, and the unique opportunities available to, a sovereign wealth fund. Second, it is a useful lens through which to view both portfolio construction and case-by-case investment decisions: looking through traditional asset classes, which are simply bundles of underlying risk factors, the investor can determine the best way to gain desired factor exposure. Finally, factor-adjusted benchmarks and performance measures hold third-party managers to higher account, making it impossible for them to claim the harvesting of factor premiums to be the purported benefits of active management and investment talent. Chapter 11 suggests an initial focus on a small set of factors that enjoy considerable empirical and theoretical support, have a long empirical track record, and can be captured in a cost-effective manner. A focus on value and illiquidity factor premiums are obvious points of departure for sovereign wealth funds with long investment horizons.

Chapter 11 further considers two additional rule-based contractual arrangements between the principal and its agent in the form of an independent investment authority managing a sovereign wealth fund's assets. The first of these is the specification of performance benchmarks through which to assess the contribution of investment discretion. In the case of simple asset-allocation frameworks, common practice is to select a set of asset-class specific indexes as benchmarks; however, it was argued that the more

sophisticated risk-factor approach to long-term asset allocation is best accompanied by the specification of a reference (or policy) portfolio. Finally, the chapter discusses and analysed the specification a dynamic portfolio rebalancing rule, which institutionalises a degree of counter-cyclical investment on the part of the agent, who might otherwise succumb to dynamically inconsistent behaviour.

This dissertation adopts a sympathetic stance on the contribution sovereign wealth funds can play in the management of resource revenues. However, this conclusion is premised on the understanding that sovereign wealth funds are embedded in a comprehensive, rule-based fiscal framework; and that they are accompanied by a fairly elaborate institutional framework. The potential contribution of sovereign wealth funds, particularly when narrowly defined as simply a portfolio of assets funded from a resource revenue windfall, should not be overstated. However, when accompanied by supporting fiscal rules and a sound institutional structure, the sovereign wealth fund model is a promising targetted institutional intervention to the by now widely understood problems of resource economies.

Bibliography

- Acemoglu, D. and Robinson, J. (2000). "Why Did the West Extend the Franchise? Democracy, Inequality, And Growth in Historical Perspective," *Quarterly Journal of Economics*, Vol. 115(4): 1167-1199.
- Acemoglu, D., Johnson, S. and Robinson, J. (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, Vol. 91(5): 1369-1401.
- Acemoglu, D., Johnson, S. and Robinson, J. (2002). "Reversal of Fortune: Geography and Institutions In The Making Of The Modern World Income Distribution," *Quarterly Journal of Economics*, Vol. 117(4): 1231-1294.
- Acemoglu, D. and Robinson, J. (2006). "Economic Backwardness in Political Perspective," *American Political Science Review*, Vol. 100(1): 115-131.
- Acemoglu, D. and Robinson, J. (2008). "Persistence of Power, Elites and Institutions," *American Economic Review*, Vol. 98(1): 267-93, March.
- Acemoglu, D. and Robinson, J. (2012). *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. Crown: New York, N.Y.
- Acemoglu, D. and Robinson, J. (2013a). "Economics versus Politics: Pitfalls of Policy Advice," *Journal of Economic Perspectives*, Vol. 27(2): 173-192.
- Acemoglu, D. and Robinson, J. (2013b). "The Resource Curse and Institutions: Getting More Specific," 27 June 2013, available online at: <http://whynationsfail.com/blog/2013/6/27/resource-curse-and-institutions-getting-more-specific.html>
- Acemoglu, D., Johnson, S., Robinson, J. and Thaicharoen, Y. (2003). "Institutional Causes, Macroeconomic Symptoms: Volatility, Crises, and Growth," *Journal of Monetary Economics*, Vol. 50(1): 49-123.
- Ades, A. and Di Tella, R. (1999). "Rents, competition, and corruption," *American Economic Review*, Vol. 89: 982-993.
- African Development Bank. (2016). "Botswana's Mineral Revenues, Expenditure and Savings Policy: A Case Study," African Natural Resources Center, African Development Bank, Abidjan, Cote d'Ivoire.
- Aizenman, J. and Lee, J. (2006). "Financial Versus Monetary Mercantilism: Long-Run View of the Large International Reserves Hoarding," IMF Working Papers 06/280, International Monetary Fund.
- Agénor, P. and Canuto, O. (2012). "Middle-Income Growth Traps", World Bank Policy Research Working Paper, 6210, Washington, D.C.
- Alesina, A. and Summers, L. (1993). "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence," *Journal of Money, Credit and Banking*, Vol. 25: 151-162.
- Alesina, A., Tabellini, G. and Campante, F. (2008). "Why is Fiscal Policy Often Pro-cyclical?" *Journal of the European Economic Association*, Vol. 6(5): 1006-1036.

Al-Hassan, A., Papaioannou, M., Skancke, M. and Sung, C. (2013) "Sovereign Wealth Funds: Aspects of Governance Structures and Investment Management," IMF Working Paper WP/13/231, November 2013, Washington D.C.

Ambachtsheer, K. (2011). "How Should Pension Funds Pay Their Own People". *Rotman International Journal of Pension Management*. Vol 4(1): 18-25.

Ang, A. (2010). "The Four Benchmarks of Sovereign Wealth Funds," 21 September 2010, available at SSRN: <http://ssrn.com/abstract=1680485>

Ang, A. (2014). *Asset Management: A Systematic Approach to Factor Investing*. Oxford University Press: Oxford, UK.

Ang, A., Brandt, M. and Denison, D. (2014). "Review of the Active Management of the Norwegian Government Pension Fund Global, Norwegian Ministry of Finance."

Ang, A., Goetzmann, W. and Schaefer, S. (2009). "Evaluation of Active Management of the Norwegian GPFG," Norway: Ministry of Finance.

Ang, A. and Kjaer, K. (2012). "Investing for the Long Run," Netspar Discussion Paper No. II/2011-104.

Ang, A. and Timmermann, A. (2012). "Regime Changes and Financial Markets," Annual Review of Financial Economics, Vol. 4: 313-337.

Arezki, R. and Van der Ploeg, F. (2010). "Trade policies, institutions and the natural resource curse," *Applied Economics Letters*, Vol. 17(15): 1443-1451.

Arezki, R., Gylfason, T. and Sy, A. (eds.) (2012). *Beyond the Curse: Policies to Harness the Power of Natural Resources*, International Monetary Fund: Washington, DC.

Arezki, R., Hamilton, K. and Kazimov, K. (2011). "Resource Windfalls, Macroeconomic Stability and Growth: The Role of Political Institutions." IMF Working Paper II/142, International Monetary Fund, Washington, DC.

Aristotle. (translated by Walford, E. [1853]). *Politics*. Henry Bohn: London, UK.

Aron, J. (2013). "Growth and Institutions: A Review of the Evidence," reprinted in *Institutions and Governance in Developing Countries*, Kunal Sen (ed.), Vol 1, Chapter 16, Edward Elgar Publishing: London, UK.

Arrow, K. (1969). "The Organisation of Economic Activity: Issues Pertinent to the Choice of Market Versus Nonmarket Allocation" in *The Analysis and Evaluation of Public Expenditure: The PPB System*. Vol. 1, U.S. Joint Economic Committee, U.S. Government Printing Office: Washington, D.C.

Asquith, W. (2006). "L-moments and TL-moments of the generalised lambda distribution", *Computational Statistics & Data Analysis*, Vol. 51(9), May 2007: 4484-4496.

Asness, C., Moskowitz T. and Pedersen, L. (2013), "Value and Momentum Everywhere." *Journal of Finance*, Vol. 68, No. 3, 929-985.

Auty, R. (2007). "Rent Cycling Theory, the Resource Curse, and Development Policy," *Developing Alternatives*, Vol 11(1): 7-13.

Avendaño, R. and Santiso, J. (2011). "Are sovereign wealth funds politically biased? A comparison with other institutional investors," in Narjess Boubakri and Jean-Claude Cossset (eds.), *Institutional Investors in Global Capital Markets*, Emerald Group Publishing Limited: Bingley, UK.

Bacon, R. and Tordo, S. (2006). *Experience with Oil Funds: Institutional and Financial Aspects*, Energy Sector Management Assistance Program, Washington, D.C.: World Bank.

Bagehot, W. (1873[1924]). *Lombard Street: A Description of the Money Market*. John Murray: London, reprinted (1924), William Clowes and Sons: London.

Balin, B. (2010). "Sovereign Wealth Funds: A Critical Analysis," The Johns Hopkins University School of Advanced Industrial Studies, Available at SSRN: <http://ssrn.com/abstract=1477725>.

Barberis, N. (2000). "Investing for the Long Run when Returns are Predictable," *Journal of Finance*, Vol. 55: 225-264.

Barberis, N., Shleifer, A. and Vishny, R. (1998). "A model of investor sentiment," *Journal of Financial Economics*, Vol. 49(3): 307-343.

Barberis, N. and Huang, M. (2001). "Mental Accounting, Loss Aversion, and Individual Stock Returns," *Journal of Finance*, Vol. 56(4): 1247-1292.

Barro, R. and Gordon, D. (1983). Rules, Discretion and Reputation in a Model of Monetary Policy. *Journal of Monetary Economics* 12: 101-121.

Barro, R. (1991). "Economic Growth in a Cross Section of Countries," *Quarterly Journal of Economics*, Vol. 106(2): 407-443.

Barro, Robert J. (1999). "Determinants of Democracy," *Journal of Political Economy*, Vol. 107(1): 158-183.

Bates, R. (1981). *States and Markets in Tropical Africa: The Political Basis of Agricultural Policies*, University of California Press: Berkeley, CA.

Bates, R. (2014). "The New Institutionalism: the Work of Douglass North", in *Institutions, Property Rights, and Economic Growth: The Legacy of Douglass North*, S. Galiani and I. Sened. Cambridge University Press: Cambridge, UK.

Baunsgaard, T., Villafuerte, M., Poplawski-Ribeiro, M. and Richmond, C. (2012), "Fiscal Frameworks for Resource Rich Developing Countries," *IMF Staff Discussion Notes*, 16 May 2012, SDN/12/04, Washington, D.C.

Beblawi, H. and Luciani, G. (1987). *The Rentier State*, Croom Helm: New York, N.Y.

Behrendt, S. (2010). "Sovereign Wealth Funds and the Santiago Principles: Where Do They Stand?", Carnegie Papers 2010, available online at: http://www.carnegieendowment.org/files/santiago_principles.pdf.

Behrendt, S. (2014). "Sovereign Wealth Funds and Their Commitment to the 'Santiago Principles': The Santiago Compliance Index 2014", Geoeconomica Briefing, October 2014, available online at: <http://www.geoeconomica.com/index.php/newsreader-9/items/69.html>

Berg, A., Portillo, R., Yang, S. and Zanna, L. (2013). "Public investment in resource-abundant developing countries", *IMF Economic Review*, Vol. 61(1):92-129.

- Bernanke, B. (2004). "The Logic of Monetary Policy," remarks before the National Economists Club, Washington, D.C. 2 December 2004.
- Berstein, S., Lerner, J. and Schoar, A. (2013). "The Investment Strategies of Sovereign Wealth Funds," *Journal of Economic Perspectives*, Vol. 27 (2): 219-38.
- Bertram, R. and Zvan, B. (2009). "Pension Funds and Incentive Compensation: A Story Based on the Ontario Teachers' Experience". *Rotman International Journal of Pension Management*. Vol 2(1): 30-33.
- Bhattacharyya, S. and Hodler, R. (2010). "Natural resources, democracy and corruption," *European Economic Review*, Vol. 54(4): 608-621.
- Birdsall, N. and Fukuyama, F. (2011). "The Post-Washington Consensus: Development After the Crisis," *Foreign Affairs*, March-April 2011, pp. 45-53.
- Black, F. (1986). "Noise," *Journal of Finance*, Vol. 41: 529-543.
- Blanchard, O. and Fischer, S. (1989). *Lectures on Macroeconomics*, MIT Press: Cambridge, MA.
- Blinder, A. (1997). "What Central Bankers Could Learn from Academics - And Vice Versa," *Journal of Economic Perspectives*, Vol. 11 (2): 3-19.
- Blinder, A. (2000). Central-bank credibility: Why Do We Care? How Do We Build It? *American Economic Review* 90(5): 1421-1431.
- Blundell-Wignall, A., Hu, Y. and Yermo, J. (2008). "Sovereign Wealth and Pension Fund Issues", OECD Working Papers on Insurance and Private Pensions, No. 14, OECD Publishing.
- Bodin, J. (1576 [1962]). *The Six Books of a Commonwealth [Les six livres de la republique]*, K. D. McRae (ed.), Harvard University Press: Cambridge, MA.
- Bogle, J. (2010). *Common Sense on Mutual Funds: New Imperatives for the Intelligent Investor*, 10th anniversary edition, John Wiley & Sons, New York, NY.
- Bolton, P. and Dewatripont, M. (2005). *Contract theory*, MIT Press, Cambridge, MA.
- Brake, S., Iverson, D., Cheung, J. and Worthington, C. (2015). "2015 Reference Portfolio", "How We Invest" White Paper, July 2015, New Zealand Superannuation Fund, Auckland, NZ.
- Brinson, G., Hood, L. and Beebower, G. (1986). "Determinants of Portfolio Performance," *Financial Analysts Journal*, Vol. 42(4): 39-48.
- British Broadcasting Corporation. (2012). "Nigeria: 'Oil-gas sector mismanagement costs billions'", BBC News, online at: <http://www.bbc.com/news/world-africa-20081268>, October 25, 2012.
- Brunnschweiler, C. (2008). "Cursing the blessings? Natural resource abundance, institutions, and economic growth," *World Development*, Vol. 36(3): 399-419.
- Brunnschweiler, C. and Bulte, E. (2008). "The Resource Curse Revisited and Revised: A Tale of Paradoxes and Red Herrings," *Journal of Environmental Economics and Management*, Vol. 55(3): 248-264.

- Bruno, M. and Sachs, J. (1982). "Energy and Resources Allocation: A Dynamic Model of the 'Dutch Disease", *Review of Economic Studies*, Vol. 51: 845-859.
- Buchanan, J. (1975), "A Contractarian Paradigm for Applying Economic Theory," *American Economic Review*, Vol. 65(2): 225-230.
- Buchanan, J. (1984). "Politics Without Romance: A Sketch of Positive Public Choice Theory and Its Normative Implications," in *The Theory of Public Choice - II*, J. Buchanan and R. Tollison (eds). University of Michigan Press: Ann Arbor, Mich.
- Buchanan, J. (1987). "The Constitution of Economic Policy", *American Economic Review*, Vol. 77: 243-250.
- Buchanan, J. (2003). "Public Choice: Politics Without Romance," *Policy*, The Centre for Independent Studies, Spring 2003; Sydney, Australia.
- Buiter, W. and Purvis, D. (1981). "Oil, Disinflation, and Export Competitiveness: A Model of the 'Dutch Disease'," in J. Bhandari and B. Putnam (eds.), *The International Transmission of Economic Disturbances under Flexible Exchange Rates*, MIT Press: Cambridge, Mass.
- Bulte, E., Damania, R. and Deacon, R. (2005) "Resource Intensity, Institutions and Development," *World Development*, Vol 33 (7): 1029-1044.
- Canner, N., Mankiw, N. and Weil, D. "An Asset Allocation Puzzle." *American Economic Review*, March 1997, 87 (1), pp. 181-191.
- Carhart, M. (1997). "On Persistence in Mutual Fund Performance", *Journal of Finance*, Vol. 52 (1).
- Carmichael, J. and Palacios, R. (2003). "Managing Public Pension Funds: A Framework," paper presented at 2nd Public Pension Fund Management Conference. World Bank, Washington D.C., May 2003.
- Cecchetti, S. (1998). *Current Issues in Monetary Economics*, Wagner, H. (ed.), Physica-Verlag: Heidelberg, 1998, pp. 121-140.
- Chambers, D., Dimson, E. and Ilmanen, A. (2011). The Norway Model. Available at SSRN: <http://ssrn.com/abstract=1936806>
- Chang, H. (2006). "Understanding the Relationship between Institutions and Economic Development: Some Key Theoretical Issues," Working Paper Series DP2006/05, World Institute for Development Economic Research, UNU-WIDER.
- Chang, H. and Evans, P. (2005). 'The Role of Institutions in Economic Change', in G. Dymski and S. Da Paula (eds.), *Reimagining Growth*, Zed Press: London, UK.
- Chhaochharia, V. and Laeven, L. (2008). "Sovereign Wealth Funds: Their Investments Strategies and Performance", CEPR Working Paper, No. 6959.
- Clark, G. and Urwin, R. (2008). "Best-practice pension fund governance." *Journal of Asset Management*, Vol. 9(1): 2-21.
- Clark, G. and Monk, A. (2013). "The scope of financial institutions: in-sourcing, outsourcing and off-shoring," *Journal of Economic Geography*, Vol. 13(2): 279-298.

- Clay, K. and Wright, G. (2005). "Order Without Law: Property Rights During the California Gold Rush," *Explorations in Economic History*, Vol. 42 (April): 155-183.
- Coase, R. (1937). "The Nature of the Firm." *Economica*, Vol. 4 (16): 386-405.
- Coase, R. (1960). "The Problem of Social Cost," *Journal of Law and Economics*, Vol 3(1): 1-44.
- Cochrane, J. (1996). "A cross-sectional test of an investment-based asset pricing model," *Journal of Political Economy*, Vol. 104(3): 572-621.
- Cochrane, J. (1999a). "New Facts in Finance," *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 23 (3):6-58.
- Cochrane, J. (1999b). "Portfolio Advice for a Multifactor World," *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 23 (3).
- Cochrane, J. (2013). "Finance: Function Matters, Not Size," *Journal of Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 27(2): 97-108.
- Cocks, T. and Brock, J. (2012). "Nigeria's Okonjo-Iweala seeks reform without the godfathers," Reuters, September 12, 2012.
- Collier, P. (2007). *The Bottom Billion*, Oxford University Press, Oxford, UK.
- Collier, P. (2010). *The Plundered Planet*, Oxford University Press, Oxford, UK.
- Collier, P. (2012). "How to spend it," UNU WIDER, Working Paper No. 2012/05.
- Collier, P. and Goderis, B. (2007). "Commodity Prices, Growth, and the Natural Resource Curse: Reconciling a Conundrum," Centre for the Study of African Economies Working Paper Series, 274.
- Collier, P. and Hoeffler, A. (1998). "On Economic Causes of Civil War," *Oxford Economic Papers*, Vol. 50(4): 563-573.
- Collier, P. and Hoeffler, A. (2004). "Greed and Grievance in Civil War," *Oxford Economic Papers*, Vol. 56 (4): 563-595.
- Collier, P., Van Der Ploeg, F., Spence, M. and Venables, A. (2010). "Managing Resource Revenues in Developing Economies," *IMF Staff Papers*, Vol. 57(1): 84-118, April 2010.
- Corden, W. and Neary, J. (1982). "Booming Sector and De-industrialisation in a Small Open Economy," *The Economic Journal*, Vol. 92 (December): 825-848
- Corden, W. (1984). "Boom Sector and Dutch Disease Economics: Survey and Consolidation," *Oxford Economic Papers*, Vol. 36: 362.
- Cox, C. (2007). "The Rise of Sovereign Business," Gauer Distinguished Lecture in Law and Policy at the American Enterprise Institute Legal Center for the Public Interest by Chairman Christopher Cox, U.S. Securities and Exchange Commission, Washington, D.C., 5 December 2007.
- Cruijsen, C., Eijffinger, S. and Hoogduin, L. (2008). 'Optimal Central Bank Transparency', CEPR Discussion Paper 6889, London, UK.

- Cukierman, A. (2007). "The Limits of Transparency." CEPR Discussion Paper No. 6475, London, UK.
- David, P. (1985). "Clio and the Economics of QWERTY," *American Economic Review*, Vol. 75(2): 332-37.
- Das, U., Lu, Y., Mulder, C. and Sy, A. (2009). "Setting up a Sovereign Wealth Fund: Some Policy and Operational Considerations." IMF Working paper WP/09/179.
- Davis, J., Ossowski, R., Daniel, J. and Barnett, S. (2001). "Oil funds: problems posing as solutions?", *Finance & Development*, December 2001.
- Deaton, A. (1991). "Saving and liquidity constraints," *Econometrica*, Vol. 59 (5).
- Debrun, X. and Kumar, M. (2007). "Fiscal Rules, Fiscal Councils and All That: Commitment Devices, Signaling Tools or Smokescreens?" in *Fiscal Policy: Current Issues and Challenges*, Papers presented at the Banca d'Italia workshop held in Perugia, 29-31 March 2007: 479-512.
- De Haan, J., Amtenbrink, F. and Eijffinger, S. (1998). "Accountability of Central Banks: Aspects and Quantification," Discussion Paper 1998-54, Tilburg University, Center for Economic Research.
- DeLong, J. B., Shleifer, A., Summers, L. and Waldmann, R. (1990). "Noise trader risk in financial markets," *Journal of Political Economy*, Vol. 98: 703-738.
- DeLong, J. B. (2000). "The Triumph of Monetarism?," *Journal of Economic Perspectives*, Vol. 14: 83-94.
- Dincer, N. and Eichengreen, B. (2014). "Central Bank Transparency and Independence: Updates and New Measures," *International Journal of Central Banking*, International Journal of Central Banking, Vol. 10(1): 189-259.
- Drummond, H. (2016). "Raiding the Permanent Fund threatens Alaska's economy and future," *Alaska Dispatch News*, May 17, 2016.
- Du Plessis, S. (2003). *An institutional assessment of inflation targeting as a framework for monetary policy*, Dissertation presented for the degree of Doctor of Philosophy, University of Stellenbosch, December 2003.
- Dyck, A and Morse, A. (2011). "Sovereign Wealth Fund Portfolios," Chicago Booth Research Paper no. 11-15. <http://ssrn.com/abstract=1792850>.
- Easterly, W. (2005). "National Economic Policies and Economic Growth: A Reappraisal," in P. Aghion and S. Durlauf, (eds.), *Handbook of Economic Growth*, Edition 1(1), Chapter 15: 1015-1059, North-Holland: Amsterdam.
- Easterly, W. (2006). "Reliving the 50s: the Big Push, Poverty Traps, and Takeoffs in Economic Development," *Journal of Economic Growth*, Vol. 11(2): 289-318.
- Easterly, W. (2011). "Benevolent Autocracy," DRI Working Paper, New York University, No. 75, May 2011.
- Ehrmann, M. and Fratzscher, M. (2008). "Purdah. On the Rationale for Central Bank Silence Around Policy Meetings," ECB Working Paper No. 868.
- Eichengreen, B. and Hausmann, R. (2005). *Other People's Money: Debt Denomination and Financial Instability in Emerging Market Economies*, University of Chicago Press, Chicago, IL.

Ellis, C. (2013). *Winning the Loser's Game: Timeless Strategies for Successful Investing*, 6th edition, McGraw-Hill Education: New York, NY.

Engerman, S. and Sokoloff, K. (2000). "Institutions, Factor Endowments, and Paths of Development in the New World," *Journal of Economic Perspectives*. Vol. 14: 217-232.

Erten, B. and Ocampo, J. (2013). "Super Cycles of Commodity Prices Since the Mid-Nineteenth Century," *World Development*, Vol. 44(3): 14-30.

Fama, E. and French, K. (1993). "Common risk factors in the returns on stocks and bonds", *Journal of Financial Economics*, Vol. 33 (3).

Fama, E. and French, K. (1992). "The Cross-Section of Expected Stock Returns", *Journal of Finance*, Vol. 47 (2).

Farchy, J. (2015). "Kazakh central bank takes 10% stake in Kazmunaigas," *Financial Times*, July 29, 2015.

Farrell, D., Lund, S., Gerlemann, E. and Seeburger, P. (2007). "The New Power Brokers: How Oil, Asia, Hedge Funds, and Private Equity Are Shaping Global Capital Markets," McKinsey Global Institute, October 2007.

Faust, J. (1996). "Whom Can We Trust to Run the Fed? Theoretical Support for the Founders' Views," *Journal of Monetary Economics*, Vol. 37, 267-283.

Federal Republic of the Nigeria. (2011). "Nigeria Sovereign Investment Authority Act," *Federal Republic of Nigeria Official Gazette*, June 3, 2011.

Fernandes, N. (2009). "Sovereign Wealth Funds: Investment Choices and Implications around the World", International Institute for Management Development International Finance Working Paper No. 238/2009 (February 2009). Lausanne, Switzerland.

Fischer, S. (1995). "Central Bank Independence Revisited," *American Economic Review*, Vol. 85, 201-206.

Frankel, J. (2012). "The Natural Resource Curse: A Survey," in *Beyond the Resource Curse*, edited by Brenda Shaffer & Taleh Ziyadov, University of Pennsylvania Press, Philadelphia, PA.

Friedman, B. (2002). "The Use and Meaning of Words in Central Banking: Inflation Targeting, Credibility, and Transparency", NBER Working Papers No. 8972.

Friedman, M. (1953). *Essays in Positive Economics*, Part 1, The Methodology of Positive Economics, University of Chicago Press, Chicago, IL.

Friedman, M. (1957). *A Theory of the Consumption Function*, Princeton University Press.

Friedman, M. (1968). "The Role of Monetary Policy," *American Economic Review*, Vol. 58 (1): 1-17.

Fukuyama, F. (1989). "The End of History," *The National Interest*, Summer 1989.

Fukuyama, F. (2011). *The Origins of Political Order*. Farrar, Straus & Giroux: New York, NY.

Fukuyama, F. (2012). "China's 'Bad Emperor' Problem," *The American Interest*, 28 May 2012.

Fukuyama, F. (2014). *Political Order and Political Decay*. Farrar, Straus & Giroux: New York, NY.

- Gavin, M. (1993). "Adjusting to a Terms of Trade Shock: Nigeria 1972-88", in *Policymaking in the Open Economy*, Rudiger Dornbusch (ed.), Basil Blackwell: Oxford, UK.
- Gavin, M. and Perotti, R. (1997). "Fiscal Policy in Latin America". *NBER Macroeconomics Annual 1997*, Ben Bernanke and Julio Rotemberg (eds). MIT Press, Cambridge, MA.
- Gelb, A. (1988). *Oil Windfalls: Blessing or Curse?*, Oxford University Press (for the World Bank), New York, NY.
- Gelb, A., Eifert, B. and Tallroth, N. (2002). "The Political Economy of Fiscal Policy and Economic Management in Oil-Exporting Countries," World Bank Policy Research Working Paper 2899, October 2002, Washington, DC.
- Goodfriend, M. (2007). "How the World Achieved Consensus on Monetary Policy," *Journal of Economic Perspectives*, Vol. 21(4): 47-68.
- Government of Timor Leste (2015). "Millennium Development Goals - 2015," Ministry of Finance, Democratic Republic of Timor-Leste, Dili, Timor Leste.
- Glaeser, E., LaPorta, R., López-de-Silanes, F. and Shleifer, A. (2004). "Do Institutions Cause Growth?", *Journal of Economic Growth*, Vol. 9(3): 271-303.
- Graham, B. (1949). *The Intelligent Investor*, Harper & Brothers, New York, NY.
- Granovetter, M. (1985). "Economic Action and Social Structure: The Problem of Embeddedness," *American Journal of Sociology*, Vol. 91(3): 481-510.
- Habakkuk, H. (1962). *American and British Technology in the Nineteenth Century*. Cambridge University Press, Cambridge, MA.
- Hall, P. and Soskice, D. (2001). "Introduction", in P. Hall and D. Soskice (eds.), *Varieties of Capitalism: the Institutional Foundations of Comparative Advantage*, Oxford University Press: Oxford, UK.
- Hamilton, J. (2009). "Understanding Crude Oil Prices," *The Energy Journal*, Vol. 30(2): 179-206.
- Hartwick, J. (1977). "Intergenerational Equity and the Investment of Rents from Exhaustible Resources," *American Economic Review*, Vol. 67 (5): 972-74.
- Hausmann, R., Hidalgo, C., Bustos, S., Coscia, M., Chung, S., Jimenez, J., Simoes, A. and Yildirim, Y. (2011). *The Atlas of Economic Complexity*, Puritan Press, Cambridge, MA.
- Hausmann, R., Lora, E. and Lora, J. (2014). "A Spending Rule for the Oil Income", Report to the Government of Kazakhstan, January 2014. Unpublished memo, Kennedy School of Government, Harvard University, Cambridge, MA.
- Hausmann, R. and Rigobon, R. (2003) "An Alternative Interpretation of the 'Resource Curse': Theory and Policy Implications," in *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, Jeffrey Davis (ed.), International Monetary Fund: Washington, DC: 12-44.
- Hess, D. and Impavido, G. (2004). "Governance of Public Pension Funds: Lessons from Corporate Governance and International Evidence," in Musalem, A. & Palacios, R. (eds.). *Public Pension Fund Management*, pp. 49-89, The World Bank: Washington, D.C.

- Hirsch, P. and Lounsbury, M. (1996). "Rediscovering Volition: The Institutional Economics of Douglass C. North," *The Academy of Management Review*, Vol. 21(3): 872-884.
- Hirschman, A. (1958). *The Strategy of Economic Development*, Yale University Press, New Haven, CT.
- Hodler, R. (2006). "The Curse of Natural Resources in Fractionalised Countries", *European Economic Review*, Vol. 50: 1367-86.
- Hodgson, G. (1998). "The Approach of Institutional Economics," *Journal of Economic Literature*, Vol. 36: 166-192.
- Hotelling, H. (1931). "The Economics of Exhaustible Resources," *Journal of Political Economy*, Vol. 39 (2): 137-75.
- Humphreys, M. (2005). "Natural Resources, Conflict, and Conflict Resolution: Uncovering the Mechanisms," *Journal of Conflict Resolution*, Vol. 49(4): 508-537.
- Humphreys, M. and Sandbu, M. (2007). "The Political Economy of Natural Resource Funds," in Humphreys, M., Sachs, J. and Stiglitz, J. (eds.) *Escaping the Resource Curse*, Columbia University Press, New York, NY.
- Huntington, S. (1968). *Political Order in Changing Societies*, Yale University Press: New Haven, CT.
- Ibbotson, R. and Kaplan, P. (2000). "Does Asset Allocation Policy Explain 40, 90, or 100 Percent of Performance?", *Financial Analysts Journal*, Vol. 56, No. 1: 26-33.
- International Monetary Fund. (2014a). "Republic of Azerbaijan: 2014 Article IV Consultation-Staff Report," June 11, 2014, Washington D.C.
- International Monetary Fund. (2014b). "Saudi Arabia: 2014 Article IV Consultation-Staff Report," September 23, 2014, Washington D.C.
- International Monetary Fund. (2014c). "Timor Leste: 2014 Article IV Consultation," October 22, 2014, Washington D.C.
- International Monetary Fund. (2015). "The Commodities Roller Coaster: A Fiscal Framework for Uncertain Times," *Fiscal Monitor*, October 2015, Washington D.C.
- International Monetary Fund. (2016). "Nigeria: Selected Issues", IMF Country Report No. 16/102, April 2016, Washington D.C.
- International Working Group on Sovereign Wealth Funds. (2008). "Generally Accepted Principles and Practices ('Santiago Principles')", Santiago, Chile: October 2008.
- Iriekpen, D. (2016). "Sanusi Confirms Amaechi Leaked Letter on Missing \$49.8bn," ThisDay, online at: <http://www.thisdaylive.com/index.php/2016/05/05/sanusi-confirms-amaechi-leaked-letter-on-missing-49-8bn/>, May 5, 2016.
- Isham, J., Woolcock, M., Pritchett, L. and Busby, G. (2005). "The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth," *World Bank Economic Review*, Vol. 19(2): 141-174.
- Jacks, D., O'Rourke, K. and Williamson, J. (2011). "Commodity Price Volatility and World Market Integration since 1700," *The Review of Economics and Statistics*, Vol. 93(3): 800-813.

Jevons, W. (1865). *The Coal Question: an inquiry concerning the progress of the nation and the probable exhaustion of our coal mines*, London, UK.

Jory, S., Perry, M. and Hemphill, T. (2010) "The role of sovereign wealth funds in global financial intermediation," *Thunderbird International Business Review*, Vol 52: 589-604.

Kaminsky, G., Reinhart, C. and Vegh, C. (2005). "When It Rains, It Pours: Procylical Capital Flows and Macroeconomic Policies," *NBER Macroeconomics Annual*, Vol. 19: 11-82.

Karl, T., 1997. *The Paradox of Plenty: Oil Booms and Petro-States*, University of California Press: Berkeley, CA.

Kasper, W., Streit, M. and Boettke, P. (2012). *Institutional Economics: Property, Competition, Policies*, Edward Elgar: Cheltenham, UK.

Kaufmann, D., Kray, A. and Mastruzzi, M. (2004). "Governance Matters IV: Governance Indicators for 1996, 1998, 2000, and 2002," *World Bank Economic Review*, Vol. 18: 253-287.

Kimmitt, R. "Public Footprints in Private Markets," *Foreign Affairs*, Vol. 87 (January/February).

Kjaer, K. (2006). "From oil to equities," speech given at the Norwegian Polytechnic Society, 2 November 2006.

Knill, A., Lee, B. and Mauck, N. (2012). "Bilateral political relations and sovereign wealth fund investment," *Journal of Corporate Finance*, Vol. 18(1): 108-123.

Koelble, T. (1995), "The New Institutionalism in Political Science and Sociology," *Comparative Politics*, Vol. 27(2): 231-243.

Kopits, G. and Symansky, S. (1998). "Fiscal Rules", IMF Occasional Paper 162, International Monetary Fund, Washington, DC.

Krueger, A. (1974). "The Political Economy of the Rent-Seeking Society," *American Economic Review*, Vol. 64 (3): 291-303.

Krugman, P. (1987). "The narrow moving band, the Dutch disease, and the competitive consequences of Mrs. Thatcher: Notes on trade in the presence of dynamic scale economies," *Journal of Development Economics*, Vol. 27(1-2), pages 41-55.

Kydland, F. and Prescott, E. (1977). Rules Rather Than Discretion: The Inconsistency of Optimal Plans. *Journal of Political Economy* 85: 473-491.

Kyle, S. (2014). "Mineral Revenues and Countercyclical Macroeconomic Policy in Kazakhstan," Department of Applied Economics and Management Working Paper, No 180170, Cornell University, Ithaca, NY.

Lahn, G. and Stevens, P. (2011). "Burning Oil to Keep Cool: The Hidden Energy Crisis in Saudi Arabia," December 2011, The Royal Institute of International Affairs (Chatham House), London, UK.

Lakonishok, J., Shleifer, A. and Vishny, R. (1994). "Contrarian Investment, Extrapolation, and Risk," *Journal of Finance*, Vol. 49 (5): 1541-78.

Laurie, N. (2005) "The frightful inadequacy of most of the statistics: a critique of Collier and Hoeffer on causes of civil war," Crisis States Research Centre Discussion Papers, 11. Crisis States Research Centre, London School of Economics and Political Science, London, UK.

Leibowitz, M., Bova, L. and Hammond, P. (2010). *The Endowment Model of Investing: Return, Risk, and Diversification*, 1st edition (2010), Hoboken: NJ.

Lewis, A. (1954). "Economic Development with Unlimited Supplies of Labour," *Manchester School*, Vol. 22 (May): 139-191.

Lewis, A. (1955). *The Theory of Economic Growth*. Allen and Unwin: London.

Lintner, J. (1965). "The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets," *Review of Economics and Statistics*, Vol. 47(1), 13-37.

Lipset, S. (1960). *Political Man: The Social Bases of Politics*, Doubleday, New York.

Lucas, R. (1990). "Why doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review*, Vol 80(1): 92-96.

Lucas, R. and Sargent, T. (1979). "After Keynesian macroeconomics," *Quarterly Review*, Federal Reserve Bank of Minneapolis, Spring 1979.

Mahdavy, H. (1970). "The Patterns and Problems of Economic Development in Rentier States: The Case of Iran," in M.A. Cook (ed.), *Studies in the Economic History of the Middle East*, Oxford University Press: London.

Malkiel, B. (2013). "Asset Management Fees and the Growth of Finance," *Journal of Economic Perspectives*, Vol. 27(2): 97-108.

Mankiw, G. (1995). "The growth of nations," *Brookings Papers on Economic Activity*, 1995(1): 275-310.

Mankiw, G., Romer, D. and Weil, D. (1992). "A contribution to the empirics of economic growth," *Quarterly Journal of Economics*, Vol. 107(2): 407-437.

Markowitz, H. (1952). "Portfolio selection," *Journal of Finance*, Vol. 7(1): 77-91.

Marx, K. (1867 [1967]). *Das Kapital*. International Publishers: New York. N.Y.

Matthews, R. (1986). "The Economics of Institutions and the Sources of Economic Growth," *Economic Journal*, Vol. 96(4): 903-18.

Matsuyama, K. (1992). "Agricultural productivity, comparative advantage, and economic growth," *Journal of Economic Theory*, Vol. 58(2): 317-334.

Mauro, P. (1995). "Corruption and growth," *Quarterly Journal of Economics*, Vol. 90: 681-712.

McKechnie, A. (2013). "Managing natural resource revenues: The Timor-Leste Petroleum Fund," Overseas Development Institute, London, UK.

Medas, P. and Zakharova, D. (2009). "Primer on Fiscal Analysis in Oil-Producing Countries," IMF Working Paper WP/09/56.

- Megginson, W. and Fotak, V. (2015). "Rise of the Fiduciary State: A Survey of Sovereign Wealth Fund Research," *Journal of Economic Surveys*, Vol. 29(4): 733-778.
- Mehlum, H., Moene, K. and Torvik, R. (2006). "Institutions and the Resource Curse," *The Economic Journal*, Vol. 116: 1-20.
- Merton, R. (1969). "Lifetime portfolio selection under uncertainty: The continuous time case," *Review of Economics and Statistics*, Vol. 51:247-257.
- Mezzacappa, S. (2009). "The so-called 'Sovereign Wealth Funds': regulatory issues, financial stability and prudential supervision," *Economic Papers*, Vol. 378 (April 2009).
- Milesi-Ferretti, G. (2004). "Good, bad or ugly? On the effects of fiscal rules with creative accounting," *Journal of Public Economics*, Vol. 88, Issues 1-2, January 2004: 377-394.
- Mishkin, F. (2000). "What Should Central Banks Do?" *Federal Reserve Bank of St. Louis Review*, Vol. 82 (6): 1-13.
- Mishkin, F. and White, E. (2014). "The Federal Reserve System's Role in the Global Economy: An Historical Perspective", paper presented at the Federal Reserve Bank of Dallas, September 18-19, 2014.
- Mitchell, O. and Hsin, P. (1997). "Public Sector Pension Governance and Performance," in *The Economics of Pensions: Principles, Policies and International Experience*. Salvador Valdes Prieto (ed.). Cambridge University Press: Cambridge: 92-126.
- Modigliani, F. and Brumberg, R. (1954). "Utility analysis and the consumption function: an interpretation of cross-section data," in Kenneth K. Kurihara (ed.), *Post- Keynesian Economics*, Rutgers University Press. New Brunswick, NJ.
- Monk, A. (2009). "Recasting the Sovereign Wealth Fund debate: trust, legitimacy, and governance," *New Political Economy*, Vol. 14 (4): 451-468.
- Mossin, J. (1966). "Equilibrium in a Capital Asset Market," *Econometrica*, Vol. 34, No. 4, pp. 768-783.
- Murphy, R. and Clemens, J. (2013). "Reforming Alberta's Heritage Fund: Lessons from Alaska and Norway." Fraser Institute, Alberta Prosperity Initiative, Alberta, Canada.
- Nese, E. (2011). "Is Fiscal Policy Procylical in Developing Oil-Producing Countries?", IMF Working Paper WP/11/171, Washington, DC.
- New Zealand Superannuation Fund. (2014). "Investment Beliefs", October 2014, New Zealand Superannuation Fund, Auckland, NZ.
- New Zealand Superannuation Fund. (2015). *2015 Annual Report*, New Zealand Superannuation Fund, Auckland, NZ.
- New Zealand Super Fund. (2016). "Reference Portfolio", available online at: <https://www.nzsuperfund.co.nz/how-we-invest/reference-portfolio>
- Nofsinger, J. (1998). "Why Targetted Investing Does Not Make Sense." *Financial Management*, Vol. 27, 87 - 96.
- Nordhaus, W. (1975). "The Political Business Cycle," *Review of Economic Studies*, Vol. 42(1): 169-190.

Norges Bank Investment Management. (2012). *Annual Report: 2012*, Oslo, Norway.

Norman, C. (2009). "Rule of Law and the Resource Curse: Abundance Versus Intensity," *Environmental Resource Economics*, Vol. 43(2): 183-207.

North, D. (1981). *Structure and Change in Economic History*, Norton: New York, NY.

North, D. (1984). "Transaction Costs, Institutions, and Economic History", *Journal of Institutional and Theoretical Economics*, Vol. 140(1).

North, D. (1986). "The New Institutional Economics," *Journal of Institutional and Theoretical Economics*, Vol. 142: 230-237.

North, D. (1990). *Institutions, Institutional Change, and Economic Performance*. Cambridge University Press: Cambridge, UK.

North, D. (1991). "Institutions," *Journal of Economic Perspectives*, Vol. 5(1): 97-112.

North, D (1994). "The New Institutional Economics and Development," *Newsletter of the Economic Research Forum for the Arab Countries, Iran & Turkey*, Vol. 1(2).

North, D. (2005). *Understanding the Process of Economic Change*, Princeton University Press, Princeton, NJ.

North, D. and Thomas, R. (1973). *The Rise of the Western World: A New Economic History*, Cambridge University Press: Cambridge, UK.

Nurkse, R. (1961). *Problems of Capital Formation in Underdeveloped Countries*. Oxford University Press, New York, N.Y.

Olsen, O. (2012). Address by Governor Oystein Olsen to the Supervisory Council of Norges Bank and invited guests, February 16, 2012, Norges Bank, Oslo, Norway.

Organisation for Economic Cooperation and Development. (2012). "OECD Investment Policy Reviews: Kazakhstan 2012", OECD Publishing, April 202.

Ossowski, R., Villafuerte, M. Medas, P. and Thomas, T. (2008). "The Role of Fiscal Institutions in Managing the Oil Revenue Boom." IMF Occasional Paper 260, International Monetary Fund, Washington.

Parliament of the Republic of Ghana. (2011). "Petroleum Revenue Act," Act No. 815, Date of assent: April 11, 2011.

Pastor, L. and Stambaugh, R. (2003). "Liquidity risk and expected stock returns," *Journal of Political Economy*, Vol. 63(2): 642-685.

Persson, T, and Tabellini, G. (2004). "Constitutional Rules and Fiscal Policy Outcomes," *American Economic Review*, Vol. 94(1): 25-45.

Petek, G. (2015). "How Might the Oil Price Plunge Affect U.S. States' Credit Quality?", Standard & Poor's Ratings Services, January 27, 2015.

Pfaff, B. (2012). *Financial Risk Modelling and Portfolio Optimisation with R*, John Wiley & Sons., Chichester, UK.

- Popper, K. (1992). *The Logic of Scientific Discovery*, second edition, Routledge: London, UK.
- Prebisch, R. (1949 [1950]). "The Economic Development of Latin America and its Principal Problems," United Nations Economic Commission for Latin America (ECLA) conference, Havana, May 1949 (in Spanish); reprinted 1950 (in English), *Economic Bulletin for Latin America*, Vol. 7(1): 1- 22.
- Presbitero, A. (2016). "Too much and too fast? Public investment scaling-up and absorptive capacity," *Journal of Development Economics*, Vol. 120(1): 17-31.
- Przeworski, A. (1985). *Capitalism and Social Democracy*. Cambridge University Press: New York.
- Pritchett, L. (1997). "Divergence, Big Time," *Journal of Economic Perspectives*, Vol. 11(3): 3-17.
- Pritchett, L. (2000). "The tyranny of concepts: CUDIE (Cumulated, Depreciated, Investment Effort) is not capital", *Journal of Economic Growth*, Vol. 5(20): 361-384.
- Ramey, G. and Ramey, V. (1995). "Cross-country evidence on the link between volatility and growth," *American Economic Review*, Vol. 85(5): 1138-1151.
- Richards, C. (2015). "A Sound Fiscal Future: Recommendations for the Sustainable Utilisation and Management of Alaska's Financial Assets," Governor's Financial Opportunities Working Group, October 2015.
- Robinson, J., Acemoglu, D. and Johnson, S. (2003). "An African Success Story: Botswana," in *Search of Prosperity: Analytic Narratives on Economic Growth*, Dani Rodrik (ed), 80-119. Princeton University Press: Princeton, N.J.
- Robinson, J. and Torvik, R. (2005). "White Elephants," *Journal of Public Economics*, Vol. 89: 197-210.
- Robinson, J., Verdier, T., and Torvik, R. (2006). "Political Foundations of the Resource Curse," *Journal of Development Economics*, Vol. 79: 447-68.
- Rodrik, D. (1999). "Where Did All the Growth Go? External Shocks, Social Conflict and Growth Collapses," *Journal of Economic Growth*, Vol. 4(4): 385-412.
- Rodrik, D. (2000). "Institutions for High-Quality Growth: What They Are and How to Acquire Them," *Studies in Comparative International Development*, Vol. 35(3): 3-31.
- Rodrik, D. (2002). "Feasible Globalisations," NBER Working Paper, No. 9129, National Bureau of Economic Research, Inc.
- Rodrik, D. (2004). "Institutions and Economic Performance - Getting Institutions Right," *CESifo DICE Report*, Ifo Institute for Economic Research at the University of Munich, Vol. 2(2): 10-15.
- Rodrik, D. (2008). "Second-Best Institutions," *American Economic Review*, Vol. 98(2): 100-104.
- Rodrik, D., Subramanian A. and Trebbi, F. (2004). "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development," *Journal of Economic Growth*, Vol. 9(2): 131-65.
- Romano, R. (1993). "Public Pension Fund Activism in Corporate Governance Reconsidered," *Columbia Law Review*, Vol. 93: 795 - 853.
- Romer, C. and Romer, D. (2002). "The Evolution of Economic Understanding and Postwar Stabilisation Policy," in *Rethinking Stabilisation Policy*, Federal Reserve Bank of Kansas City, 11-87.

- Romer, D. (1993). "The New Keynesian Synthesis," *Journal of Economic Perspectives*, Vol. 7(1): 5-22.
- Rosenstein-Rodan, P. (1943). "Problems of Industrialisation of Eastern and South-Eastern Europe", *Economic Journal*, Vol. 53, No. 210/211: 202-11.
- Ross, M. (1999). "The Political Economy of the Resource Curse." *World Politics*, Vol. 51(1):297-322.
- Ross, M. (2001). "Does Oil Hinder Democracy?" *World Politics*, Vol. 53(3): 325-61.
- Ross, S. (1973). "The Economic Theory of Agency: The Principal's Problem," *American Economic Review*, Vol. 63(2): 134-39.
- Ross, S. (1976)."The Arbitrage Theory of Capital Asset Pricing," *Journal of Economic Theory*, Vol. 13: 341-360.
- Rostow, W. (1962). *The Stages of Economic Growth*. Cambridge University Press: London.
- Rozanov, A. (2005). "Who Holds the Wealth of Nations?", *Central Banking*, Vol. 15 (4).
- Sachs, J. (2005). *The End of Poverty: Economic Possibilities for Our Time*, Penguin Press: New York.
- Sachs, J. and Warner, A. (1995). "Natural Resource Abundance and Economic Growth." NBER Working Paper Series No. 5398, National Bureau of Economic Research.
- Sachs, J. and Warner, A. (1997). "Natural Resource Abundance and Economic Growth." Center for International Development and Harvard Institute for International Development, Harvard University, Cambridge, Mass.
- Sachs, J. and Warner, A. (1999). "The big push, natural resource booms and growth," *Journal of Development Economics*, Vol. 59(1): 43-76.
- Sachs, J. and Warner, A. (2001). "Natural Resources and Economic Development: The curse of natural resources," *European Economic Review*, Vol. 45: 827 - 838.
- Sala-i-Martin, X. (1997). "I just ran two million regressions," *American Economic Review*, Vol. 87 (2): 178-83.
- Sala-i-Martin, X. and Subramanian, A. (2003). "Addressing the Natural Resource Curse: An Illustration from Nigeria." IMF Working Paper WP/03/139.
- Samuelson, P.A. (1969). "Lifetime portfolio selection by dynamic stochastic programming," *Review of Economics and Statistics*, Vol. 51:239-246.
- Santiso, J. (2008). "Sovereign Development Funds: Key financial actors of the shifting wealth of nations," OECD Emerging Markets Network Working Paper, OECD: Paris.
- Sargent, T. and Wallace, N. (1975). "Rational Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule," *Journal of Political Economy*, Vol. 83, 241-254.
- Sarr, M., Bulte, E., Meissner, C. and Swanson, T. (2011). *Public Choice*, Vol. 148 (3): 353-380.
- Sarr, M. and Swanson, T. (2013). "Corruption and the Curse: The Dictator's Choice," Working Papers 2013.06, Fondazione Eni Enrico Mattei, Milan, Italy.

- Satyanath, S. and Subramanian, A. (2004). "What Determines Long-Run Macroeconomic Stability? Democratic Institutions," IMF Working Papers 04/215, International Monetary Fund, Washington, DC.
- Schmidt-Hebbel, K. (2012). "Fiscal Institutions in Resource-Rich Economies: Lessons from Chile and Norway." Working Paper 416, Pontifical Catholic University of Chile, Santiago, Chile.
- Sharpe, W. (1964). "Capital asset prices: A theory of market equilibrium under conditions of risk," *Journal of Finance*, Vol. 19 (3), 425-442
- Shiller, R. (1984). "Stock prices and social dynamics," *Brookings Papers on Economic Activity*, 457-498.
- Shiller, R. (1989). *Market Volatility*, MIT Press, Cambridge, MA.
- Shiller, R. (2000). *Irrational Exuberance*, Princeton University Press, Princeton, NJ.
- Shleifer, A. and Vishny, R. (1990). "Equilibrium short horizons of investors and firms," *American Economic Review*, Vol. 80: 148-153.
- Singer, H. (1950). "U.S. Foreign Investment in Underdeveloped Areas: The Distribution of Gains Between Investing and Borrowing Countries," *American Economic Review*, Vol. 40: 473-485.
- Smith, A. (1776 [1981]). *An Inquiry into the Nature and Causes of the Wealth of Nations*, R. H. Campbell, A. S. Skinner, and W. B. Todd (eds.), Liberty Fund: Indianapolis, Indiana.
- Smith, A. (1762-63[1982]). *Lectures on Jurisprudence*, R. L. Meek, D. D. Raphael and P. G. Stein (eds.), Liberty Fund: Indianapolis, Indiana.
- Smith, V. (2008). *Rationality in Economics: Constructivist and Ecological Forms*, Cambridge University Press: Cambridge, UK.
- Solow, R. (1974). "Intergenerational Equity and Exhaustible Resources," *Review of Economic Studies*, Vol. 41 (29).
- Stein, H. (1994). "Theories of Institutions and Economic Reform in Africa," *World Development*, Vol. 22(12): 889-904.
- Stein, E. and Stein, J. (1991). "Stock Price Distributions with Stochastic Volatility: An Analytic Approach," *The Review of Financial Studies*, Vol. 4(4).
- Sterling, C. (1991). "Can Dr. Amini Save Iran?" *The Reporter*, 17 August 1991.
- Stern, G. (1999). "The Use of Explicit Targets for Monetary Policy: Practical Experience of 91 Economies in the 1990s," *Bank of England Quarterly Bulletin*, 272-281.
- Stewart, F. and Yermo, J. (2008). "Pension Fund Governance: Challenges and Potential Solutions," OECD Working Papers on Insurance and Private Pensions No. 18, OECD Publishing, Paris, France.
- Stiglitz, J. (2012). "Sovereign wealth funds – distinguishing aspects and opportunities," in *Sovereign Wealth Funds and Long-Term Investing*, Bolton, P., Samama, F. and Stiglitz, J. (eds), Columbia University Press: New York.
- Summers, L. (2007). "Funds that Shake Capitalist Logic," *Financial Times*, 29 July 2007.

- Svensson, L. (1997). "Optimal Inflation Targets, 'Conservative' Central Banks, and Linear Inflation Contracts," *American Economic Review*, Vol. 87(1): 98-114.
- Svensson, L. (2003). "Inflation Targeting: Should It Be Modelled as an Instrument Rule or a Targeting Rule?", *European Economic Review*, Vol. 46: 771-780.
- Svensson, L. (2003). "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules," *Journal of Economic Literature* 41: 426-477.
- Swensen, D. (2000). *Pioneering Portfolio Management: An Unconventional Approach to Institutional Investment*, Free Press: New York, NY.
- Talvi, E. and Vegh, C. (2005). "Tax base variability and procyclical fiscal policy in developing countries," *Journal of Development Economics*, Vol. 78 (1): 156- 190.
- Taylor, J.B. (1997). "A Core of Practical Macroeconomics," *American Economic Review*, Vol. 87: 233-235.
- Taylor, J.B. (2010). "Does the Crisis Experience Call for a New Paradigm in Monetary Policy?" CASE Network Studies and Analyses No. 402.
- The Economist. (1977). "The Dutch Disease", *The Economist*, 26 November 1977: 82-83.
- Tobin, J. (1974). "What is Permanent Endowment Income," *American Economic Review*, Vol. 64(2), May: 427-32.
- Torvik, R. (2002). "Natural Resources, Rent Seeking and Welfare", *Journal of Development Economics*, Vol. 67: 455-70.
- Torvik, R. (2009). "Why do some resource-abundant countries succeed while others do not?", *Oxford Review of Economic Policy*, Vol. 25 (2): 241-256.
- Torvik, R. (2012). "The Political Economy of Reform in Resource-Rich Countries", in Arezki, R., Gylfason T. and Sy, A. (eds.), *Beyond the Curse: Policies to Harness the Power of Natural Resources*, International Monetary Fund, Washington, D.C.
- Tornell, A. and Lane, P. (1999). 'The Voracity Effect', *American Economic Review*, Vol. 89(1): 22-46.
- Treynor, J. (1961). "Market Value, Time, and Risk." Unpublished manuscript.
- Truman, E. (2008), "A Blueprint for Sovereign Wealth Fund Best Practices," Peterson Institute for International Economics, Policy Brief 8-3, Washington, DC.
- Truman, E. (2010). *Sovereign Wealth Funds: Threat or Salvation?*, Peterson Institute for International Economics, Washington, D.C.
- Tullock, G. (1967). "The Welfare Costs of Tariffs, Monopolies and Theft." *Western Economic Journal*, Vol. 5: 224- 232.
- United States Department of Labour (1994). "Interpretive Bulletin 94-1", June 28, 1994, Washington, DC.
- Useem, M. and Hess, D. (2001). "Governance and Investments of Public Pensions," in Mitchell, O. and Hustead, E. (eds.), *Pensions in the Public Sector*, pp. 132-152. University of Pennsylvania Press: Philadelphia, PA.

- Useem, M. and Mitchell, O. (2000). "Holders of the Purse Strings: Governance and Performance of Public Retirement Systems," *Social Science Quarterly*, Vol. 81 (2): 489-506.
- Van der Ploeg, F. (2008). "Challenges and Opportunities for Resource Rich Economies," OxCarre Research Paper 2008-05, Oxford, UK.
- Van der Ploeg, R. and Poelhekke, S. (2009). "The Volatility Curse: Revisiting the Paradox of Plenty," DNB Working Papers 206, Netherlands Central Bank, Research Department, Amsterdam, NL.
- Van Wijnbergen, S. (1981). "Optimal Investment and Exchange Rate Management in Oil Exporting Countries: A Normative Analysis of the Dutch Disease," mimeo, Development Research Center, World Bank, Washington, DC.
- Van Wijnbergen, S. (1984a). "Inflation, Employment, and the Dutch Disease in Oil-Exporting Countries: A Short-Run Disequilibrium Analysis," *The Quarterly Journal of Economics*, Vol. 99(2): 233-50.
- Van Wijnbergen, S. (1984b). "The 'Dutch Disease': A Disease After All?" *The Economic Journal*, Vol. 94.
- Venables, A. (2010). "Resource rents; when to spend and how to save," *International Tax and Public Finance*, Vol. 17 (4): 340-356.
- Verma, S. (2012). "China's CIC quashes Europe bailout talk. Again.", *Emergingmarkets.org*, published online on 13 February 2012 at www.emergingmarkets.org/Article/2978172/Chinas-CIC-quashes-Europe-bailout-talk-Again.html, Accessed 12 January 2013.
- Walker, B. (2016). "Costs of delaying Alaska's fiscal fix are too great," *Alaska Dispatch News*, May 14, 2016.
- Walsh, C. (1995). "Optimal Contracts for Central Bankers," *American Economic Review*, Vol. 85: 150-167.
- Wantchekon, L. (2002). "Why do Resource Dependent Countries Have Authoritarian Governments?" *Journal of African Finance and Economic Development*, Vol. 2(1): 57-77.
- Warrack, A. (2008). "Whither a Heritage Fund Public Dividend Policy?", *Alaska Permanent Fund Corporation Trustees' Papers*, Vol. 8 (2008).
- Warren, G. and Pearson, F. (1933). *Prices*. John Wiley & Sons: New York, N.Y.
- Weimer, D. (1995). *Institutional Design*, Kluwer: Norwell, MA.
- Weingast, B. (1995). "The Economic Role of Political Institutions." *The Journal of Law, Economics, and Organisation*, Vol. 11(1): 1-31.
- Weingast, B. (1997). "The Political Foundations of Democracy and the Rule of Law," *American Political Science Review*, Vol. 91: 245-63.
- Williamson, O. (1975). *Markets and Hierarchies, Analysis and Antitrust Implications: A Study in the Economics of Internal Organisation*, Free Press: New York, NY.
- Williamson, O. (1979). "Transaction Cost Economics: The Governance of Contractual Relations," *Journal of Law and Economics*, Vol. 22(2): 233-61.
- Williamson, O. (1985). *The Economic Institutions of Capitalism*, Free Press: New York, NY.

- Williamson, O. (1990). "A Comparison of Alternative Approaches to Economic Organisation," *Journal of Institutional and Theoretical Economics*, Vol. 146(1): 61-71.
- Williamson, O. (1996). *The Mechanisms of Governance*, Oxford University Press: New York, NY.
- World Bank. (2011). "Azerbaijan Demographic Change Implications for Social Policy and Poverty," Human Development Sector Unit, Report No. 63155-AZ, 29 July 2011.
- World Trade Organisation. (2010). *World Trade Report: Trade in natural resources*, 2010, Geneva.
- Wright, C. (2012). "Middle East: The shadowy world of Gulf sovereign wealth," *Euromoney*, November 2012.
- Wright, G. (1990). "The Origins of American Industrial Success, 1879-1940." *American Economic Review*, Vol. 80: 651-68.
- Wright, G. and Czelusta, J. (2004). "The Myth of the Resource Curse", *Challenge*, Vol. 47, March-April.
- Wright, G. and Czelusta, J. (2007). "Resource-Based Growth Past and Present," in Lederman, D. and Maloney, W. (eds.), *Natural Resources: Neither Curse nor Destiny*, Stanford University Press: 183-211.
- Wolf, M. (2007). "The Brave New World of State Capitalism," *Financial Times*, 16 October 2007.
- Woodford. (2002). *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton: Princeton University Press.
- Zawalsky, M. (2012). "Interview with Mark Wiseman," Ivey Business Review, Ivey Business School, Western University, London, Ontario, December 2012.
- Zhang, L. (2005). "The value premium," *Journal of Finance*, Vol. 60(1): 67-104.