The Private Credit Market of the Cape Colony, 1673-1834: Wealth, property rights, and social networks

by

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Declaration of Authorship

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Abstract

A well-developed financial sector is important for economic development. Historical evidence has shown financial transactions have been around for more than 5 000 years. This research into historical financial markets often shows that, contrary to popular belief, these markets were a sign of prosperity, rather than of struggling growth and poverty. Yet, only scattered evidence exists on the historical financial market of South Africa. This is the main aim of this dissertation: to investigate the historical financial market of the Cape Colony, specifically the private credit market. The main database used for the research is the probate inventories, also known as the MOOC 8 series. These inventories listed all the assets of the individual, as well as their debts and credits. The second chapter is focused on the descriptive statistics and characteristics of borrowers at the Cape and looks at various historical results to be tested using the complete series. The first research question is focused on describing the market and investigates previous historical claims in light of recent international literature. Conclusions from this chapter are that the role of the Company (the government at the time), church and Orphan Chamber has been greatly overestimated. Also, rather than borrowing for survival, debt was made for productive investment, specifically land purchases. The strongest characteristic of borrowers at the Cape was wealth. The richest thus had more debt than their poor counterparts.

The long period over which these probate inventories were captured presents an opportunity to study intergenerational wealth mobility at the Cape for this pre-industrial period. Literature on intergenerational wealth in developing regions and their history is scarce due to data limitations. But this dissertation gives new insight into this literature. For this early period of development, high wealth mobility (measured through land, slaves, and debt) existed at the Cape, disputing claims that development at the Cape was limited to an elite few. It is also contrary to the assertion by historians that the system of partible inheritance were detrimental to development.

Another aspect important for private credit transactions is the social network an individual formed part of. Two separate chapters look at the role of social networks and trading on credit, with specific reference to homophily and centralities. By using network analysis, the basic human interactions which determine not only development but also the formation of institutions can be studied. The centrality measures show that wealth had little influence on an individual's position in the network and that central families tended to stay central for much longer than individuals. There was also a central role for the three main institutions in connecting individuals into the larger network. Modern literature suggests that people bind together in groups with

similar backgrounds – known as homophily. With this long series, I test how long it takes for integration between groups to take place. High levels of homophily, i.e. trading with someone from a similar European background, continue throughout the first century. The high level of homophily observed in the Cape's private credit network can be explained by the increase in familial trading, rather than wealth. This remains an unexploited research methodology in economic history.

The final research question is to investigate the role of property rights in determining debt at the Cape. The second chapter concludes that overall wealth was strongly correlated with debt at the Cape, yet theory and the historiography suggest land was still important for debt. The aim of the sixth chapter is to investigate this using an instrumental variable approach. The two main systems of property ownership at the Cape were freehold farms and loan farms. Between these two systems existed distinct *de jure* and *de facto* property rights: freehold farms had both secure and well-defined *de jure* and *de facto* property rights, while the loan farms had less secure *de jure* property rights, but secure *de facto* property rights were enforced by settlers. I exploited this difference and used an instrumental variable of being the eldest son to test the assumption. The eldest son was more likely to own a freehold farm than sons born later, but no differences in debt exist between the two groups. The results suggest settlers relied more on *de facto* property rights, i.e. the perceived rights and how rights were used, rather than *de jure* property rights, i.e. formal laws defensible in court.

Opsomming

'n Goed ontwikkelde finansiële sektor is belangrik vir ekonomiese ontwikkeling. Historiese bewysstukke stel ook voor dat finansiële transaksies alreeds vir 5 000 jaar uitgevoer word. Navorsing oor historiese finansiële markte toon dat die bestaan van 'n kredietmark eerder 'n teken van 'n welvarende ekonomie as 'n teken van armsaligheid en stagnerende groei was. Ondanks die groeiende literatuur is daar steeds nie sistematiese navorsing oor die historiese finansiële markte van Suid-Afrika nie. Dit is die doel van hierdie verhandeling: om die historiese finansiële mark van die Kaapkolonie te ondersoek, spesifiek die private kredietmark. Die databasis wat gebruik is vir die navorsing is die boedelinventarisse, ook bekend as die MOOC 8-reeks. Hierdie inventarisse is 'n samestelling van alle bates van die individu, sowel as die skuld wat aan en deur hulle onderskeidelik geskuld is. Die tweede hoofstuk is gefokus op die beskrywende statistieke en eienskappe van skuldenaars aan die Kaap en toets verskeie kenmerke van die mark. Dit is die eerste navorsing wat die hele inventaris-reeks gebruik om die finansiële markte te ondersoek. Die hoofresultate van die hoofstuk was dat die rol van die VOC (die owerheid aan die Kaap), kerk en Weeskamer se rol grootliks oordryf is deur historici. Ook, eerder as wat skuld gemaak was vir oorlewing, was skuld gebruik vir produktiewe beleggings, veral in plase. Die sterkste kenmerk van skuldenaars was rykdom. Die rykste mense aan die Kaap het dus die meeste skuld gehad.

Die lang periode waaroor hierdie inventarisse opgeneem is bied die geleentheid om intergeneratiewe rykdomsmobiliteit aan die Kaap vir die pre-industriële era te ondersoek. Literatuur oor intergeneratiewe rykdomsmobiliteit in ontwikkelende areas en hulle geskiedenis is skaars as gevolg van databeperkinge en -tekorte. Hierdie verhandeling gee nuwe insigte op hierdie literatuur. Die resultate wys dat hoë ryksdomsmobiliteit (gemeet deur aantal plase, slawe en skuld) bestaan het in die Kaap vir die vroeë koloniale periode en betwis vorige bewyse van swak ontwikkeling aan die Kaap. Die hoë rykdomsmobiliteit bied ook teenbewyse dat die stelsel van verdeelbare erfenis nadelig was vir ontwikkeling vir almal behalwe die elite.

Nog 'n aspek wat belangrik was om toegang tot privaat krediettransaksies te kry was sosiale netwerke. Twee hoofstukke ondersoek die rol van sosiale netwerke en handel op krediet ondersoek, spesifiek homofilie en sentraliteit. Deur gebruik te maak van netwerkanalises kan basiese menslike interaksie beskryf word, wat kan bydra tot hoe instansies in 'n ekonomie ontwikkel. Die sentraliteitsmaatstawwe toon dat rykdom nie 'n invloed op 'n individu se posisie in die netwerk gehad het nie en dat sentrale families langer sentraal gebly het as individue. Die moderne

literatuur stel voor dat individue en groepe met dieselfde agtergrondeienskappe neig om meer met mekaar te handel. Die lang tydperk waaroor die inventarisse bestaan kan gebruik word om te toets hoe lank dit neem vir groepe om met mekaar te integreer. Daar word gesien dat hoë vlakke van homofilie bly bestaan in die eerste eeu van ontwikkeling aan die Kaap. Dit wil sê groepe met dieselfde agtergrond bly handel dryf met mekaar. Die hoë vlakke van homofilie in die Kaap se privaat kredietmark se netwerk kan verduidelik word deur 'n toename in familiehandel eerder as rykdom. Hierdie metodologie bly 'n onontginde area binne ekonomiese geskiedenis.

Die laaste navorsingsvraag het ondersoek ingestel na die rol van eiendomsreg aan die Kaap en die effek daarvan op skuld. Eiendom is 'n belangrike bate en inset in produksie, en die teorie voorspel dat grondeienaarskap belangrik is vir skuld. Die artikel het 'n instrumentele veranderlike te gebruik om die hipotese te toets. Daar was twee hoofstelsels waarop grond geëis en besit kon word aan die Kaap: vryplase en leenplase. Tussen hierdie twee stelsels bestaan verskillende *de jure* en *de facto* eiedomsregte. Vryplase het versekerde en gedefinieerde *de jure* en *de facto* eiendomsreg gehad, terwyl leenplase se *de jure* regte nie verseker was nie, maar wel versekerde *de facto* regte gehad het wat deur setlaars toegepas is. Deur gebruik te maak van die eksogene verskil in geboorte-orde, gebruik ek die oudste seun as 'n instrument. Die oudste seun was meer geneig om 'n vryplaas te besit/erf as sy jonger broers, maar daar bestaan nie 'n verskil in skuldvlakke tussen die twee groepe nie. Die resultate bevestig dat die setlaars *de facto* eiedomsreg in ag geneem het wanneer skuldtransaksies oorweeg is, eerder as *de jure* regte. Dit wil sê die regte soos ondersteun deur die setlaars en wat waargeneem word in die gemeenskap, eerder as die regte soos gedefinieer in die wet.

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Soli Deo Gloria!

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Abbreviations

BCE	**B**efore **C**ommon **E**ra
DRC	**D**utch **R**eformed **C**hurch
GDP	**G**ross **D**omestic **P**roduct
MOOC	**M**aster **O**f **O**rphan **C**hamber
rds	Rijksdaalder
SAF	**S**outh **A**frican **F**amily **R**egisters
VOC	**V**ereenigde **O**ost-Indische **C**ompagnie

Chapter 1

Introduction

1.1 Financial markets today and their history

Financial market development and economic growth are related. De Gregorio and Guidotti (1995:445) found a positive causal link between financial market development and economic growth, but warns that the relationship varies across time and countries. Despite the two being related, there is no consensus on the direction of causality. Due to this lack of consensus, two competing hypotheses have been put forward: the supply-leading hypothesis and the demand-following hypothesis. The supply-leading hypothesis states that causality runs from financial development to economic growth; the demand-following hypothesis states the opposite (Patrick, 1966). One study to test these hypotheses found that the demand-following hypothesis is supported in industrial countries, while the supply-leading hypothesis is supported in developing countries (Calderón and Liu, 2003). This suggests that in industrial countries the supply of financial services is important for growth, while in developing countries the demand for these financial services is important. Merton and Bodie (1995:4) suggest another methodology: a functional or an institutional approach. The functional approach studies financial functions in a market, such as money as the medium of exchange, and has found these financial functions are more stable over time. The institutional approach investigates innovation and competition among financial institutions, like banks or stock exchanges, and whether this leads to greater efficiency in the entire market.

A key limitation of studies on financial development is the focus on formal financial services

offered by banks. In developing countries, informal financial services, outside the formal intermediation of banks, also play an important role. Informal financial markets often revolve around microcredit, where loans are obtained with no or little collateral. Microcredit institutions are successful in solving asymmetric information with regard to the collateral of the poor, which banks or formal financial institutions are unable to do. The prime example of a microcredit institution is the Grameen Bank. Established in 1983 in Bangladesh, it provides small loans to farmers and requires timely repayment to continue a relationship with the bank (Khandker et al., 1995). With this new source of credit and capital, the poor are able to survive or support productive enterprises (Van Bastelaer, 2000).

This contemporary evidence suggests that access to financial services and markets is important for economic development. But both these markets, formal and informal, have their roots in history. In fact, trading took place long before the monetary exchange system of today existed. This is mainly known as bartering, but recent research has revealed that many of these exchanges were much more sophisticated than simply trading one good for another. Some of the earliest credit transactions can be traced to 3000 BCE in Mesopotamia, where farmers traded on credit due to seasonal differences. In this society, barley and silver served as medium of exchange (Merton and Bodie, 1995:5). The phenomenon where trading happens in the absence of money is described in more detail by Gelderblom and Jonker (2015), who call the medium of exchange 'ghost money', a measure of settlement which can either substitute or complement coin, or currency.

Formal financial institutions' roots are found in twelfth century Venice, Italy, with Genoese bankers. These banks took deposits and made loans to princes, merchants and towns. In medieval Florence, the Medici family became famous bankers, consolidating financial power with social standing. Ferguson (2008a) suggests their rise was due to 'meticulous bookkeeping' and diversification rather than the size of their enterprise. Pagett and Ansell (1993) also show that the Medicis' position in the network of wealthy families was more important than their level of wealth. The Netherlands, England, the United States and Japan often form the epicenter of studies on financial institutions due to their well-developed financial systems today and throughout history (Rosseau, 2002).

But research has also emerged on private credit transactions between individuals throughout history. Much of this research has been focused on Europe and some of the New World colonies of the United States. Lack of currency was often a reason why informal credit transactions

were pervasive in these societies. Although the common belief was that this led to poverty, it was in fact a source of income and wealth. Chapter 2 looks at this literature in detail and at the effects of these credit transactions on the economy throughout history.

In this introduction, I focus on the environment in which many of these developments took place. The sixteenth, seventeenth and eighteenth centuries witnessed great change in Europe with colonisation spreading new ideas, settlements and technology. The next section provides a brief European history of these centuries with a specific focus on the development of financial markets.

1.2 Europe in the early modern period: Great change and new possibilities

There are four major 'events' that shaped the modern era in Europe which I focus on here: explorations of the Americas and the markets of the East, the Protestant Reformation and its consequent 'Protestant work ethic', the Glorious Revolution and the Industrial Revolution. These 'events' had significant influences on the long-term economic development of European nations and the nations colonised by them. This section briefly sketches these 'events' and their economic outcomes, although not all of these had direct effects on financial markets.

The Industrial Revolution was a turning point in economic development and production. In Britain during the eighteenth century, a new mode of production was developed – the factory. The rapid increase in the volume of goods produced also slowly resulted in an increase in income per capita (Landes, 1998:200). From the British islands, it spread to Europe and America and the divide in income and economic development created by the Industrial Revolution still persists today. Allen (2009) suggests the reason for industrial take-off in Britain rather than another region was the combination of low energy costs and high wages. He also agrees that the Low Countries were similarly successful in moving to industrial production. Mokyr (2002:29) suggests a large role for the Enlightenment Era or Scientific Revolution as a cause for the Industrial Revolution. He writes that 'the true key to the timing of the Industrial Revolution has to be sought in the scientific revolution of the seventeenth century.'

De Vries (1994:257) proposes an 'Industrious Revolution' was needed to promote the Industrial Revolution. He suggests that the 'Industrious Revolution' reallocated the productive resources of households 'from direct consumption to marketed goods.' Van Nederveen Meerkerk (2008) and Allen and Weisdorf (2011) show support for this hypothesis in the Netherlands and Britain, but both caution as the distinction between urban and farm workers is important in identifying this 'Industrious Revolution'.

The contribution of financial markets to of the Industrial Revolution is somewhat counter-intuitive. The cost of capital and demand for finance were low during the initial period in Britain (Kindleberger, 1984:193). An example of the low cost of capital is the spinning jenny (Allen, 2002). He shows how the spinning jenny, a relatively simple technology and low-cost capital input, contributed to the Industrial Revolution. However, as Europe tried to catch up to Britain, the need for finance increased. Landes (1998:260) offers four places where the European elite and population would get the finance to industrialise: personal investment; financial intermediaries and private credit; government assistance and international capital flows. As shown later in this dissertation, the contribution of private credit has been underestimated until recently. In fact, private credit happened so regularly during this period that Muldrew (1998) calls it the 'economy of obligation'.

Landes (1998:217) suggests political and social institutions had a significant effect on why the Industrial Revolution took place in Britain. This includes property rights (which stimulated saving and investment), enforcement of contracts, and a stable and responsive government. But many of these have their roots in another historical event – the Glorious Revolution (1688/1689). The Glorious Revolution was a set of changes to the English Constitution which would include secure property rights, as well as private property rights (North and Weingast, 1989). North and Weingast (1989:819) contend that the Glorious Revolution led to the English financial revolution because the Crown could no longer manipulate repayments and ultimately, it decreased interest rates. Secure private property rights also led to a growth in private credit markets in England (Quinn, 2001).

But Britain was not unique in its financial revolution. In fact, William of Orange introduced many of the financial instruments and institutions from Dutch markets to the English markets after the Glorious Revolution. The Dutch colonial expansion, which had formally begun with the establishment of the VOC in 1602, required more capital for the merchants who brought goods from Asia. Gelderblom and Jonker (2004) show a similar decline in interest rates in the

seventeenth-century Netherlands. Instead of government bonds providing the secondary market, in the Netherlands, the VOC shares created this market and gave rise to the Amsterdam securities market. Ferguson (2008a:75–76) writes that the new financial innovation found in the Amsterdam market was the key to the Dutch's continued fight for independence, but that the combination of increased debt via these securities and decreasing interest rates meant capital was abundant in the United Provinces, and that default was unlikely. Gelderblom and Jonker (2011) postulate that to successfully complete a financial revolution, the credible commitment of North and Weingast (1989) is a necessary condition, but not sufficient. The 'vital ingredient' is private savings. They state that '...[u]nless such institutions coincided with growing riches, unless they enabled the authorities to tap private wealth efficiently and timely, they achieved little or nothing' (Gelderblom and Jonker, 2011:666).

What was the source of such private saving? The Dutch and English had another aspect in common – a Protestant faith. The Protestant Reformation started in the mid-sixteenth century, with Martin Luther advocating against the moral decay of the Holy Roman Catholic Church. The Reformation had as many economic outcomes as it did theological. The first of these economic outcomes was an increase in human capital and educational attainment. The literacy rates in Protestant regions increased with schooling so that 'all Christians [could] read the Gospel by themselves' (Becker and Woessmann, 2009:531). These literacy effects were still present in 1816 Prussia, almost three centuries after the start of the Reformation (Becker and Woessmann, 2010).

In Max Weber's *The Protestant Ethic and the Spirit of Capitalism*, Weber focuses on the Calvinist branches of Protestantism (Landes, 1998:174). The Protestant regions of Germany, the Netherlands and also Switzerland and Britain, differed in work ethic to their Catholic counterparts. The Protestant faith placed a higher value on work over leisure, which is often associated with more wealth and pro-capitalist values (Hayward and Kemmelmeier, 2011). Basten and Betz (2013:89) provide empirical support for the 'Protestant work ethic' in Switzerland, where Protestant regions have later retirement and higher incomes today. However, the relationship between economic growth and Protestantism offer differing results. Cantoni (2015) found no effect of Protestantism on economic growth in Germany, and Blum and Dudley (2001) found the effect of Protestantism on economic growth was through information networks. Arruñada (2010) argues the difference between Protestant and Catholic regions was due to a 'social ethic' where Protestants supported institutions more, were less bound to close friends and family and

held homogenous values.

But the Reformation also had an effect on savings and private credit transactions and trading. Muldrew (1998:132) writes: 'Protestant theology's emphasis on faith was mirrored by an increasing emphasis on trust within everyday social relations. As the number of broken obligations grew, the development of the theology of the covenant of grace introduced a metaphor as applicable to the ethics of moral economic exchange within the more active credit based market...' This transference to trust in society also meant that the trustworthiness of the individual or household became key in securing wealth through secure debt relations.

The church, Protestant and Catholic, was also involved in the credit market, not only as a creditor and source of credit, but also through the laws it enacted. Through usury laws, the church prohibited the charging of interest above 5% on loans. If the interest rate is fixed, capital markets will adjust to the risk of credit through another channel, like the use of more collateral (Hoffman et al., 2000) and the exclusion of the poor from the French credit market. In other cases, the market's depth was adjusted (Van Zanden and De Moor, 2012). But control of the market opened opportunities for 'outsiders' like Jewish lenders in medieval Italy who were not compelled by the church to conform to these usury laws (Botticini, 2000).

From the sixteenth century, missionary work also expanded and many believers were sent to the four corners of the world to spread their respective religions. Before the Dutch dominated trade across the oceans, the Portuguese and Spanish had large empires of their own. Christopher Columbus (1451–1506) was commissioned by the Spanish crown to explore and discover new routes to India. Instead of finding a new route to India, he arrived in the Americas. This 'discovery' led to the permanent settlement of European colonies on the east coast of what today is the United States and Canada. Similarly, it was Vasco Da Gama (1460–1524) who first reached India by ocean. India was especially important for European traders in search of spices, while the Far East, like China and Japan, became important for its silk. The route found by him would later come to dominate world trade, with colonies settled all along it by different European powers, including at the southern tip of Africa, then known as the Cape of Good Hope (Israel, 1995:938).

The Spanish and Portugese did not continue to dominate world trade in the seventeenth century. Toward the end of the sixteenth century, the Dutch became a new power in world trade.

In 1602, the Dutch East India Company (VOC or the Company hereafter) was established by the States General in the Netherlands. The Company resembled a modern-day company with tradable shares and a split between management and ownership. However, Gelderblom et al. (2013) and Gelderblom and Jonker (2015) argue it had three additional features: permanent capital, limited legal liability for its directors, and legal personhood. The combination of these features fortified the Company's position in its formative years. The Company was granted a monopoly for trade with Asia from the States General, and from the outset the Company was determined to become a dominant player in world trade. Their first true success came after taking control over the Indonesian spice islands from the Portuguese in 1605. To protect this trade, the Dutch made settlements along this route (Israel, 1995:322) and by 1624 the European settlement in Batavia stood at 8 000. The initial period for the Company was particularly successful, with the Amsterdam stock exchange valuing the shares at five times the par value, while profits later became more modest (De Vries and Van Der Woude, 1997:463).

The Company, with its monopoly on trade from the far East, played a crucial role in the establishment of the Dutch Empire. The Company, however, was not the only aspect of the Dutch economy that made it a powerful economy during the seventeenth century. Another institution that would make a contribution to the Dutch economy, the Amsterdam Exchange Bank (*Wisselbank*), was established in 1609. The motivation for the creation of this bank was the vast number of foreign currencies floating in the Dutch economy (Quinn and Roberds, 2009:33). The bank made more commercial trade possible; Quinn and Roberds (2009:65) put the daily trading of the Exchange Bank at ten to twelve million florins per day. With the introduction of receipts in 1683, the Exchange Bank became the template of modern central banks (Quinn and Roberds, 2009).

The Dutch invented another financial institution during the seventeenth century – the first modern stock market. With the establishment of the Company and its structure based on shares, a market to transfer these shares from one person to another was needed. As early as 1607, only five years after the Company was granted its charter, traders began to trade share derivatives on the Amsterdam Stock Exchange (*Beurs*). These included forwards, options and repos (Petram, 2011:20). This was alongside the commodities exchange. Petram (2011:59) shows how in the 1630s and 1640s the market moved from trading Company shares to a complete financial market, 'characterized by a high level of market activity and a growing share of speculative transactions with short-term investment horizons'.

During this Golden Age of the Dutch economy, it was not only foreign trade that created this thriving economy. The wider economy, especially the rural parts, was supported by secure property rights. These rights allowed agriculture and fishing to flourish (De Vries and Van Der Woude, 1997:161), while it also allowed average households to take part in financial transactions (Van Zanden and De Moor, 2012). The Thirty Years' War and other religious prosecution taking place over the rest of Europe was a benefit to Dutch industry, which included pottery, paper making and printing, and food processing (De Vries and Van Der Woude, 1997).

This Golden Age of development and industrialization did not last. De Vries and Van Der Woude (1997:681, 685–686) write the following on the complicated decline of the Dutch economy in the eighteenth century:

> The integration of shipping, trading, and production that had been the hallmark of the Golden Age now gave way to the separation of the shipping, trading, financing, insuring, and producing sectors... The declaration of war in 1780 ended the protection that neutrality had given to Dutch shipping and mortally wounded the VOC... The Revolutionary War and Napoleonic wars squeezed Dutch commerce into illegal interstices of British blockades and the French Continental System... In this long period of crisis, disinvestment from the commercial and industrial sectors and the destruction of asset value through foreign and domestic default undermined the remaining international stature of the commercial and financial sectors.

The end of the eighteenth century saw two new European powers vie for control over geographic regions. The American War of Independence had an influence on both France and Britain. After the loss of the Thirteen Colonies, Britain turned its attention to Asia, Africa and the Pacific for new colonies. The French had accumulated much debt for their part in the American War of Independence, and this became one of the many intricate causes of the French Revolution. After the French Revolution, Napoleon Bonaparte became the French ruler. Napoleon as French Emperor fought for and ruled over much of continental Europe and even invaded Russia. But his defeat at Waterloo in 1815 left Britain unrivaled at sea (Saunders, 2004:9) and the British Empire expanded to 9.5 million square miles in 1860 (Ferguson, 2008b).

The British Empire included the Cape Colony after 1806, but the colony was first settled by the Dutch in 1652, not for settlement purposes but 1) to serve as a refreshment station for passing

ships to India and 2) to prevent the British from taking strategic control of the region (Israel, 1995:938). The Dutch brought with them many of their financial and institutional arrangements. It is this colony which forms the base for this dissertation. The next section gives a brief history of the Cape and its institutions before describing the research questions addressed in this dissertation.

1.3 The Cape Colony's Historiography and Economic History

Before European settlers arrived at the southern tip of Africa, the region was inhabited mainly by Khoikhoi. The Khoikhoi were a group of herders who had inhabited the southern Cape from the first millennium. With cattle as their prized possession, they moved seasonally for grazing land. Their nomadic lifestyle prevented them from accumulating land (Feinstein, 2005:14).

After Da Gama successfully sailed around Africa to India in 1497, the Portugese settled in St Helena, an island in the middle of the Atlantic. Even before the VOC took an interest in the southern tip of Africa, the British also thought of building a station there. In 1619, the English Company approached the Dutch regarding the fortification of the Cape, but this never realized. The Company took control of St Helena in 1645, but shortly after looked for a new provision station. Table Bay seemed the most viable. De Kock (1936:xi) offered four reasons why the Company decided to lay foundations at the Cape:

1. St Helena had become unsuitable as a refreshment station;
2. Ships between Europe and Asia needed a steady supply of fresh fruit, vegetables and water;
3. The Cape offered a sheltered geographical location;
4. The shipwrecked sailors of the *Haarlem* in 1647 provided new information on the Cape's viability as a refreshment station.

After the wreck of the *Haarlem*, the settlement at the Cape was pursued in earnest by the Dutch. This was also partly because of souring relations between the British and the Dutch (Robertson, 1952:214). Jan van Riebeeck was charged by the VOC to build a fort and hospital, lay a garden for vegatables and to trade with the local population for meat (De Kock, 1936). De Kock (1924:8) suggested that the decision by the Company to settle at the Cape was 'entirely practical and excluded any motives of political ambition or religious enthusiasm – factors which have frequently determined colonisation schemes.'

The first years of settlement at the Cape featured many hardships and some successes for the colonists. With the beginning of winter, the rain brought with it some growth for the vegetable patches around the fort. The excitement was short-lived – soon after, the gardens were flooded and crops spoilt. In summer, the gale force south-eastern winds scorched much of the crops sowed during winter (Robertson, 1945a:6). The obtainment of cattle was also not as easy as reported by the sailors of the *Haarlem*. The Khoikhoi within the immediate vicinity relied on a shellfish diet rather than cattle. A week after their arrival, Van Riebeeck was able to buy only a cow and a calf, and it was not until six months later that the cattle-owning Khoikhoi tribes appeared (Robertson, 1945a:5). This was the first sign of improvement for the Europeans. Van Riebeeck was able to barter for enough cattle, cows and sheep that by the end of the year he was able to provide the passing ships with enough vegetables and meat. Other ventures like whaling failed with the decrease in Antarctic whaling and the growth in Arctic whaling (Robertson, 1945d:252).

In 1653, the stock of cattle and sheep increased, butter was regularly produced and grains were planted in Rondebosch, sheltered from the harsh winds (Robertson, 1945a:10). Soon they had enough provisions for the small garrison and the ships which arrived at the Cape. There was a large increase in ship traffic at the Cape throughout the seventeenth and early eighteenth century. Boshoff and Fourie (2010) found that the ship traffic at the Cape had a significant impact on the demand for agricultural produce, especially wheat.

It was shortly after this that Van Riebeeck also started to write to his superiors in Batavia and the Heren XVII, the board of the VOC, that more immigration was needed if the Cape's colonial settlement was to be successful. Although this was initially met with disregard, in 1654 after the conclusion of the First Anglo-Dutch War, the Company investigated the possibility of further settlement. Van Riebeeck proposed that 'freemen should be bound to remain for at least ten years' and that the Company 'should maintain the monopoly of all trading' (Robertson,

1945a:16). In 1657, the Company released employees to become settlers. The first settlement was built around the fort at Cape Town with a vision of small-scale farming similar to the European model.

This free settlement was not without problems either. The burghers focused on the cattle trade with the Khoikhoi to make as much cash as possible from the foreign ships.[1] This disregard for agriculture led to the ban of trading cattle with the Khoikhoi in May 1658. The burghers were also restricted in what they could cultivate and were forced to focus on wheat, not vines or tobacco. In December of 1658, the community at the Cape wrote to Van Riebeeck to petition for better economic opportunities. They wrote about their high labour costs, the prohibition to trade with the Khoikhoi and their limited access to foreign ships. Van Riebeeck, although sympathetic to the concerns of the free burghers, had little to offer as compromise (Robertson, 1945b:90), and in 1664, the farming community experienced its first depression (De Kiewiet, 1941:6).

Despite the efforts of Van Riebeeck to establish large-scale colonisation at the Cape, this would only happen under Simon Van Der Stel (1679–1699). More arrivals came from Europe, most from the Netherlands and Germany, to escape the depressed economic situation after the Thirty Years' War. The population was also boosted by another group of immigrants from France. The Revocation of the Edict of Nantes (1685) banned Protestantism in France and many French Protestants fled to the Netherlands seeking protection. But due to the large influx of refugees and inability of the Dutch government to ensure their employment, many of these refugees moved to Dutch colonies, the Cape being no exception. The first group of French Huguenots arrived at the Cape in 1688, where they quickly became part of Dutch society. De Kiewiet (1941:7) notes the French assimilated to Dutch culture within two generations.

The new arrivals from Europe and the agricultural nature of the Cape's economy increased the demand for arable land. Van Der Stel expanded the colony to the mountainous region around Stellenbosch. The expansion of Simon Van Der Stel was continued by his son, Willem Adriaan (1699–1707). Willem Adriaan was especially known for his agricultural science and the implementation of viticulture. This boosted the French Huguenots' influence at the Cape as well (Fourie and Von Fintel, 2014). These farms were all held under the freehold system,

[1]Ships which stopped at the Cape for provisions included ships from the Netherlands, France and Britain. Boshoff and Fourie (2010) show that the number of ships increased from around ten annually to seventy in the early eighteenth-century.

but the limit on arable land was quickly reached and the freehold system was closed in 1717.

The closure of the system did not, however, deter colonial expansion. De Kock (1924:19) writes that many young colonists were unable to successfully pursue agriculture in the settled region and endeavoured to move across the mountains eastward. The Company's inability to halt this expansion led to the introduction of the loan farm system. Chapter 6 discusses these systems and economic effects in more detail. This expansion was only slowed in the early nineteenth century when the European settlers made contact with the Bantu-speaking Xhosa on the eastern frontier. De Kiewiet (1941:11) offers the following opinion on the expansion of the colony and why the Europeans could easily move to the interior of South Africa in comparison to Canada and Australia:

> The hardships and hunger that dogged the steps of every explorer who plunged into the Australian interior were all but unknown to the South African pioneer. In the richest game country that the world had ever known food was easily obtained. The rigours and agues of Canadian cold they never felt. Neither climate nor topography halted their progress.

The Xhosa population was more numerous and had superior weapons technology to the Khoikhoi and managed to halt colonial expansion (Fourie and Green, 2015). Figure 1.1 shows the Cape's official boundaries in 1682, 1705, 1731, and 1795. By the end of the eighteenth century, the colony was sparsely settled, with only a few towns. In 1792, the Company also became concerned about the economic development of the Cape. After the Commission of Inquiry in 1792, changes were made to military establishments and the tax systems, but restrictions on trade remained (De Kock, 1936:13).

The Cape's development trajectory was influenced by various Company policies brought to the economy from Europe by the VOC. The first was the fixed price setting of agricultural produce by the Company in Cape Town. The prices for all agricultural products were set by VOC officials, and farmers at the Cape were only allowed to sell to the Company in Cape Town (Van Duin and Ross, 1987). Du Plessis and Du Plessis (2012) use these prices to show how fixed prices caused deflationary pressure throughout the eighteenth century. Botha (1939) showed that, despite complaints from farmers, the prices for these agricultural products were

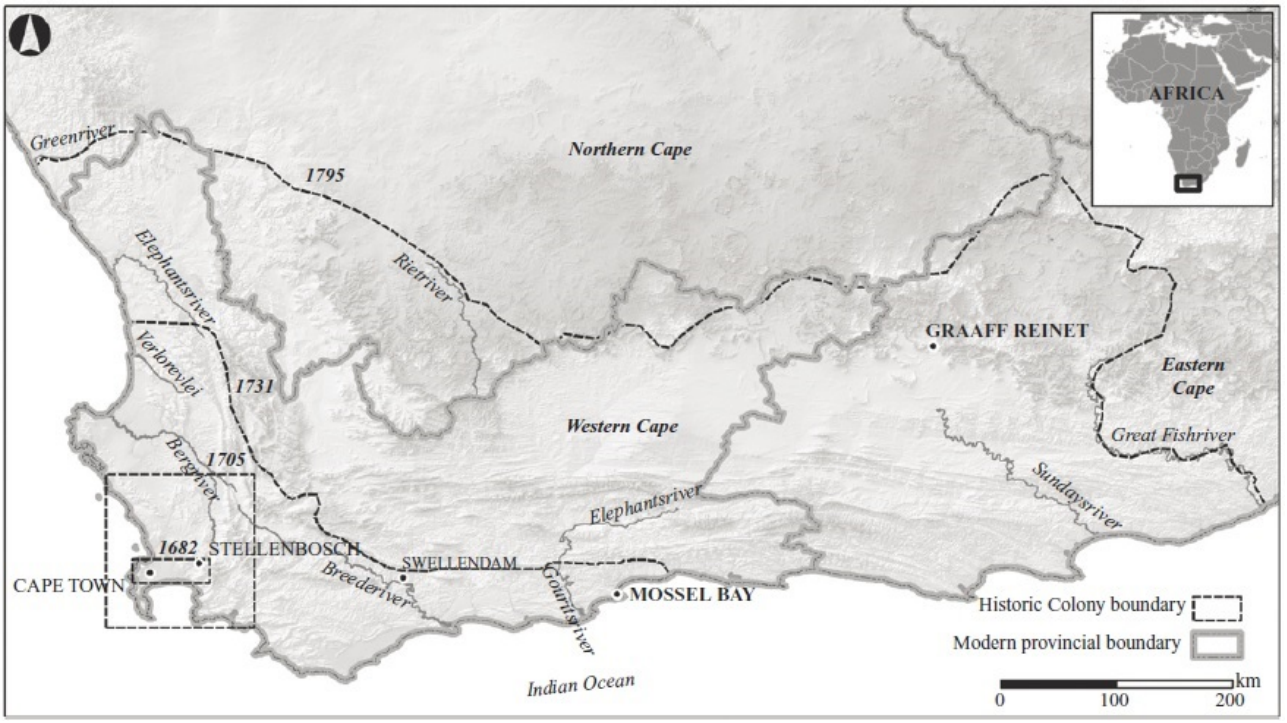

FIGURE 1.1: Map of the Cape Colony's boundaries in 1682, 1705, 1731, and 1795 with modern boundaries

Source: Fourie (2013)

remarkably stable over the century.

But with fixed prices came another Dutch institution – *pachters* or lease-holders. Many of these *pachters* became influential and wealthy individuals, like Hendrik Oostwald Eksteen, Martin Melck and Jacob Van Reenen. The *pacht*-system was a monopoly on the provision of goods to the Company in Cape Town. There were *pachts*, for example, for alcohol (Eksteen), and meat (Van Reenen). Groenewald (2011) studied two groups of *pachters*, in the early 1730s and later in the 1770s. He found that the *pachters* in the later period were more likely to become prosperous. Chapters 4 and 6 look at this group of affluent settlers in more detail and how they used connections and marriage to move up the Cape's social ladder. Groenewald (2011) further asserts that the *pachters* at the Cape were different from their Dutch counterparts because of the Cape's unique economic structure. The Cape's entrepreneurs used the various *pachten* to establish their different ventures and improve their social mobility rather than the Dutch use of *pachten* for land-holdings.

The Cape's economic structure was also influenced by slavery. The lack of local labour and the outlawing of enslaving the local Khoikhoi population, who often worked on settler farms

(Fourie and Green, 2015), forced the Company to supply labour by importing slaves. In 1657, Van Riebeeck wrote to the Heren XVII that slavery was essential to ensure the success of agriculture at the Cape (De Kock, 1936:7). The importation of slaves coincided with a Council of Policy decision not to promote European settlement to the Cape in 1717. Although slavery in the Cape never reached the levels of the sugar plantations in the New World, Worden (1985:19) suggests the slaves were an important input for Cape farms, despite the seasonal fluctuations of demand. Armstrong and Worden (1989:140) found the price of a male slave fluctuated throughout the century, with an average of 200 rds, while Fourie (2013) followed Guelke and Shell (1983) in the use of slaves as an accurate wealth measure at the Cape.

The Cape's slavery never reached the levels of the New World and American colonies. Despite this, slavery was an important aspect of the Cape's economy and 'it was generally accepted by the colonists that slavery was essential to the economic and social well-being of the Cape' (Armstrong and Worden, 1989:163). Armstrong and Worden (1989:109) investigate the number of slaves imported to the Cape. They find that the number of slaves increased from zero in 1652 to 36 169 in 1834. The most dramatic increase in the number of slaves was toward the end of the eighteenth-century. Fourie and Van Zanden (2013) show slaves compiled about 65% of the population and had a significant impact on economic prosperity. They concluded that the high proportion of slaves 'increased productivity and caused a low dependency ratio' (Fourie and Van Zanden, 2013:484).

The Cape formed part of the British Empire from the early nineteenth century, which also had implications for the slave trade and economy. The first step toward emancipation was the abolition of the slave trade through the Slave Trade Act of 1806. Both Worden (1985:64) and Armstrong and Worden (1989:163) note the intense response to these international events by Cape farmers. The main concern was the effect complete emancipation would have on the economy, and even the Governor at the Cape, Jan Willem Janssens, feared that it would 'plunge the colony into misery' (Armstrong and Worden, 1989:142). Slavery ended formally in the Cape on 1 December 1834 and many of the fears about the effect of the abolition of slavery were found unwarranted (Armstrong and Worden, 1989:167).

Strong property rights, or at least the belief in strong property rights, were also imported from the Dutch economy. Chapter 6 reconsiders the Cape's property rights and their effect on the Cape's economy in detail. The freehold farm system was the first system of property ownership brought to the Cape by the new European settlers. These were mostly restricted to the farms

close to Cape Town and in the southwestern Cape. Later, the loan farm system was developed to expand the colony even further in the northern and eastern directions. Loan farms were introduced after most of the fertile soil in the region was claimed under the freehold system, roughly by the turn of the eighteenth century.

The Dutch also brought financial institutions with them. Besides the Company, which itself actively supported settlers through loans at the Cape, the church and the Orphan Chamber were also established by the Dutch. In Amsterdam, both the *Burgerweeshuis*, similar to the Orphan Chamber, and the church were already active institutional investors in the stock exchange by the sixteenth century (Gelderblom and Jonker, 2009). The Orphan Chamber at the Cape was established to administer the estates of those whose heirs were absent from the Cape, or where minors were involved. The Orphan Chamber was involved in the credit market through the capital accumulated by the inheritances it was placed in charge of. It loaned much of these funds to individuals for mortgages to purchase farms. The same was true of the church. The main religious organisation at the Cape for the early period of settlement was the Dutch Reformed Church (DRC, or simply the church), which had a monopoly on organised religion until the establishment of the Lutheran Church in 1780.

Dutch control over the Cape Colony spanned 145 years until 1795. After France declared war on the Republic of the Netherlands and Great Britain in 1793, Great Britain responded by taking control of much of the Indian Ocean. This included an assault on the Cape and taking control of the colony in 1795. The colony was returned to Batavian control for a short period between 1803 and 1806, before Britain governed again from 1806.

Between 1660 and 1795, the settler population at the Cape expanded from a dozen to 14 000, including women and children. Due to the systems placed by the Company like its market control, strong property rights, the *pacht*-system, high population growth, and continued area expansion, historians described the Cape as a 'social and economic backwater' (Trapido, 1990:78). De Kock (1924:23–24) describes the Cape's economic situation in 1795. He writes that except for Cape Town and Stellenbosch, settlers barely made a subsistence living through pastoral farming and hunting. The only sources of wealth were agriculture and stock farming (De Kock, 1936:16). De Kiewiet (1941:26) suggests even after 150 years, the Cape's exports were 'pitifully small' and that the colony's internal markets were underdeveloped. Giliomee (2003:31) suggests the settlers lived simply with scanty furniture and a shortage of beds. Schumann (1938:33) postulates that 'the transformation of the country toward a market and credit

economy would probably have been a gradual one.' In Chapter 2, these views are challenged through new theories about how credit has been a main driver of economic activity for much longer than previously thought.

Scholarship by Ross challenges the views of poverty at the Cape. According to Ross (1986:87), agriculture in the colony had 'comparatively high levels of commercialization.' He is supported by Neumark (1956:36,37) who proposed migration to the frontier happened because of the profitability of the loan farms. New scholarship using archival records mostly supports Ross' view (Fourie, 2013). One of the first aspects which has been challenged was the low levels of GDP. Fourie and Van Zanden (2013) found the Cape's GDP per capita for this period to be similar to that of regions in Europe. They conclude that the divergence between South Africa's growth and the rest of the world only came much later in the nineteenth century, and not in the early period of colonial expansion.

Inaccuracies in data are often a problem for comparing GDP across countries and time, which leads economic historians to rely on different measures to study economic development. One of these alternatives is wages. The first study on colonial wages in South Africa was undertaken by De Zwart (2011). He found soldiers at the Cape were more than able to sustain themselves above a bare-bones basket. He also found the Cape's wages were higher than the comparative wages in the Natal region. Similarly, Du Plessis and Du Plessis (2012) concluded that the employees of the VOC at the Cape had high living standards that improved over the eighteenth century.

These high levels of wage income coincided with high levels of inequality. Fourie and Von Fintel (2010:259) studied inequality at the Cape using the tax censuses (*opgaafrolle*). They found that 'the unequal Cape society developed not because of certain 'initial endowments', but due to the policies enacted by the Dutch East India Company.' In Fourie and Von Fintel (2011), they compare the Cape's inequality to other regions and found that the Cape's inequality was even higher that that of regions like Chile, the Netherlands, Nueva España, England and Wales for the same period.

Using the same probate inventories as throughout this dissertation, Fourie (2013) found high levels of personal wealth at the Cape. In comparison to other regions in the world, personal wealth was equal to those in the Netherlands, England and colonies in America. In fact, he

described the wealth in these inventories as 'remarkable' and claimed that this wealth was often related to slave wealth.

One aspect of the Cape's economic development has been neglected – financial transactions. The probate inventories not only list all the assets of the settlers, but also record the vast number of transactions on credit between the settlers. This has thus far been ignored by not only Cape historians, but also by the recent empirical studies. The financial development of the Cape and these credit transactions are only briefly mentioned by Ross (1989), or hinted at in Robertson (1945a), or ignored by Fourie (2013). Fourie (2014:144) only refers to 'evidence of an extensive credit network within the settler community' without further investigation. This dissertation is an attempt to fill some of these gaps. It focuses on credit transactions which took place between settlers, the Company, the Orphan Chamber and the church. It makes use of 4 120 inventories and over 25 000 credit transactions to study what the structure, extent and characteristics of the private credit market were.

1.4 Summary of Chapters

The dissertation is divided into five chapters, with an overarching theme of private credit transactions from the late seventeenth to the early nineteenth century – or specifically from 1673 to 1834. This section provides a summary of each of the chapters and the conclusions drawn from them. The main data set used throughout the dissertation is the MOOC 8 series of probate inventories. Appendix A describes this series in detail, as well as how the data was captured from these inventories and how it was matched to the genealogical records.

1.4.1 Chapter 2: 'Impending ruin' or 'Remarkable wealth': The role of private credit markets in a settler economy

The first chapter gives the first glimpse of the wealth of information available from the probate inventories by using the entire series rather than a selection. It adds to the literature that suggests widespread credit in pre-industrial economies was not a sign of poverty, but rather an indication of the presence of assets. The Cape's credit market has often been interpreted by historians as a cause for concern and a situation that would lead to poverty. This chapter looks

descriptively at the structure of the Cape's private credit market, what settlers borrowed for, and what the characteristics of borrowers at the Cape were.

The first conclusion and contribution of Chapter 2 is to show the relatively small role the Company, church and Orphan Chamber played in the private credit market at the Cape. Traditionally, these institutions were described as the main sources of credit, but they were in fact only involved in a small proportion of transactions. Most transactions happened between settler men, with surprisingly many transactions also involving women. The second contribution found is to show that instead of borrowing for survival and consumption purposes, the main reason for borrowing was production and that this was supported by the many loans made to purchase land. The third contribution is the strong correlation I find between wealth and debt. Wealth, as reflected by the number of slaves, and credit are closely correlated even though few slaves were purchased through debt transactions. The conclusions from this chapter are that many of the historical concerns about the connection between debt and poverty were unwarranted, and that the Cape's credit market, similar to the European markets, was related to wealth, rather than poverty.

1.4.2 Chapter 3: 'Favoured children': Intergenerational wealth, debt, and credit in the eighteenth century Cape Colony

This chapter sets out to study intergenerational effects both in debt and in wealth for this pre-industrial period at the Cape. Intergenerational wealth has been well-studied in economic literature, specifically how the inheritance of wealth can influence successive generations and how mobility influences the development of economies. Most studies find some intergenerational wealth mobility, rather than high wealth persistence. Historical studies in developing countries are often limited due to lack of data, and this chapter adds to both this historical and contemporary literature on the relationship between parents' financial decisions and those of their children.

The first contribution of this chapter is to show positive intergenerational effects on three wealth measures – land ownership, slave ownership and debt. The high positive intergenerational wealth mobility shown here is contrary to previous evidence, which suggested economic development at the Cape was limited to the elite, also sometimes referred to as the gentry. It

also disputes claims that the system of partible inheritance at the Cape was detrimental to growth. The second contribution is to provide further support for more contemporary literature, which claims that parents and children save and invest in similar patterns.

1.4.3 Chapter 4: 'Webs of credit and obligation': A network analysis of credit transactions for the eighteenth century Cape Colony

Family was a key component in making connections at the Cape. This chapter studies the effect of social networks and connections and their effect on debt. Networks have not only been mentioned in history as important for access to debt, but contemporary evidence also supports this hypothesis. Network analysis is a relatively recent methodology used by economists. The high demand for micro-level data on individuals often limits its use to contemporary data, but the probate records allow such a methodology to be used for the Cape Colony.

Applying this new methodology to the Cape's credit market, I identify the most central individuals within the Cape's credit market. I expand this methodology to also study families. The results show that while central individuals tended to change over time, central families tended to remain at the centre. The third and final contribution of this chapter is to show that although the three main institutions at the Cape – Company, Orphan Chamber and church – were not involved in as many transactions, they were important in connecting individuals to the larger network at the Cape.

1.4.4 Chapter 5: Ties that bind: Family, background and credit transactions in terms of homophily

Another aspect of social network analysis is homophily, or the observation in networks that more connections are made with nodes who share a similar background characteristic. Empirical evidence exists for homophily in networks like marriage patterns, friendships and human capital investment. In this chapter, I offer another aspect of homophily – trading on credit with individuals who share the same European nationality.

The three main European nationalities which I focus on in the chapter are Dutch, French, and German. The historiography of the Cape Colony suggests that cultural assimilation between these different cultures happened rapidly. However, I show that preferential trading with individuals who share a European background remained for the entire century. The chapter explores two possible avenues for this: wealth and familial trading. Wealth shows virtually no homophily at the Cape, while familial trading increases at the same time as the overall levels of homophily increase at the Cape. This suggests homophily between European backgrounds was related to familial trading. A limitation of the study was the absence of marriage links and how these influenced trading.

1.4.5 Chapter 6: Which property rights matter for debt – *de jure* or *de facto*? Evidence from colonial South Africa

The final chapter returns to the correlation between wealth and debt in colonial South Africa. Economic theory, as well as contemporary evidence, show land is a preferred form of collateral for credit transactions. Secure property rights as an economic institution have empirical support that they are important for economies and long-term development. This chapter investigated whether property rights in land mattered for debt transactions at the Cape Colony for this early period.

I use the distinction between freehold and loan farms, in terms of *de jure* and *de facto* property rights, in order to test whether more secure property rights mattered for debt. The first contribution is to test an immediate impact of property rights on economic outcomes, and the second, to provide empirical evidence on the Cape's property right institution. In order to find a causal link between debt and property rights, I use birth order, or being the eldest son as an instrumental variable. The results support recent literature that *de facto* or the underlying belief in property rights was more important when settlers considered debt transactions. The null result also suggests other aspects of individuals were more important when settlers transacted with each other. These include the overall productive capacity of the settler (closely related to slave ownership), the net value of the estate or the immediate ability to repay debt, and the familial and social connections an individual had. The question of when property rights started to matter for debt transactions at the Cape remains open for future research.

Chapter 2

'Impending ruin' or 'Remarkable wealth': The role of private credit markets in a settler economy

2.1 Introduction

In 1795, shortly before the British annexed the Cape Colony from the Dutch, a concerned farmer wrote to the British government to describe the economic conditions at the Cape. This man was Johannes Fredrik Kirsten. He wrote of widespread poverty and debt: 'By far the greater part of the Farmers and Inhabitants of the Town are Bankrupts [sic], the rest have their property under Sequester, and every individual looks forward to impending ruin.' In his view, 'the Farmer' was in 'every aspect a looser [sic], and had nothing to look forward to but unavoidable poverty' (Muller, 1960).

But a closer look at his personal life grants cause for suspicion on the part of his sentiment and interpretation of the general economic conditions of the Cape. He was born in 1759 and received a good education. He, in later life, used his father's connections with Company officials, to obtain a position within the Company. His continued to climb the social ladder by marriage to the widow of Marthinus Melck, son of Martin Melck, at the time the richest man at the Cape. Using his Company connections he set up many lucrative private ventures, through which he became wealthy as well. By the time of his death, he owned 100 slaves, 674 oxen, 130 horses, 1 400 sheep and 388 morgen of land. His gloomy outlook on the economy was influenced

by his brother's precarious position rather than his own. His brother, Jan Pieter Kirsten, was on the verge of collapse, with a total debt of 6 000 gulden (2 000 rds, or 500 pounds).

Historians of the Cape have echoed Johannes Fredrik Kirsten's view. Guelke (1989:81–82) states poor, small farmers 'were tied to wealthier ones by debts' and Schoeman (2011a) says 'most survied on the basis of debt, credit and borrowing'. But economic historians have recently begun to challenge the traditional view of the Cape Colony. It is moreover timely that similar literature on European capital markets has emerged, also disputing claims that personal debt led to poverty. This chapter aims to add to both these strands of literature. First it adds to the European literature by providing another case study analysing the correlation between debt and wealth, and second, it revisits the Cape literature in view of a functional approach to credit markets (Merton and Bodie, 1995).

The first contribution of this chapter is to consider the entire MOOC 8 series, the list of eighteenth-century probate inventories of Cape settlers, and capture the debts and credits within them. This means a total of 12 637 credit transactions and 12 580 debt transactions are analysed. It provides a good description of who borrowed the most, what they borrowed for and what the characteristics of the borrowers were.[1] Confirming the European literature and contrary to the South African historical literature, debt was not correlated with poverty in the Cape Colony, but rather with wealth. In contrast to some regions in Europe, for example Germany, the poor at the Cape were not excluded from the private credit market. Poor settlers borrowed for different purposes than their wealthy counterparts.

2.2 Pre-industrial European markets

The primary function of the financial market in the economy is to allocate resources (Merton and Bodie, 1995). But there are two strands of study when considering the historical development of financial markets. The first is formal financial markets, or banking and stock market history. The second strand of research emerged more recently, and refers to private credit

[1]The biographical sketches that exist, and the sample of probate inventories for studying debt at the Cape are related to 1) computational ability and 2) historical methodology. The probate series was only digitised in 2004 and before that it would not have been possible to study the entire series due to time restrictions. Historical methodology also tends to use the individual as a focal point and study their debts and credit more in depth than done here.

transactions and their influence on economic outcomes. Private credit transactions are transactions on credit between two individuals without formal intermediation from banks. This is not to say these transactions were not formalised, and often involved legally binding contracts (Van Bochove and Kole, 2014), but they generally did not involve a financial intermediary to connect borrowers with lenders. Such transactions can be traced back as early as 3000 BCE in Mesopotamia (Merton and Bodie, 1995). It is such informal (i.e. without a financial intermediary) credit transactions that form the basis for this study.

A golden thread of three reasons has been found to explain why pre-industrial private credit transactions were plentiful. First, individuals in early economies used the private credit market to smooth consumption. Many of these societies relied on agriculture for survival, and with large seasonal variations (Holderness, 1976), credit became a conduit for trade. This was true for the medieval and early modern period. Second, with development, trade over distances and long-term capital investment, especially in land, were made possible by the same credit markets. The third problem solved by the private credit market was that trade became possible without cash (Schofield and Lambrecht, 2009). Western Europe, especially the Low Countries, France and the British Isles, was plagued by chronic coin and cash shortages in this period, where Muldrew (2012) states 'most market transactions involved the extension of informal credit because of the lack of ready cash.' This informal credit culture also gave rise to what Gelderblom and Jonker (2015) term 'ghost money', a generally accepted measure of account which can replace a real currency or work hand-in-hand with an existing currency. The culture of informal lending in Amsterdam from the fifteenth century also enabled the market to function without deposit banks for much longer than in Paris (Gelderblom et al., 2016).

The extent to which private credit transactions contributed to poverty or improved productive capacity depended on the local context. For example, inland and coastal medieval Flanders had two very different credit markets, even though the cultures were similar. The coastal region experienced high taxes on land and the loss of property rights, which limited peasants' credit opportunities, while inland Flanders continued to subdivide land among peasants, which led to a thriving credit market (Thoen and Soens, 2009). In medieval Italy, Jewish lenders were an intermediary for rich and poor borrowers alike. Rich borrowers used the credit obtained from the Jewish lenders to invest in capital, while poor borrowers used the credit for survival (Botticini, 2000). In eighteenth-century Nuits St. Georges, in eastern France, a highly concentrated credit market emerged with notaries and merchants as intermediaries, as a response to the outside threat of government intervention. The concentration of the market also excluded the poor

from the market, and most borrowers and lenders came from the social elite (Rosenthal, 1994). Those who participated in credit transactions thus in some way or form had collateral. It is this that drove Spufford (1990) and Jones (1980) to conclude that high levels of indebtedness is not a sign of poverty, but rather of the presence of assets. This was also true for medieval Holland, where land titles and secure property rights led to financial sophistication of households (Van Zanden and De Moor, 2012).

In a study of early modern Germany, Ogilvie et al. (2012) challenge the view that borrowers mainly came from the destitute. They found that the inhabitants of Wildberg, a town in the Württemburg region, used credit to rebuild productive capacity after the Thirty Years' War, rather than for consumption purposes. These authors used both marriage and probate inventories to discover who took part in credit transactions. They further show that borrowers came from many socio-economic backgrounds and that they were tied together through guilds, churches, charitable foundations, hospitals and even groups of heirs and children in guardianship. Guilds, churches and militias also played a role in the credit market in Amsterdam. The same network was used by notaries, who designed a standard loan form which lowered transaction costs and greatly increased the volume of credit transactions (Van Bochove and Kole, 2014). In eighteenth-century France, notaries were key to linking borrowers and lenders in Paris. Here, they used their inside knowledge of the social elite to reduce asymmetric information and thus were able to successfully complete more transactions (Hoffman et al., 2000:299–300).

Across the Atlantic, a positive correlation between economic growth and credit markets in a historical context has been established. Rothenburg (1985) found that credit market development and growth preceded economic growth in the Massachusetts region. In a similar vein as Ogilvie et al. (2012), Rothenburg (1985) used the American Revolution as a break in the emergence of the capital market. In another case, Lamoreaux et al. (2003) found networks were important for the establishment of credit, and that these networks were built on repeated interaction between settlers. This repeated interaction and mutual dependence ensured repayment of debts. However, this was not only the case in America, but Zuijderduijn (2009:214) suggests creditors would use peer pressure, and sometimes resort to threats to ensure repayments in the Low Countries. This ensured more transactions, but also repeated interaction between individuals.

There was also a role for charitable institutions. During the seventeenth and eighteenth centuries, charitable institutions like the Orphan Chamber and church were 'welcome sources of

credit' (Sutherland, 2009). McCants (1997:174) show the large role of debt as a source of income for the Orphan Chamber. These institutions were brought to Makassar and Batavia by the Company. The Company itself also had an important role in credit provision and often provided credit against other sources of collateral like slaves and jewellery.

This literature suggests that individual country effects will be different, and local institutions and cultures will have an effect on the development of the private credit market. In this light, I analyse the Cape Colony's credit market of the late seventeenth to early nineteenth century, specifically 1673–1834. The period was chosen for two reasons: first, for data availability; it coincides with when the probate records were kept by the Orphan Chamber in this format. Second, it provides a long period for which these transactions are observed, to determine the growth of the market and extends even over a change of government in the late nineteenth-century.

2.3 The Cape Colony and the market for credit

Already in 1657, the Company released Company workmen to become farmers close to the fort in Table Bay. The initial plan for these free farmers was to have small-scale farms around Cape Town, similar to those of Dutch agriculture, and for the Cape only to serve as a refreshment station. However, less fertile soil and harsh weather patterns made the region unsuitable for this type of agriculture, and the settlement expanded toward the fertile mountainous regions. Due to the richer soil quality, the farmers that would settle here invested in wheat and barley cultivation and later also produced wine - especially after the arrival of the French Huguenots. A new problem arose with this successful cultivation: labour shortages. The Company forbade the enslavement of the Khoikhoi, and soon started importing slaves (Baten and Fourie, 2015) to increase the supply of labour.

The second problem with the expansion of the Colony was the lack of capital. Although the Company provided loans for land and slave purchases, the settlers relied on each other for trade and skills development. This trade often happened on credit and caused a mutual reliance between settlers. The result of this mutual dependence was a flourishing private credit market, yet only snapshots of it exist in the literature. Muldrew (2012) observes a similar reliance on credit for trade in early modern England, calling it 'an advanced form of barter'. South African

historians have described the Company, the Orphan Chamber and the church, as sources of credit much like in Batavia and Java. Others argue large contributions to the capital market came from Company employees like Joachim Von Dessin (Ross, 1989). The true nature and size of these credit transactions, however, have remained hidden and this chapter aims to provide a more detailed picture.

One reason for the reliance on each other and the volumes of trade which happened on credit was the lack of currency. The location of the Cape in the global trade network of the Dutch Empire caused various currencies to float in the Colony, from Dutch gulden and rijksdaalders, and British pounds, to Spanish and Portuguese coins.[2] The farmers resorted to using credit for convenience. Yet, this was the case elsewhere as well, with Gelderblom and Jonker (2015) stating 'paying cash was a chore' in the eighteenth-century Low Countries. Muldrew (2012:391) argues 'most buying and selling was done on credit' in eighteenth-century England, while Vickers (2011:425) noted that 'cash never dominated trade in the settler community' in colonial Massachusetts.

Currency remained a problem at the Cape throughout the eighteenth century, and it became most acute in 1792. After the British government took control of the Cape in 1795, the pound became the dominant currency of exchange. After the second British takeover in 1806, the rijksdaalder depreciated sharply against the pound and was finally fixed at one shilling and sixpence to the pound. It coincided with the establishment of the Lombard Bank, which resembled a modern-day pawnshop rather than a formal bank. It granted settlers credit against pledged items and had a minimum loan of 100 rds. Yet even the establishment of this institution in Cape Town did not replace or lead to a collapse of the informal credit transactions between settlers. In fact, in the probate series only 45 transactions are observed with the Lombard bank, while 5 738 are observed between settlers for the same period.

Until now, the extent, structure and characteristics of the private credit market have remained hidden in source material. This chapter investigates these source documents to study the private credit market at the Cape and what the relationship between debt, credit and wealth was. Before this relationship is investigated, I detail the data and discuss its limitations.

[2]Appendix A provides more information on the exchange rates between these currencies, which appeared most in the inventories, and how they were converted.

2.4 The probate inventory series: settlers and their credit transactions

A source often used by South African historians and economic historians to investigate the settler living standards at the Cape is the probate inventories or MOOC 8 series. The households or individuals included in these inventories were those with children younger than 25 years old, those with no last will and testament, or those whose heirs were overseas or absent (TANAP, 2012). An example of how these debts were recorded and acknowledged in the inventories are found in Figure 2.1.

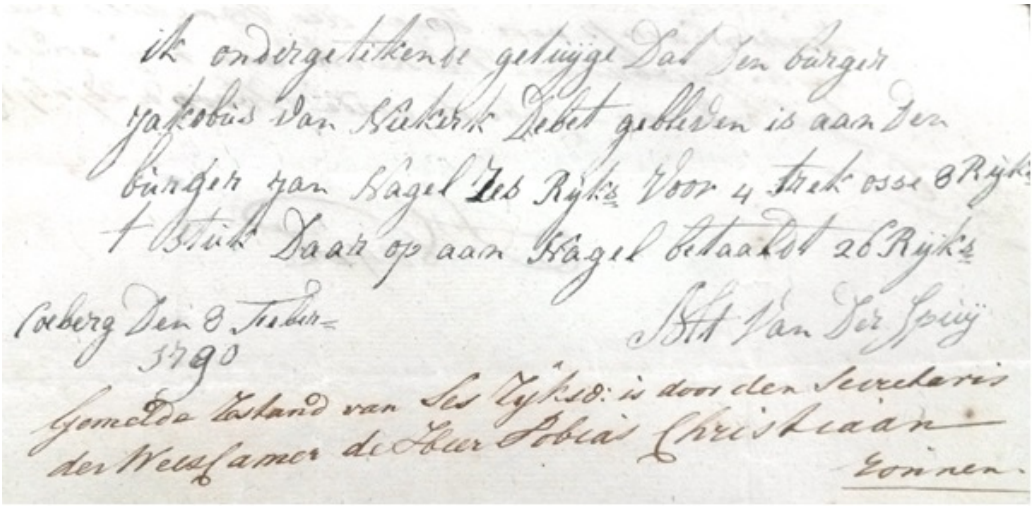

FIGURE 2.1: Example of how a debt transaction were recorded for the inventories

Probate inventories have been used extensively as source documents. However, they are not without limitations. Main (1974) explains three core problems with the use of inventories: interpreting prices, an age-bias toward older males, and selection bias, i.e. whether the rich or poor are excluded. Prices are of little importance here. Credit transactions would only have taken place if the two parties involved mutually agreed on the terms, and in the regression analysis I control for nominal price changes. The age-bias is also of little concern since 1) our econometric results show little correlation between age and debt and 2) the distribution of ages for the matched sample has a widespread distribution of ages (from 18 to 80). The final concern remains whether there is an over- or under-representation of the poor or the wealthy in the sample.

Fourie (2013) discusses the issue extensively. Because the probate series was collected by the Orphan Chamber, only households without wills and testaments are included. This would

exclude many of the wealthy households at the Cape. The comparison with wills from the Stellenbosch region, transcribed by Krezensinkski-De Widt (2002), shows the Stellenbosch inventories were much wealthier. The MOOC 8 series was thus biased toward a lower part of the income/wealth distribution. This introduces a downward bias in the results.

Another downward bias is the timing of these transactions. The transactions are only observed after the death of the individual. Some time has thus lapsed between when the transaction took place, which means some debts may have already been paid back in part or in full. The data does not allow an easy solution to this, but would again suggest the results presented here are an underestimation of the true market. McCants (2006), however, suggests probate inventories are ideal for studying small or rural localities, a description that fits the Cape almost perfectly. Other studies like Ogilvie et al. (2012) and Rothenburg (1985) have also pointed to inventories as being useful, and used probate inventories to discuss private credit markets.

The second source of valuable information on the settlers comes from the genealogical records (Cilliers, 2016). From these I was able to find the age, occupation and household size for 2 100 of the individuals in the probate records. Appendix A provides information on the matching process between the MOOC 8 series and the genealogies. Table 2.1 provides the descriptive statistics between the full probate sample, the matched sample (those in both the probate series and genealogies) and the remaining unmatched (those found only in the probate series). The main advantage of matching the two series is the addition of new variables like age and occupation. A drawback is the loss of some observations and the possibility of mismatches.

As in all countries at this time, land was a valuable asset. At the Cape it most often took the form of a farm, as Cape Town (1652), Stellenbosch (1679), Swellendam (1743) and Graaff-Reinet (1786) were small and slow-growing during this period.[3] I do not distinguish between farm land and town properties in this analysis, simply because the distinction was not made often enough in the probate series and therefore I refer only to 'land' and not to 'property' or 'real estate'. In 37 percent of the probates some land is recorded. The average value of land came to 1 882.03 rds and an average size of 6 180.35m^2. The matched sample (40 percent) had a higher proportion of individuals with land than the unmatched sample (35 percent), with

[3]Compared to Europe, the Cape's population size of about 10 000 at the end of the eighteenth century (Cilliers and Fourie, 2012), only resembled a town in Europe at the time and indicates how sparsely settled the Cape was. In 1807, Stellenbosch consisted of 90 houses, while Swellendam had 20 and Graaff-Reinet only 18. Although other towns, like George in 1800, were also established, the settlements did not significantly grow in this period.

TABLE 2.1: Descriptive statistics of wealth information of full and matched samples – excluding zeroes

	Obs.	Mean	Std. dev.	Min	Max
Full sample					
Number of inventories	4 160				
Land present	1 555	0.37			
Value of land	854	1 822	4 874	3	100 000
Size of land	94	6 180	10 813	6	68 822
Number of slaves	2 073	6.45	7.72	1	73
Value of cash	1 516	334	1 373	0	36 652
Value of credit	2 020	2 540	12 645	2	256 425
Number of credit transactions	12 637	423	1 792	0	80 600
Value of debt	2 866	1 751	6 719	2	164 641
Number of debt transactions	12 580	411	2 098	0	110 188
Both lender and borrower	4 160	0.41			
Matched sample					
Number of inventories	2 117				
Land present	839	0.4			
Value of land	512	1 883	4 236	3	50 000
Size of land	56	7 202	12 320	6	68 821
Number of slaves	1 182	7.05	8.51	1	73
Value of cash	714	398	1 254	0	13 539
Value of credit	1 058	3 290	14 626	3	256 424
Number of credit transactions	6 706	549	2 165	0	80 600
Value of debt	1 544	2 021	6 991	4	135 755
Number of debt transactions	7 094	460	2 083	0	100 098
Both lender and borrower	2 117	0.43			
Unmatched sample					
	Obs.	Mean	Std. Dev.	Min	Max
Number of inventories	2 043				
Land present	716	0.35			
Value of land	512	1 884	4 236	3	50 000
Size of land	38	4 673	8 022	17	34 379
Number of slaves	891	5.65	6.66	1	61
Value of cash	802	277	1 470	0	36 652
Value of credit	962	1 716	9 966	2	200 853
Number of credit transactions	5 931	280	1 226	0	44 950
Value of debt	1 322	1 436	6 373	2	164 641
Number of debt transactions	5 486	349	2 116	0	110 188
Both lender and borrower	2 043	0.4			

Source: Probate inventories and genealogies, own calculations.

Notes: Full sample: probates; matched sample: probates and genealogies; unmatched sample: probates only.

higher values and larger sizes as well. However, because no distinction is made, it remains a problem to use land ownership as a proxy for wealth. This is exacerbated by the infrequent reporting of the size and value of land.

The zero values are also important to consider for three reasons. First, a zero debt value can mean the individual was excluded from the market. This forms part of asymmetric information problems in the private credit market. The second reason relates to choice. The individual could have made the choice not to engage in credit activity, even if they did have access to

the market, which would indicate a preference for certain individuals. And third, the debt and credit values and the transaction itself could simply not have been reported in the probate inventories, which would cause measurement error in the sample. All of these contribute to the downward selection bias mentioned before. Table 2.2 gives the same descriptive statistics with the zero values included.

TABLE 2.2: Descriptive statistics of wealth information of full and matched samples – including zeroes

Full sample					
	Obs.	Mean	Std. dev.	Min	Max
Number of inventories	4 160				
Land present	4 160	0.37			
Value of land	4 160	374	2 327	0	100 000
Size of land	4 160	140	1860	0	68 822
Number of slaves	4 160	3.21	6.33	0	73
Value of cash	4 160	122	844	0	36 652
Value of credit	4 160	1 234	8 901	0	256 425
Number of credit transactions	12 637	423	1 792	0	80 600
Value of debt	4 160	1 206	5 636	0	164 640
Number of debt transactions	12 580	411	2 098	0	110 188
Both lender and borrower	4 160	0.41			
Matched sample					
Number of inventories	2 117				
Land present	2 117	0.40			
Value of land	2 117	456	2 232	0	50 000
Size of land	2 117	191	2 298	0	68 821
Number of slaves	2 117	3.93	7.17	0	73
Value of cash	2 117	134	752	0	13 539
Value of credit	2 117	1 644	10 468	0	256 424
Number of credit transactions	6 706	549	2 165	0	80 600
Value of debt	2 117	1 474	6 037	0	135 755
Number of debt transactions	7 094	460	2 083	0	100 098
Both lender and borrower	2 117	0.43			
Unmatched sample					
	Obs.	Mean	Std. dev.	Min	Max
Number of inventories	2 043				
Land present	2 043	0.35			
Value of land	2 043	290	2 418	0	100 000
Size of land	2 043	87	1 251	0	34 379
Number of slaves	2 043	2.47	5.22	0	61
Value of cash	2 043	109	930	0	36 652
Value of credit	2 043	808	6 891	0	200 853
Number of credit transactions	5 931	280	1 226	0	44 950
Value of debt	2 043	929	5 174	0	164 641
Number of debt transactions	5 486	349	2 116	0	110 188
Both lender and borrower	2 043	0.4			

Source: Probate inventories and genealogies, own calculations

Notes: Full sample: probates; matched sample: probates and genealogies; unmatched sample: probates only.

Due to these problems, scholars of the Cape Colony have turned to slave ownership as a proxy for wealth (Guelke and Shell, 1983; Fourie, 2013). Slaves were well-documented in the inventories, and more often than not the slave's name and gender are listed on the inventory. More

than half of the inventories in the full and matched samples record some slave ownership, while this declines to 40 percent in the unmatched sample. In households where slaves were present, the average number of slaves owned was 6.45 in the full sample, 7.05 in the matched sample and 5.65 in the unmatched sample. Following Armstrong and Worden (1989), I divided the slave ownership into the following groups: 0 slaves, between 1 and 5 slaves, between 6 and 10 slaves, between 11 and 24 slaves, and more than 24 slaves. Table 2.3 shows the groups and the proportions of each group found in the various samples. As with the averages in Table 2.1, more individuals in the unmatched sample owned no slaves, and less than 1 percent owned more than 24 slaves. Of the matched sample, on the other hand, 44 percent owned no slaves and 2.41 percent owned more than 24 slaves. The results presented throughout this dissertation are not sensitive to these groupings of slave ownership.

TABLE 2.3: Slave ownership group – frequency and proportion by samples

Groups	*Full sample*		*Matched sample*		*Unmatched sample*	
	Obs.	%	Obs.	%	Obs.	%
0 Slaves	2 087	50.17	935	44.17	1 152	56.37
Between 1 and 5 slaves	1 312	31.54	715	33.77	597	29.22
Between 6 and 10 slaves	389	9.35	232	10.96	157	7.68
Between 11 and 24 slaves	305	7.33	184	8.69	121	5.92
More than 24 slaves	67	1.61	51	2.41	16	0.78
Total	4160	100.00	2117	100.00	2043	100.00

Source: Probate inventories and genealogies, own calculations

Notes: Full sample: probates; matched sample: probates and genealogies; unmatched sample: probates only.

Across both the assets (land and slaves) as well as the financial measures (debts and credits), the unmatched sample appears to be poorer than the matched sample. The difference comes from the discrepancies between the two data sources. The probate series is more likely to capture individuals without heirs or children, while the genealogical records are more likely to capture large families. The records that are not matched are the single male individuals at the Cape, of whom there were many. The unmatched sample is therefore biased toward the poorest population, while the full sample is biased toward the left tail of the wealth distribution. This leaves the matched sample with an upward bias within the probate sample, but because the probate inventories are themselves downwardly biased, the matched sample likely captures the median individual in terms of wealth at the Cape.

Another measure to verify these biases is suggested by Lindert (1981). He argues that to test the accuracy of probate inventories is to measure them against tax records. The Cape's tax records were known as *opgaafrolle* were digitised by Hans Heese in the 1970s and used by Fourie

and Von Fintel (2014) to study settler skills. Table 2.4 shows the comparison between the probate records and the tax records. Here, I excluded the zero values from the table, because to be included in the tax census at least some assets had to be accrued. It is clear from Table 2.4 that the matched sample is close to the tax censuses, supporting the claim that the matched sample is a close approximation of the median settler at the Cape, and represents an accurate picture of Cape society.

TABLE 2.4: Slave distribution of samples, and comparison with *opgaafrolle*

	Obs.	Mean	Std. Dev.	Min.	25^{th} percentile	Median	75^{th} percentile	Max.
Full sample	2 073	6.4	7.7	1	2	4	8	73
Matched sample	1 182	7.0	8.4	1	2	4	9	73
Unmatched sample	891	5.7	6.7	1	1	3	7	61
Opgaafrolle	6 932	7.4	8.4	1	2	4	9	66

Source: Probate inventories and genealogies, own calculations. *Opgaafrolle* from Fourie and Von Fintel (2014)

Notes: Full sample: probates; matched sample: probates and genealogies; unmatched sample: probates only.

The financial measures included in the probate inventories are cash value, credit owed to the individual and debt owed by the individual. Cash in the inventories did not distinguish between silver and coins, but mainly consisted of some silver and the coins and notes found on the estate. The first indication of low reliance on cash is already seen in this poor recording of cash. Only 1 516 inventories had some cash listed, or 36% of the whole sample – 714 in the matched sample and 802 in the unmatched sample (see Table 2.1). The low levels of cash can be attributed to three possible causes:

- the chronic shortages of the Dutch rijksdaalder, the main currency used for transactions, at the Cape.
- the variety of different currencies that floated at the Cape and needed to be converted to rijksdaalder before they could be used.
- family members' ability to easily hide or conceal cash before the inventory was taken.
- the cash found was likely used to settle small debts immediately after death and before the inventory was taken.

The first two situations have been shown to be accurate and there is ample anecdotal evidence that chronic cash shortages existed. These low levels of cash can spur more trade to happen on

credit. In the regression results presented later, I find a very low correlation between cash and debt, supportive of the notion that credit was a ready alternative for cash at the Cape. Similar results were found in England, the Low Countries and colonial Massachusetts (Muldrew, 2012; Gelderblom and Jonker, 2015; Vickers, 2011).

Yet, the third explanation may be of interest as well. In fact, the lack of currency recorded in probate inventories is not uncommon. Nicoloni and Ramos (2010) found that only 31 percent of Spanish probate inventories listed cash, lower than the sample found here. They suggest a new way to correct for this under-recording by imputing the cash values for those not recorded. I chose not to do this because cash flow and the value of cash to the economy are not the main focus of this study. In Nicoloni and Ramos' approach, coins and their values also need to be separated from silver in the household. At the Cape, this was not always the case. In the regression analysis, the sample size was not influenced by cash values and was influenced more by the number of children and age of individuals.

Across all three samples, more than 65 percent of households were involved in credit transactions, with an average of 3 credit/debt transactions per inventory and more than 40 percent of inventories involved in both borrowing and lending.[4] The largest creditor in the inventories was Pieter Johannes Petrus Serrurier (MOOC 8/33.2), with 256 425 rds owed to him. Given the average price of a male slave at 345 rds between 1790 and 1793 (Armstrong and Worden, 1989:140), this is equal to 743 male slaves – an extraordinary number. He had mostly large debts over 500 rds, but most was bonds at an average of 2 000 rds and some even larger at 6 000 rds. Serrurier, a minister of the Dutch Reformed Church, was born at the Cape in 1735, married once, and had six children, and he died at the age of 84. Besides the large amount owed to him, he also had cash valued at 7 198 rds and 29 slaves.

The individual who owed the most to others, and whose records could be matched to the genealogical records, was Johannes Paulus Eksteen (MOOC 8/38.61). He owed 135 755 rds, but also had 10 300 owed to him, only 60 rds in cash and 73 slaves. He was the father of Hendrik Oostwald Eksteen (MOOC8/3.93), whom Groenewald (2009) describes as an 'early modern entrepreneur' at the Cape. The unmatched individual with the highest debt, is Thobias Christiaan Rönnenkamp (MOOC 8/46.28), who owed 164 640 rds. He is discussed in more detail in

[4]A complication with this high proportion of inventories recorded as both borrowers and lenders means 'quasi-bankers' would be difficult to identify.

To place these amounts into context, I compared them to wages. De Zwart (2011), who studied soldier wages, and Du Plessis and Du Plessis (2012), who studied Company employees, found wages above subsistence levels for settlers at the Cape. De Zwart (2011) found wage levels at 17.5 grams of silver per day for 1837, while Du Plessis and Du Plessis (2012) found wages of 3.5 grams of silver per day for 1730 and later 5 grams of silver per day for 1790. Taking the 1790 wages and the constant price of 9.61 grams of silver per gulden, the annual wage rate (assuming 300 working days) comes to 156 rds per year. Rönnenkamp is an example of a Company employee who probably would have earned this salary, yet his debt stood at 500 times this wage rate at his death. Even if the net position (credit value minus debt value) of Rönnenkamp is considered, it is 100 times more than this annual wage. This suggests an extraordinary level of individual debt at the Cape. Despite this, private credit transactions appeared regularly in most of the inventories. The question this study turns to next is what settlers borrowed for and whether it was the wealthy or the poor that had the most debt.

The descriptive statistics already pointed to significant use of credit and debt transactions as a basis for trade in the early Cape Colony. However, it remains to be seen if this borrowing occurred for consumption purposes, was used most by the wealthy or the poor, and what the characteristics of borrowers at the Cape were. These are the questions looked at in the following sections.

2.5 Consumption smoothing or wealth creation: The motives for debt

From the descriptive statistics provided above, the probate inventories have proven a valuable source of information on financial interaction between settlers. But as Johannes Fredrik Kirsten and the later historiography observed, the high volume of transactions recorded was an intolerable burden for the settlers. With this new, complete data set on credit and debt transactions, this assertion could be tested empirically. These results show a robust correlation between wealth and debt, rather than debt and poverty, and also that debt transactions occurred for

long-term investment in capital rather than for consumption.

Another claim made by the historical literature is that the Company, church and Orphan Chamber were dominant when it came to the capital markets and lending. This does not, however, seem to be the case with the complete series of probate inventories. In fact, these three institutions combined were involved in less than 10% of transactions. Table 2.5 shows who was involved in debt and credit transactions, sorted by gender or institution.

TABLE 2.5: Lenders and borrowers at the Cape

	Full sample				*Matched sample*				*Unmatched sample*			
	Lenders		Borrowers		Lenders		Borrowers		Lenders		Borrowers	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Male	5 834	95.59	4 993	83.79	5 001	95.22	4 374	83.58	4 444	95.92	3 341	83.99
Female	186	3.05	300	5.72	156	2.97	293	5.60	133	2.87	243	6.11
Company	36	0.59	196	3.74	6	0.11	90	1.72	2	0.04	82	2.06
Orphan Chamber	23	0.38	212	4.04	30	0.57	196	3.73	18	0.39	154	3.87
Other	16	0.26	48	0.92	20	0.38	33	0.63	15	0.32	28	0.70

Source: Probate inventories and genealogies, own calculations.

This is already an important finding – it shows how the contributions of the Company, church and Orphan Chamber have been overestimated by historians.[5] Also, settlers would likely have different motivations for borrowing from these institutions versus borrowing from a neighbour. (I return to this issue with my regression analysis later in the chapter.) To investigate the purpose of borrowing at the Cape, I closely follow the methodology of Ogilvie et al. (2012), but adapt the categories for the Cape's economy. The Cape's economy relied more on agriculture, while the Wildberg region was focused on the textile industry. For this reason, I remove buildings and cloth from the table, but add categories such as agricultural output, (e.g. bundles of wheat) and slaves.

The descriptions are divided into three broad categories – consumption, production and mixed. More than a third of the debt transactions contained some description of what the debt was for. This is lower than the 45 percent found in Ogilvie et al. (2012), but still a significant portion and enough to give a good indication of what borrowing was done for. The distribution for the value of debt between the known and unknown purposes is shown in Figure 2.2. There is no significant difference between these, and I assumed that the unknown purposes would not be problematic for the purpose of my analysis. Table 2.6 shows the purpose categories for

[5] I return to the role of these institutions in Chapter 4.

borrowing at the Cape.

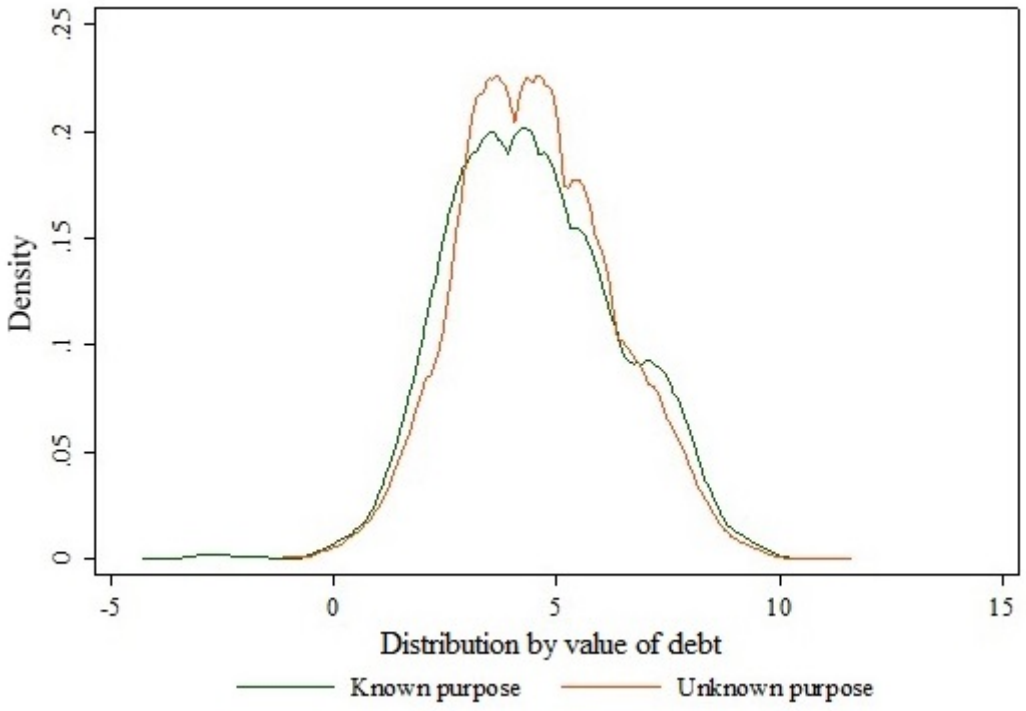

FIGURE 2.2: Distributions between known and unknown purposes of debt

The first important observation from Table 2.6 is the small share of debt made for consumption purposes. This finding challenges the claims by contemporary writers, and later by historians, that the settlers mostly got into debt because they were poor and needed to borrow to survive. As Table 2.6 shows, only 20 percent of debt was incurred for consumption (or non-productive purposes). In fact, the highest proportion of debt incurred for this reason was in the household expenditure category, which included consumables such as candles, a product that the settlers often made themselves. It was likely also richer settlers who would buy candles on credit rather than make them.

The second observation from Table 2.6 is that the debts with the highest average value per transaction were inheritance debts.[6] Under Roman-Dutch law at the Cape, the estate would be equally divided between the surviving spouse and children. In the context of the probate inventories, these debts would be inheritance owed to the minors, whose parents often died before their adulthood. For example, Margaretha Gildenhuijsen owed each of her children 3 763 gulden, or 1 254 rds, for their portion of their father's estate. At the time of her death,

[6]These are removed from the analysis below since they were incurred after death and were not made for economic reasons. However, due to the structure and nature of the data, these debts should be mentioned.

TABLE 2.6: Purpose of debt: Frequencies, proportions, and mean nominal values of debt by samples

Purpose of debt	*Full sample*			*Matched sample*			*Unmatched sample*		
	Freq.	%	Mean Value	Freq.	%	Mean Value	Freq.	%	Mean Value
Child care	31	0.7	137.71	18	0.71	199.94	13	0.7	51.56
Clothing and shoes	31	0.7	35.37	17	0.67	49.15	14	0.75	18.63
Food	193	4.37	55.03	102	4	82.67	91	4.87	25.86
Funeral expenses	383	8.67	52.21	176	6.91	49.49	207	11.07	54.52
Household expenditure	203	4.59	220.94	86	3.38	346.9	117	6.26	124.48
Medical expenses	55	1.24	27.71	25	0.98	36.41	30	1.6	19.66
Wedding expenses	1	0.02	50	1	0.04	50	16	0.86	140.92
Other consumption	26	0.59	149.59	10	0.39	163.45	0	0	0
Consumption total	923	20.89	91.07	435	17.07	122.25	488	26.1	54.45
Land	1 139	25.78	1 206.85	717	28.14	1 334.31	422	22.57	988.9
Land bought with bond	826	18.7	1 398.85	527	20.68	1 557.24	299	15.99	1 120.75
Agricultural output	126	2.85	49.6	79	3.1	49.84	47	2.51	49.19
Cattle	366	8.28	83.75	214	8.4	81.58	152	8.13	86.85
Slaves	87	1.97	785.39	56	2.2	518.72	31	1.66	1241.29
Wages	222	5.02	55.14	121	4.75	57.95	101	5.4	51.71
Working capital	146	3.3	125.86	95	3.73	135.01	51	2.73	108.81
Other production	387	8.76	1 059.88	211	8.28	947.82	176	9.41	1 194.24
Production total	2 473	55.98	480.92	1493	58.59	585.31	980	52.41	605.22
Accounts	108	2.44	273.33	69	2.71	241.11	39	2.09	330.35
Auctions	102	2.31	1434.73	61	2.39	484.71	41	2.19	2883.5
Taxes	12	0.27	225.14	7	0.27	117.86	5	0.27	375.34
Wares	335	7.58	121.33	199	7.81	142.89	136	7.27	89.54
Donations	8	0.18	1 083.34	5	0.2	302.5	3	0.16	2124.44
Inheritance	238	5.39	1 788.12	155	6.08	2 083.46	83	4.44	1 229.87
Other mixed	219	4.96	165.05	124	4.87	111.52	95	5.08	234.92
Mixed total	1022	23.13	727.29	620	24.33	508.67	402	21.5	984.15
Specific purpose given	4 418	34.96	1 374.52	2 548	35.79	1 216.23	1870	33.9	1 643.82
General purpose given	651	5.15	469.71	399	5.6	471.51	252	4.57	466.86
No purpose given	7 567	59.88	289.9	4 172	58.6	332.86	3 395	61.54	237.1
Total	12 636	100	711.38	7 119	100	673.53	5 517	100	782.59

Source: Probate inventories and genealogies, own calculations.

three of her children were younger than 16, and only one daughter was married. The Orphan Chamber would have been in charge of the estate until these children came of age, when these inheritance debts would be paid to them. Adult heirs could also not be resident within the Colony, which forced the Orphan Chamber to take charge of the assets. Because seafaring was dangerous, many of the individuals who traveled to the Cape from Western Europe would have been young, unmarried men, or men who came without their families and once settled, brought their families from Europe. For example, one inventory shows the case of the brothers Dirk and Hendrik Olivier (MOOC 8/4.99), who died without any children[7] and the heirs to the estate were absent at the time. In these cases, the estate would be managed by the Orphan Chamber until the heirs could be located.

Yet, although these inheritance debts were on average the largest, only 238 of them are recorded. They are far outnumbered by land debts, with 1 139 transactions and an average value of

[7]This is according to the genealogical records.

1 206,8 rds. Within these, 826 bonds were used for purchasing land, with an average value of 1 398 rds. These bonds were securitised loan contracts, witnessed by a third-party individual and recorded by an official. Almost all bonds were used for land, although a few instances were used for acquiring slaves or other agricultural goods.[8] There are four types of bonds in the inventory series: mortgage bonds (*schepenkennisse*), notarial bonds (*notarieel obligaties*), secretarial bonds (*secretrieel obligaties*), and private bonds (*onderhandsche obligaties*). The bonds offer the most information on interest rates, which clustered between four and six percent. Hoffman et al. (2000:44) found similar levels and clustering in France for the seventeenth century. They conclude that this ceiling on interest rates led to a rationing of credit. The limited data here presents a hurdle if one were to try to determine whether similar rationing happened at the Cape, and more systematic information would be required to make the conclusion. How much these interest rates were adhered to should also be investigated.

The bond market offers a perfect illustration of the way settlers at the Cape adopted the Dutch credit institutions. By 1620, the bond market in Amsterdam was completely market-based, or driven by personal contact between creditors and borrowers (Gelderblom et al., 2016). This meant that individuals could buy and sell bonds such as *schepenkennis* and *obligaties*, as long as they had some form of collateral – often shops or a general mortgage on all the individual's possessions. The same was true at the Cape: credit transactions were market-driven and personalised; most were unique in terms of creditors, debtors and amounts with most owners of bonds having it as both a debt and a credit. For example, Jacob Minnaar (MOOC8/24.56) had three bonds as credits in his inventory, with three different individuals, but he also had two other bonds as debts committed to two other individuals. The biggest difference between the Cape's bond market and the Amsterdam market was the form of collateral. At the Cape this was mainly farm land and sometimes slaves, not shops or general mortgage on personal possessions like in Amsterdam.

The bonds were generally larger loans and contained information on the interest rate at the Cape. The average size of a loan with a bond was 1 024.14 rds, while the average for all the other loans was 314.17 rds. In Western Europe, bonds and debt were correlated with private wealth, including real estate and merchandise (Gelderblom et al., 2016). This was the case at the Cape as well: richer individuals were more likely to have the capital needed to secure the bond. As Figure 2.3 shows the number of bonds relative to the number of slaves. There were

[8]These were recorded in their appropriate categories.

more bonds in inventories with more slaves.

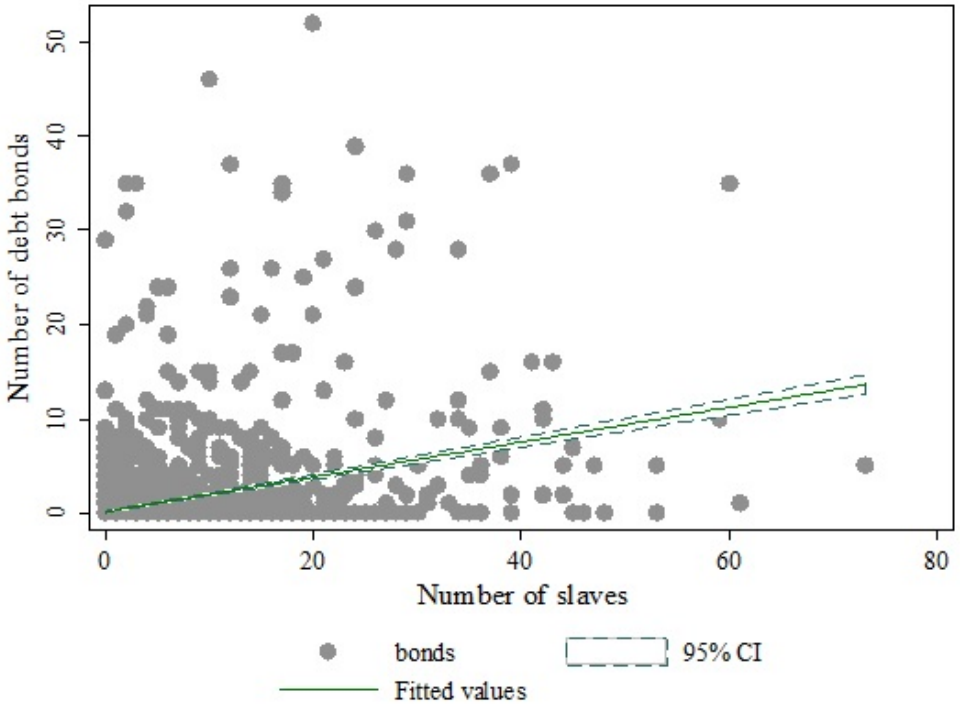

FIGURE 2.3: Relationship between the number of bonds and slaves owned

If land ownership was important for the type of transactions in the credit market, were land and bonds also the most important determinants for an individual's overall level of debt? Next, I look at the characteristics of the individuals in the matched sample, that is 2 117 probate inventories. Other empirical studies, including Ogilvie et al. (2012), found some demographic characteristics as important predictors of debt, like the age and gender of the individual. These assumptions and theories are tested for the Cape using a Tobit regression model used (because of the left truncation of the distribution). The left truncation is due to no negative debt values being observed. To investigate the relationship between debt and wealth, I ran the Tobit regression with controls for demographic variables, wealth variables, and decade controls, but also controlled for price changes by looking at the real levels of debt. This is shown in Panel A of Table 2.7. In Panel B of Table 2.8, I ran an OLS regression with a wealth index. The wealth index was generated from the value of cash, the number of farms, slaves, sheep, cattle and horses.[9] The index values were then divided into percentiles to make the interpretation similar to that of Panel A. With this OLS regression, I continued to control for the demographic and

[9]The results are robust whether the value of cash is included or excluded here.

decade controls.

The first observation from Table 2.7 is the non-significance of the demographic variables, with only females borrowing significantly more using the real values of debt. Previous research has shown that widows at the Cape used their inheritance from estates to improve both their financial position and social status.[10] Also, the farmer dummy is insignificant throughout, not supporting previous hypotheses that the farmers at the Cape were highly indebted and had the most debt by occupation. Other occupations included in the regression included doctors, Company employees, and soldiers.

To further investigate impact of demographics on debt, the transactions were divided into various sizes: small, medium and large loans. Small loans included any debt transactions worth less than 100 rds, medium loans were between 100 and 300 rds and large loans included transactions of more than 300 rds. These were correlated to the 25th percentile and 75th percentile of the full sample. Armstrong and Worden (1989:140) found the price of a male slave to be between 195 rds and 345 rds in the late eighteenth century at the Cape, which correlates to these values as well — a medium loan would equal the value of a male slave. Figure 2.4 and Figure 2.5 show the proportion of each debt size by age group and occupation.

Both these figures show no significant difference between the various groups. Older individuals had similar debt patterns as younger individuals, supporting the assumption that there is little age bias in the sample. Occupation does matter to some extent: sailors have more small debts than the other occupations, but this is to be expected. Sailors were only at the Cape for short periods. Physicians, on the other hand had lots of large debts, likely due to the fact that they were wealthy and trusted individuals.

But when the same transactions are clustered according to slave ownership group (Figure 2.6), a pattern emerges. The individuals with no slaves had significantly more small debts than individuals with more than 24 slaves. The individuals with more slaves tended to have more large debts. This suggests that capital was a signal of riskiness for creditors, especially the number of slaves given their relative importance to farms and other assets. The regressions also support this hypothesis. Slave ownership seems to be the only significant characteristic to determine debt, even when controlling for other production inputs. It is now important to note

[10] Young males also married these widows to improve their social standing (Von Fintel et al., 2013).

TABLE 2.7: Tobit and OLS model of determinants of settlers' borrowing at the Cape

Panel A: Tobit regression results		
Dependent variable:	Value of individual debt in rijksdaalders	
	Nominal values, 1673—1834	Inflation-adjusted values, 1699—1793
Age	-0.005	-0.000
	(-1.310)	(-0.050)
Male	-0.233	-0.474*
	(-0.799)	(-1.884)
Spouse also listed on inventory	-0.041	-0.122
	(-0.088)	(-0.384)
Number of children	-0.007	0.012
	(-0.365)	(0.478)
Farmers	0.199	-0.242
	(0.945)	(-1.134)
Number of slaves	0.087***	0.081***
	(5.852)	(5.947)
Number of properties	0.193***	0.045
	(5.225)	(0.516)
Cash in inventory	0.0001**	0.0001
	(2.380)	(0.219)
Bonds present in inventory	1.072***	1.310**
	(2.642)	(2.522)
Both borrower and lender	-0.273*	-0.110
	(-1.925)	(-0.512)
VOC	0.271	0.341
	(0.728)	(0.966)
Church	0.679**	0.628*
	(2.310)	(1.956)
Orphan Chamber	1.253***	0.818***
	(5.452)	(3.300)
Constant	6.209***	1.100***
	(8.195)	(17.934)
Decade controls	YES	YES
N	570	178
Pseudo R2	0.1102	0.1356

Source: Probate inventories and genealogies, own calculations.
Notes: The dependent variable is the level of debt recorded in the inventory (i.e. the total value of loans for the inventory) in log-linear terms, but excludes inheritance debts since these were not made for economic reasons. Age was calculated using the birth and death dates of individuals found in the genealogies; Male is a dummy variable for gender and equals 1 for males; the spouse listed on the inventory equals 1 when both spouses are recorded on the inventory and 0 if it is only an individual. The number of children is recorded from the genealogical records; Farmer is a dummy for when the individual has an occupation recorded as 'farmer'. VOC, Church and Orphan Chamber are dummy variables for if the person ever borrowed from these institutions. Robust standard errors are in parentheses. The decrease in observations from the 4,160 probate inventories to 570 is mainly due to the missing information in the genealogical records for the early period, especially missing ages from under-reporting of birth dates.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

the difference between this result and the results in Price (1991) and Dennison (2011). Price (1991) showed how large slave plantations had much debt, similar to the result I found for the Cape Colony. Price then quickly moves to the acquisition of slaves on credit. There is evidence that slaves were bought on credit at the Cape as well, but Table 2.6 shows only two percent of debt transactions concerned the purchasing of slaves. In this study, slaves are taken as an indication of wealth. Dennison (2011), on the other hand, focused on serfs[11] and their access to credit. The focus here is on most of the free population, including freed slaves, but not the debt of slaves itself.

[11]The serfs of Dennison's work were farm labourers tied to their lord's estate by the feudal system in Russia.

TABLE 2.8: Tobit and OLS model of determinants of settlers' borrowing at the Cape

Panel B: OLS regression results		
Dependent variable:	Value of individual debt in rijksdaalders	
	Nominal values, 1673—1834	Inflation-adjusted values, 1699—1793
Age	0.0066	0.0084
	(0.0057)	(0.0067)
Male	0.2970	-0.1777
	(0.3298)	(0.3247)
Spouse also listed on inventory	-0.3616	0.2024
	(0.4081)	(0.4578)
Number of children	-0.0446*	-0.0262
	(0.0243)	(0.0310)
Farmers	0.002	-0.0787
	(0.2965)	(0.3178)
Percentile of wealth index	0.0185***	0.0127***
	(0.0039)	(0.0046)
Bonds present in inventory	0.0756**	0.0650**
	(0.0294)	(0.0301)
Both borrower and lender	0.1358	0.1226
	(0.1976)	(0.2499)
VOC	0.1269	-0.0656
	(0.3437)	(0.3215)
Church	0.3994	0.4353
	(0.4030)	(0.04308)
Orphan Chamber	1.2203***	0.7787***
	(0.2776)	(0.2907)
Constant	4.6886***	6.597***
	(0.8618)	(0.7138)
Decade controls	YES	YES
N	251	174
R^2	0.2991	0.2271

Source: Probate inventories and genealogies, own calculations.
Notes: The dependent variable is the level of debt recorded in the inventory (i.e. the total value of loans for the inventory) in log-linear terms, but excludes inheritance debts since these were not made for economic reasons. Age was calculated using the birth and death dates of individuals found in the genealogies; Male is a dummy variable for gender and equals 1 for males; the spouse listed on the inventory equals 1 when both spouses are recorded on the inventory and 0 if it is only an individual. The number of children is recorded from the genealogical records; Farmer is a dummy for when the individual has an occupation recorded as 'farmer'. VOC, Church and Orphan Chamber are dummy variables for if the person ever borrowed from these institutions. Robust standard errors are in parentheses. The decrease in observations from the 4,160 probate inventories to 570 is mainly due to the missing information in the genealogical records for the early period, especially missing ages from under-reporting of birth dates.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

This also disputes the existing historiography on slaves and debt at the Cape. Robertson (1945c:171) wrote '[a]nother reason the coming of the slaves was not an unmixed blessing was that the purchase of slaves added to the freeman's debt'. But Table 2.6 shows only 87 purchases of slaves on credit. At the Cape, slaves were an important capital investment and asset, like Guelke and Shell (1983) stated. It was also these assets that creditors relied on to gauge a debtor's riskiness, which explains the strong correlation between slave ownership and debt shown here.

Table 2.7 also shows that the number of farms listed on the inventory are positively associated with debt, but the significance disappears when real values of debt are used. Cash only has a marginal effect on debt, but also loses significance with real values. The number of slaves remains significant regardless of other controls, suggesting, like Guelke and Shell (1983), that

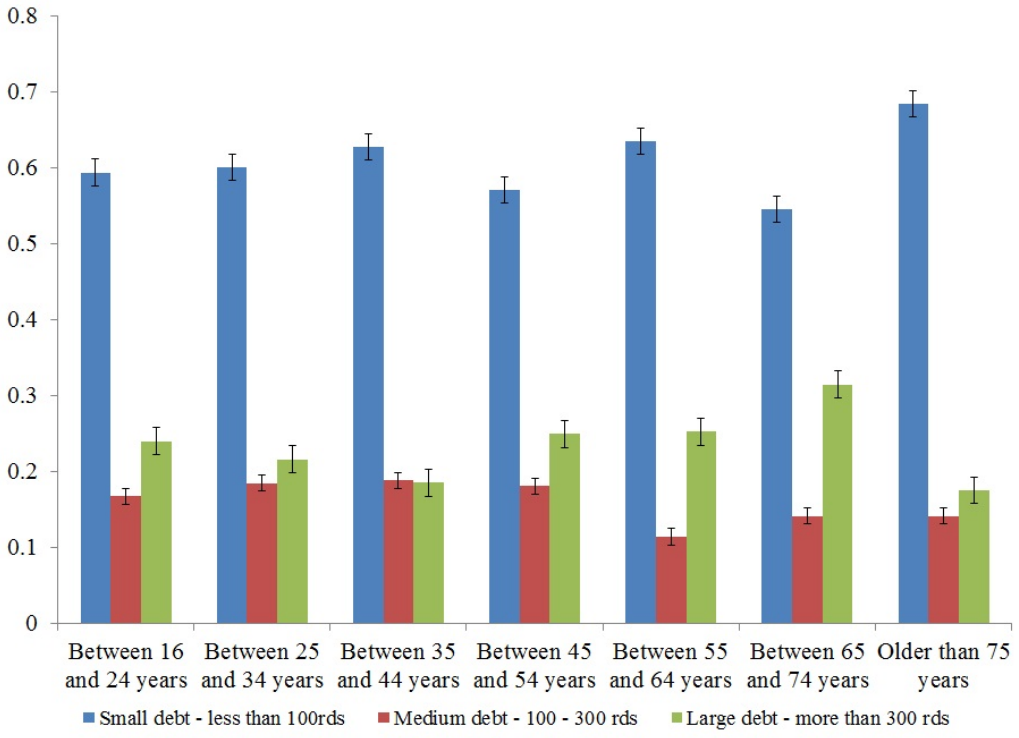

FIGURE 2.4: Proportion of debt size by age group

slaves were an important indicator of wealth at the Cape and thus a more accurate means of estimating wealth than farm land. This strong correlation between wealth and debt relates well to literature on private credit markets of Western Europe, especially the Dutch, British, and French cases where assets were important correlates of debt (Thoen and Soens, 2009).

To do a robustness check on this finding, I created a wealth index by including farm land, the number of slaves, sheep, cattle, horses and cash value.[12] I then divided the population into percentiles for interpretation with the natural logarithm of debt. These regression results are shown in Table 2.8 Panel B. The positive effect of wealth is clearly seen in the positive and significant coefficient on the percentile of the wealth index. This result suggests that a one percent increase in wealth is correlated with a 1.85 percent increase in nominal debt, while it is associated with a 1.27 percent increase in real debt.

The results reported above do not support the suggestion that high debt levels were a result of poverty, but rather suggest that they were used to invest in land and long-term capital. The results also do not support the suggestion that farmers at the Cape were the most indebted of all occupations, but it does suggest wealth (often measured by the number of slaves owned)

[12]The results are robust whether I include or exclude the cash in the inventory.

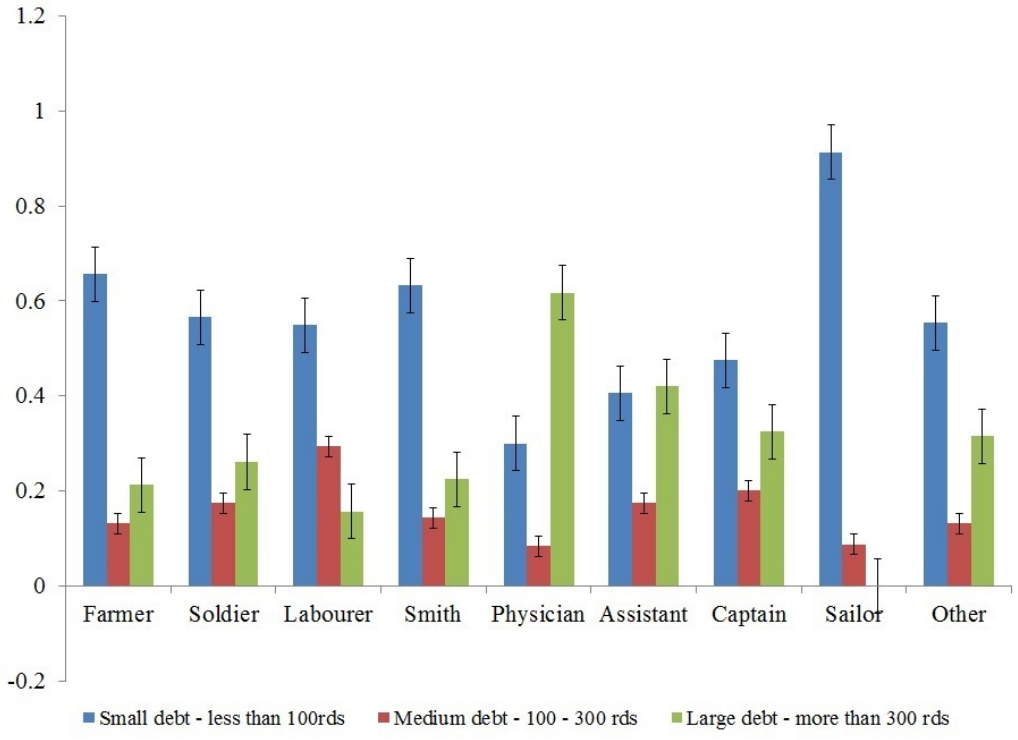

FIGURE 2.5: Proportion of debt size by occupation

was an important determinant for debt. The same holds for other regions, like Western Europe and the early colonies in America – it was the individuals with the most assets who had the most debt. This supports the claim that debt was used for wealth generation rather than for consumption smoothing.

If slaves were associated with wealth and larger debts, it was the wealthy individuals with access to capital and slaves who would have had more debt. Settlers without slaves lacked the capital to invest in large, long-term debts to improve productive capacity and purchase land. The wealthiest settlers, those with more than 24 slaves, dominated the market in terms of the size of their debt. They had the most debt (Figure 2.7), both in levels and spread, but also extended more credit to others (Figure 2.8).

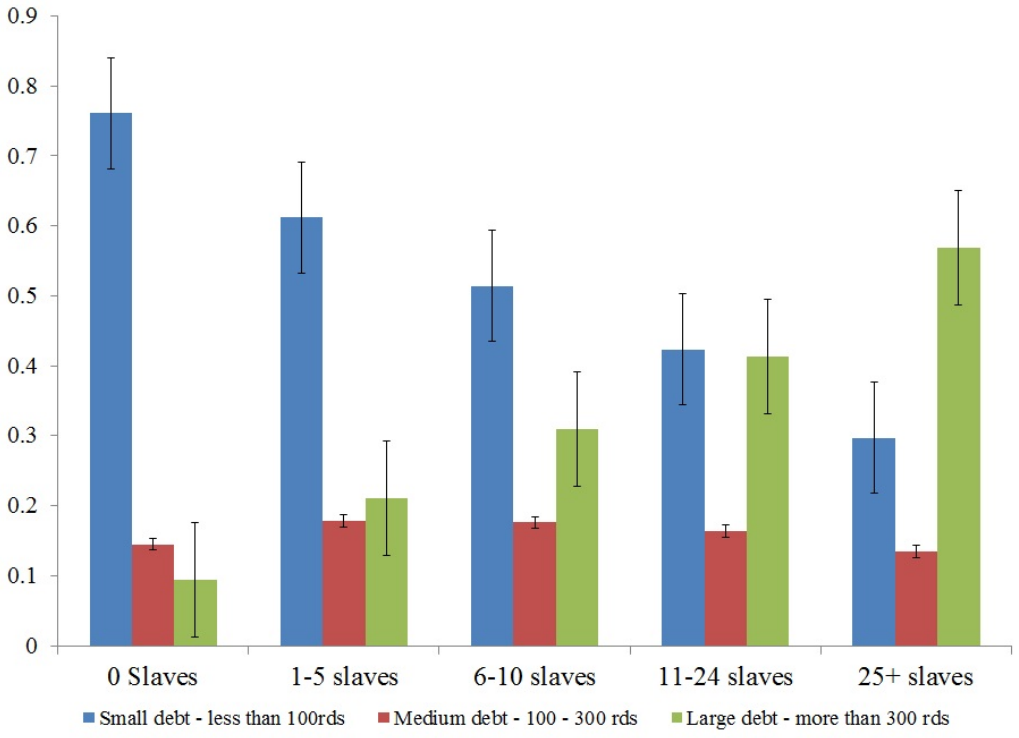

FIGURE 2.6: Proportion of debt size by slave ownership

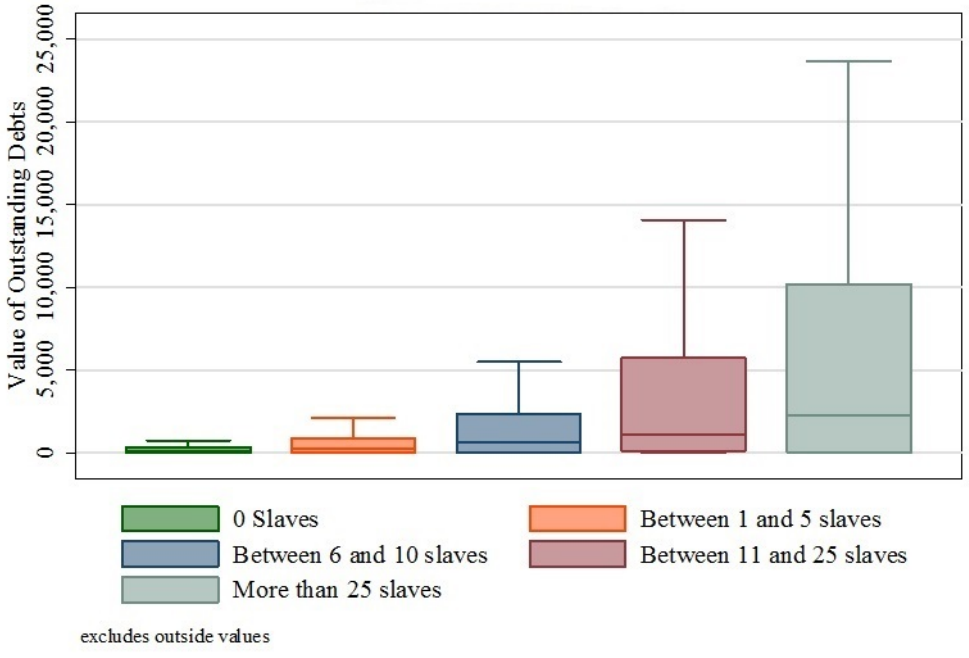

FIGURE 2.7: Proportion of debt size by slave group

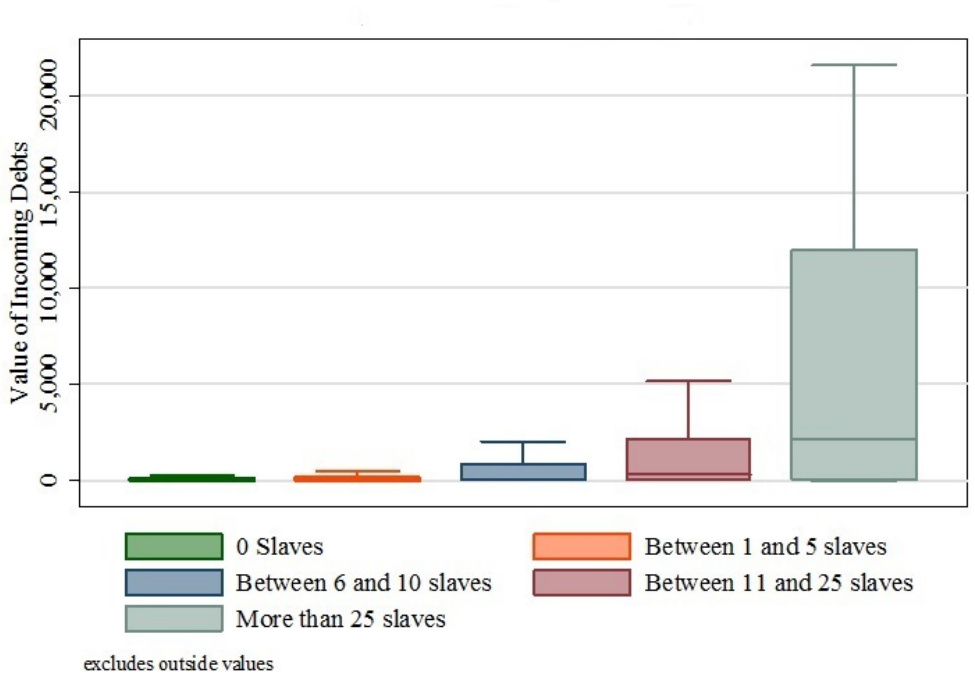

FIGURE 2.8: Proportion of debt size by slave ownership

This raises the question: were the poor excluded from the market? The probate inventories do not support this hypothesis, but they do suggest that the poor used the market for different reasons. Figure 2.9 shows the debt sizes by slave ownership group. More than 60 percent of the individuals with no slaves had at least some debt; of these 40 percent had debt below 100 rds and some even had more than 500 rds of debt. The proportion of individuals with debt of more than 500 rds increases to 60 percent for the groups with more than 24 slaves. This suggests the poor were not systematically excluded from the private credit market at the Cape.

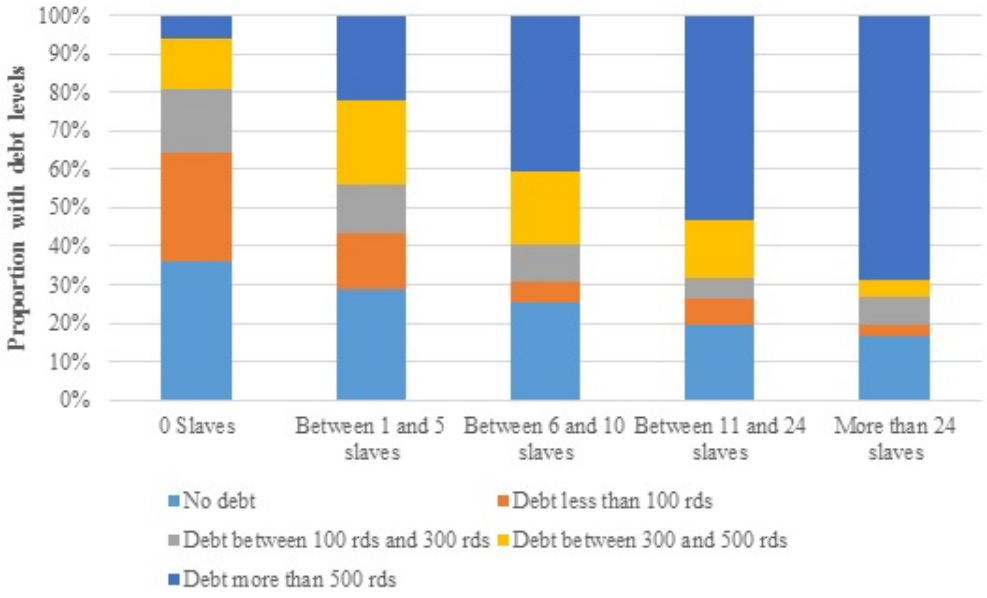

FIGURE 2.9: Proportions of debt sizes by slave ownership

There are some explantions for a zero debt value, especially in the higher groups: the debt might not have been recorded, the individual might have chosen not to transact on debt, or they might have repaid all their obligations before their death. Unfortunately, there is no way to determine which of these carries the largest weight, or to correct for this measurement error. But there is also no evidence that this would have influenced the overall trend and conclusions from these results.

The market continued to grow throughout the century. Figure 2.10 shows the total size of the private credit market observed in the probate inventories for the period. There was little financial innovation at the Cape for much of the eighteenth century. The only financial innovation was the invention of the *slagtersbriefjes* by the Van Reenen brothers (Havemann and Fourie, 2014), to whom Johannes Fredrik Kirsten's brother owed a substantial amount. They describe the *slagtersbriefjes* as uncollateralised loans and promissory notes. A vast number of these loans, together with macro-economic and foreign conditions, led to a financial crisis between 1788 and 1793. The inventories, however, show less than ten of these promissory notes. What is more, the private credit market emerged intact after the crisis, with the market continuing well into the nineteenth century.

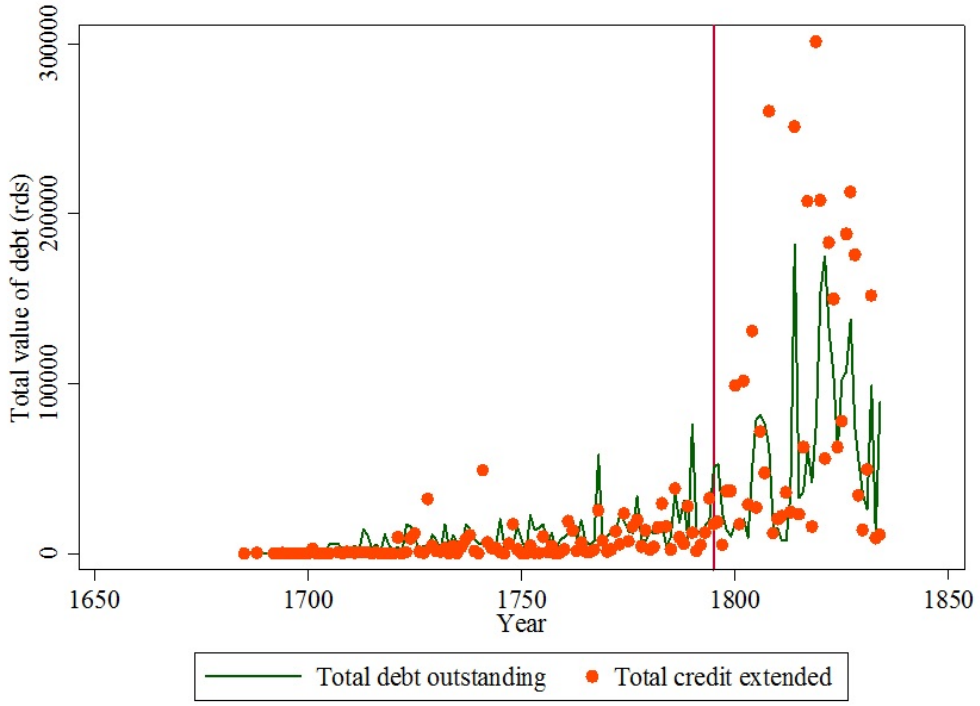

FIGURE 2.10: Size of private credit market over eighteenth century, with en of crisis period

These results offer new insights into the Cape's private credit market: the market was not dominated by the three main institutions, the settlers borrowed for long-term investment in land; and debt was correlated with wealth and not poverty. Although the high level of debt at the Cape has been described by historians before, this chapter offered a different perspective.

2.6 Conclusion: The consequences of the private credit market and further research questions

This chapter set out to use the wealth of information contained in the inventories to describe what the private credit market at the Cape looked like. A strong and robust correlation with wealth was established. It also found that large institutions like the Company, the Orphan Chamber and the church did not play a dominant role in these transactions, but that settlers traded much more with each other on credit. Farmers were also not the most indebted group, and wealth was the best determinant of credit. Most debt transactions happened for long-term investment in land, and not for survival and consumption.

These contributions support new evidence by Fourie (2013), De Zwart (2011), Du Plessis and Du Plessis (2012), and Fourie and Van Zanden (2013), that the Cape was far from the poor colony described in previous historical literature. The private credit market helped to provide settlers with loans to invest in long-term capital, and debt was incurred to purchase land rather than for consumption items. The settlers used assets, especially slaves, to indicate riskiness. The wealthy colonial settlers had the most debt, rather than the poor settlers as often described by contemporary commentators and historians. A causal link between debt and wealth, though, remains hidden.

Questions on the functioning of the market also remain. Despite the absence of a causal link, was wealth transferred over generations, and what happened to debt? What was the role of networks, and did wealth influence your position in the network? Did certain background characteristics determine with whom one traded on credit? And finally, what was the role property rights played in determining debt? The subsequent chapters will explore these issues.

Chapter 3

'Favoured children': Intergenerational wealth and debt in the eighteenth-century Cape Colony

3.1 Introduction

'Favoured children of respected colonists probably passed unobtrusively into the ranks of colonial society,' is what Penn (1999:94) wrote about children of European settlers and free black or Khoikhoi women. But the children of mixed-race relations were not the only ones who were able to use their family name or family connections to improve their socioeconomic status. Johannes Fredrik Kirsten used his father's connections to embark on various investments (Muller, 1960). The Van Reenen brothers owed a debt to their father for their success (Havemann and Fourie, 2014). Hendrik Oostwald Eksteen's children all married into wealthy families (Groenewald, 2009). And Mitchell (2008) describes how Maria Vosloo's children took part in the local economy and made good marriages. The Cape's history is littered with examples of how, wealthy families in particular, experienced social mobility in the early period.

The transference of income and wealth across generations has long been subject to scrutiny by economists and sociologists. This is mainly due to concerns about its effect on inequality. Solon (1999), however, showed that these concerns were often raised without empirical evidence and that actual mobility is much lower than expected. More recent literature on intergenerational mobility has turned to the historical origins of mobility in developed countries. This interest

in developed countries is two-fold: it aids our understanding of the roots of development, and these countries can be conveniently studied due to the ready availability of large data sets (Cilliers and Fourie, 2016).[1] More recently, Piketty (2014:85) suggests that wealth inequality is much higher, especially in developed countries, due to the lack of social mobility. He writes: '...growth can thus increase social mobility for individuals whose parents did not belong to the elite of the previous generation... but in theory it does limit the reproduction and amplification of inequalities of wealth.'

Historically speaking, intergenerational mobility, both positive and negative, has been measured in various ways. Occupations between fathers and sons have been linked (Clark and Hamilton, 2006; Bogberg-Fazlic et al., 2011; Dribe and Svensson, 2008). Titles and the land ownership that comes with them have also been the subject of the study of intergenerational economic effects (Ergene and Berker, 2009; Campbell and Lee, 2003). These studies used indirect proxies or measures for wealth. A more direct method is to use probate estate records, as done by Clark and Cummins (2014) and Arrondel and Grange (2006). Both these studies found a positive and significant persistence in wealth for England and France during the nineteenth century. In a study comparing mobility between the US and England, Long and Ferrie (2013) found American mobility was much higher, but this difference disappeared in the twentieth century. Bleakley and Ferrie (2016) found little influence on financial resources in the human capital development of successive generations. Feigenbaum (2015) found that the negative shock on income from the Great Depression lowered intergenerational mobility.

Despite the existence of extensive literature on mobility, these studies are not without limitations. For example, Clark and Cummins (2014) only focus on rare surnames in matching probate records over centuries. Long and Ferrie (2013) have been criticised for not accounting for structural change in the economy (Hout and Guest, 2013), or for the low mobility among farmers (Xie and Killewald, 2013). To find information on both a father and a son's wealth, matching is often required across multiple historical sources, and match rates are often low (20 percent for Long and Ferrie (2013) and 26 percent for Abramitzky et al. (2013)). Problems also arise when comparisons are made across countries and historical periods (Van Leeuwen and Maas, 2010). This has spurred new research into how to correct for this measurement error in historical sources (Olivetti and Paserman, 2015).

[1] Cilliers and Fourie (2016) offer a perspective on intergenerational occupational mobility in South Africa after the discovery of diamonds and gold, and the industrial take-off in the late nineteenth century.

This chapter aims to add to the debate on mobility in pre-industrial societies. Fourie and Von Fintel (2010) showed how inequality at the Cape was high and persistent even within the European settler community. They attribute this inequality to the 'landed gentry' and the rise thereof. I measure the wealth mobility between fathers and their children (sons and daughters) using three measures of wealth: land ownership, slave ownership, and debt. Across all of the measures, the Cape's settlers experienced significant mobility in their wealth. The settlers were able to obtain equal, and even higher levels of land ownership, slave ownership, and debt levels than their fathers.

3.2 Wealth measures at the Cape: What settlers considered important

There are two important wealth measures used in Cape historiography: land ownership and slaves. Land ownership has been linked to the gentry of the Cape (Guelke and Shell, 1983; Williams, 2013; Groenewald 2009). Many of these wealthy farmers would have been what Mentzel (1925) described as landlords, either absent or resident on their respective farms. Dooling (2005:161) focuses on many of the gentry's farms and follows the profitability of these farms over time. He concludes that the 'stability of landed and slave wealth thus attained meant slave-owners could increase agrarian output successfully as well as their slave-holdings year after year.'

Another case which illustrates the importance of land ownership for settlers at the Cape, is shown in Willem Adriaan Van Der Stel's term as governor at the Cape, and the revolt he faced after he abused his power to acquire land. During his father Simon's term, the colony expanded outward. Willem Adriaan owned vast amounts of productive land, notably his farm Vergelegen, and at some point had the largest land-holdings at the Cape. Land ownership by Company employees was prohibited by Company regulations, and spurred the free settlers of the Cape to write to the Heren XVII. Despite many attempts to quell the settlers' objections, like arresting the burghers' leaders Adam Tas and Hendrik Hüssing, to keep the productive parts of the colony for himself, Willem Adriaan's term ended with his reputation in tatters. He left the Cape for Amsterdam with his brother in 1708 (De Villiers, 2012). This illustrates how the settlers were willing to fight for their rights to use and own land, and not have to compete

unfairly with Company employees.

The Van Der Stel family legacy also included expansion into viticulture (De Villiers, 2012). This expansion toward the mountainous regions of the Cape and the prohibition from the Company to enslave the local population, encouraged the importation of slaves (Fourie and Von Fintel, 2014). The slaves arriving at the Cape mostly came from the East Indies, including modern-day India, Malaysia, and Indonesia, where the Dutch had settlements, but also from Madagascar and Mozambique (Baten and Fourie, 2015). They were sold from the slave lodge in Cape Town and worked predominantly on farms. The average number of slaves owned by one household was five in the early eighteenth century (Fourie, 2013). Despite this, many small-scale farmers failed to catch up to the large slave-holdings of the more affluent farmers (Du Plessis et al., 2015). The accuracy with which slaves were captured in the probate inventories and other sources indicates the value these slaves held for their owners. Another measure of their worth for their owners is the vigorous way with which slave owners set out to find runaway slaves. Penn (2005:94) writes of how the Company called on settlers to 'send out a man everyday to look for runaways,' and the harsh punishment bestowed on these runaway slaves. The economic benefit of these slaves should not be underestimated. Fourie and Van Zanden (2013) showed that the GDP per capita for the economy of the Cape, based on this slave labour, was on par with other European countries and American colonies for the eighteenth century.

The frontier farmers were not as wealthy as their counterparts in the southwestern region of the Colony, where most land ownership was in freehold (Guelke, 1989). Many of these farmers on the frontier were forced to take up loan farms on the expanding frontier after the freehold system closed in 1717.[2] The loan farms had lower values than the freehold farms. These farmers relied on stock farming more than viticulture, and under this system the colony expanded eastward as far as the Kei River. This is where they met the isiXhosa-speaking population, which halted their expansion, towards the end of the eighteenth century (Fourie and Van Zanden, 2013). Although the settlers on the frontier have traditionally been described as less profitable than their freehold counterparts, Neumark (1956:45) suggests the turning point for loan farms to become successful was in the 1740s with the first boom in the meat market.

I add another measure for wealth – debt. The preceding chapter showed how debt was strongly correlated with wealth, robust even to price changes over the century. This is in line with the international literature, which claims that private credit transactions and wealth (rather than

[2]Chapter 6 looks at freehold and loan farms in detail.

poverty) went hand-in-hand in pre-industrial societies. To my knowledge, there has not been an attempt to test the effect of debt over generations. More contemporary studies have found evidence that financial transfers over generations are important. Charles and Hurst (2002), for example, show that children in the United States tended to save and invest in the same patterns as their parents.

There is also evidence in the Cape's probate inventories that children borrowed from their parents, either biological or in-law. For example, Marthinus Oosthuijsen (MOOC8/23.3) owed his biological father 100 rds when he died in 1800, while Simon Faesen (MOOC8/3.83) owed his father-in-law, Claas Laubster, 400 rds. Even a known member of the gentry, Hendrik Oostwald Eksteen (MOOC8/3.93), owed his father-in-law, Jan Meijnderts Kruijwagen, the sizeable amount of 13 500 rds at the time of his death in 1718.

Recent historical scholarship on families at the Cape has shown the importance of intergenerational wealth. Hall (1994) showed how women, especially widows, were central to preserving wealth, while Newton-King (1994) found that even in the frontier community, consolidation of wealth over generations was important. Dooling (2005) contributes to the debate by showing how marriage was a way to accumulate wealth and that, again, women were important in this context. These studies all describe, using historical evidence, that intergenerational wealth was an important aspect of Cape economic life. This study attempts to provide more quantitative evidence of such intergenerational wealth transfers.

Before I continue, a note here on the system of inheritance at the Cape. A system of partible inheritance was observed, which meant that the widow/widower of an estate received half of the inheritance, and the rest was divided equally among sons and daughters. Although some evidence exists that sons were inevitably favoured in the division of estates, I focus on both sons and daughters and their fathers' wealth in the regressions below. Although ideally mothers and their wealth should also be added to the analysis, the matching of mothers to their respective children in the genealogical records is problematic and remains open for future research.

3.3 Wealth of fathers and children

There are two methodologies for measuring intergenerational wealth mobility. The first is to use discrete measures of wealth, like the slave ownership groups used in Chapter 2. For discrete measures of wealth, hierarchically ordered classes are needed. One concern with the latter approach is the interpretation of the results. For example, would it be the same effect moving from owning zero slaves to owning 1–5 slaves than moving from owning 11–24 slaves to owning more than 24 slaves? This movement is usually not linear, and for this reason, I chose to use the continual approach. With this, the correlations between the first and successive generation ranges between 0 and 1 and can be interpreted as elasticities. Studies on intergenerational earnings have found elasticities between 0.3 and 0.4 (Long and Ferrie, 2013; Clark and Cummins, 2014). The continual approach is especially applicable to debt, a new measurement used in this chapter.

Historical studies to measure intergenerational wealth mobility have been limited by the amount of information available for calculating income and wealth. This has led to many innovative ways of either matching different sources to each other, like using rare surnames, or ways of measuring wealth, like linking occupations to wages. The Cape is no different. The most influential source on families at the Cape is the genealogical records. These records trace families by paternal lineage back to the seventeenth century, and have been used in many historical and demographic studies. The information in the genealogies allows for calculations of age, fertility, marriage patterns, migration and occupations, but also the links between successive generations (Cilliers, 2016). Unfortunately, they contain limited information on wealth.

The probate inventories, on the other hand, contain rich information on the Cape settlers' wealth. These inventories listed all the assets and debt of settlers at the time of their death. Although they contain some information on children in the household, this was not sufficient to apply to an intergenerational study. The matched records from both these sources do, however, have enough information on both generations and the wealth of each to test the intergenerational wealth mobility at the Cape in the eighteenth century. Appendix A provides information on the matching process.

I use the same matched records (see Chapter 2 for details) to identify the fathers in the genealogical records. This left me with 282 pairs of fathers and children in the analysis. To use the continual approach and to estimate the growth from the first generation's wealth to the

next, I used the log-linear terms of my wealth estimates. The estimation specifications are as follows:

$$Y_{i,t} = \alpha + \beta Y_{i,t-1} + \text{Number of siblings} + \varepsilon_{it}$$

$Y_{i,t}$ is the natural logarithm of the child's wealth measures (land-holdings, slaves, and debt), while $Y_{i,t-1}$ is the father's corresponding values for these wealth measures, also in logarithmic terms.[3] Before I measured these separately, I estimated the effect between the father's and the children's wealth indices. The wealth index was created in the same way as in Chapter 2, except that debt was also included in the index, and not used as the dependent variable. β is usually interpreted as intergenerational persistence in society, while its complement $1-\beta$ is intergenerational mobility. β is also referred to as the intergenerational elasticity of wealth. This means the coefficients of between 0.3 and 0.4 found in Long and Ferrie (2013) and Olivetti and Paserman (2015) indicate high mobility, but low persistence of wealth in the US. The number of siblings was added as a control to the regressions, because of the system of partible inheritance at the Cape mentioned before. The number of siblings is expected to have a negative effect on intergenerational wealth transfers, since the portion of the estate which each child receives would be smaller.

I ran six specifications for the wealth indices. The first was the simplest form, i.e. the child's wealth regressed on the father's wealth with a control for household size. In the second and third specifications, I added controls for the gender of the child and decade controls. Most studies on the Cape's intergenerational wealth have placed an emphasis on the large role of slave and land ownership. To control for this, in the fourth specification I only looked at families where at least one slave or one farm is owned, and in the fifth specification both these assets must be present. Finally, I interacted the gender of the child with the wealth index to see if different partial effects are present for daughters and sons. Before I present the regression results, some descriptive statistics on the father and child pairs.

Across all the wealth measurements, the children's mean value is lower than the fathers'. This was expected due to the the partible inheritance system. The average number of siblings, or household size, of these families is much higher than that of the entire matched sample. This is one explanation for the lower mean values of wealth in the children's inventories. There are

[3] I replaced zero values with $1 \times 10e^{-10}$ for positive logarithm values. The results are robust, even if I removed the zero values.

TABLE 3.1: Descriptive statistics: Father/child pairs used in regression analysis to match sample

	Children's Wealth Variables				
	Obs.	Mean	Std. Dev.	Minimum	Maximum
Number of farms	282	1.52	1.96	0	10
Number of slaves	282	5.21	7.47	0	44
Debt value	282	1174.54	3125.54	0	22 384.25
Number of siblings	160	6.11	3.97	1	23
Gender (1 = Male)	160	0.64	0.48	0	1
	Fathers's Wealth Variables				
	Obs.	Mean	Std. Dev.	Minimum	Maximum
Father's number of farms	282	1.59	1.67	0	10
Father's number of slaves	282	6.31	7.89	0	43
Father's debt value	282	1301.45	3362.15	0	25 969
	Matched Variables Statistics				
	Obs.	Mean	Std. Dev.	Minimum	Maximum
Number of farms	2 112	1.22	1.97	0	10
Number of slaves	2 112	3.93	7.17	0	73
Value of debt	2 112	1 475.03	6 043.54	0	135 755
Number of siblings	1 021	4.93	3.76	1	23
Gender (1 = Male)	2 108	0.68	0.47	0	1

Source: Probate inventories and genealogies, own calculations.

Notes: The number of siblings is the same as the father's total number of children. I do not distinguish between children from different mothers.

also fewer women in this sample than in the matched sample. These descriptive statistics are shown in Table 3.1.

These statistics do not shed light on the significance of these variables from one generation to the next. This is the question I turn to next. Table 3.2 and Table 3.3 show the regression results for father and child's wealth measurements with the various controls. Wealth measured through the wealth index was consistently positive and significant across the various specifications. The coefficients ranged between 0.15 in specification 1 and 0.226 in specification 5. This suggests a high mobility and low persistence in wealth at the Cape (between 77.3 percent and 85 percent of a child's wealth is not inherited from their father). The mobility effect was lowest in specification 5, where the focus was on the father and child pairs with at least one slave and one farm, i.e. the wealthiest. This suggests that, although the wealthy still experienced high mobility, most mobility at the Cape was experienced by the poor.

These results hold even with controls for the father's household size. The system of partible inheritance would have meant that children in larger families inherited less. However, the household size of the father was positively correlated with the child's wealth. This suggests larger families were wealthier in successive generations. Cilliers (2016:44) also found that larger

families were wealthier at the Cape.

The gender control and interaction effect between gender and wealth was not significant in any of the specifications, and the interaction effect was excluded from the regressions in Table 3.3. This suggests that neither sons nor daughters had a partial effect over the other when wealth mobility is considered. This is more support for Dooling (2005) and Du Plessis et al. (2015), who found that rather than males being the dominant economic players at the Cape, both genders could achieve economic stability.

TABLE 3.2: Regression results of intergenerational persistence in wealth

	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5	Specification 6
Wealth index of father	0.150*	0.152**	0.156**	0.258***	0.226***	0.195*
	(1.966)	(1.995)	(2.035)	(3.275)	(2.722)	(1.779)
Father's household size	0.975*	0.932	1.162**	0.919*	0.564	1.205**
	(1.692)	(1.607)	(2.061)	(1.666)	(0.900)	(2.106)
Male	3.411	2.744	1.565	4.599	6.407	8.236
		(0.765)	(0.634)	(0.357)	(0.894)	(0.752)
Male × wealth index						-0.074
						(-0.499)
Constant	38.902***	37.206***	20.848***	21.527***	37.123***	18.803**
	(7.439)	(6.541)	(2.677)	(2.837)	(3.301)	(2.132)
Decade controls	No	No	Yes	Yes	Yes	Yes
R-squared	0.038	0.036	0.128	0.209	0.167	0.123
N	141	141	136	108	65	136

Source: Probate inventories and genealogies, own calculations.
Notes: T-statistics in brackets.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

This already suggests that the Cape experienced high mobility throughout the eighteenth century. But it is also important to consider the different wealth indices (land, slaves and debt) separately. This is done in Table 3.3.

For the number of farms, the coefficient started at 0.227 and increased to 0.319 for the final specification. This means between 22.7 percent in the first specification and 31.9 percent in the third specification of the child's wealth was from the father, while between 77.3 percent and 68.1 percent of the child's wealth came from his/her own generation. One possible explanation for this very high mobility in land-holdings is the open frontier during this period. The official boundary of the colony expanded throughout the century. Figure 1.1 (page 12) shows the Cape's official boundaries in 1682, 1705, 1731, and 1795. However, many settlers settled outside of this official boundary under the loan farm system (Neumark, 1956:17).[4] There is also qualitative evidence of this. De Kock (1924:19) writes: 'Many of the younger colonists,

[4]Chapter 6 looks at the differentiation between freehold and loan farms in more detail.

TABLE 3.3: Regression results of intergenerational persistence in different assets

	Specification 1	Specification 2	Specification 3	Specification 4	Specification 5
Log of father's number of properties	0.227**	0.232**	0.228**	0.228**	0.319***
	(2.346)	(2.375)	(2.376)	(2.376)	(2.902)
Father's household size	0.006	0.006	0.004	0.004	-0.009
	(0.451)	(0.451)	(0.290)	(0.290)	(-0.531)
Male		-0.055	-0.096	-0.096	-0.099
		(-0.449)	(-0.790)	(-0.790)	(-0.727)
Decade controls	No	No	Yes	Yes	Yes
Constant	0.270**	0.303**	-0.117	-0.117	-0.188
	(2.468)	(2.286)	(-0.467)	(-0.467)	(-0.561)
R-squared	0.035	0.028	0.133	0.133	0.205
N	113	113	108	108	75
Log of father's slaves	0.179***	0.180***	0.132**	0.109*	0.018**
	(2.974)	(2.997)	(2.229)	(1.911)	(2.122)
Father's household size		-0.142	-0.142	0.013	0.003 0.002
	(-0.794)	(-0.792)	(0.074)	(0.018)	(0.088)
Male		-1.362	-0.130	-1.685	0.173
		(-0.920)	(-0.089)	(-1.192)	(0.877)
Decade controls	No	No	Yes	Yes	Yes
Constant	-7.545***	-6.640***	-5.553*	-3.431	1.127**
	(-5.461)	(-4.180)	(-1.742)	(-1.231)	(2.331)
R-squared	0.027	0.029	0.110	0.222	0.029
N	282	281	275	202	104
Log of father's debt	0.201**	0.199**	0.191**	0.183*	0.219
	(2.500)	(2.460)	(2.388)	(1.961)	(1.551)
Father's household size	0.046	0.046	0.059	0.073*	0.048
	(1.270)	(1.280)	(1.608)	(1.718)	(0.750)
Male		-0.110	-0.127	-0.252	-0.348
		(-0.368)	(-0.417)	(-0.693)	(-0.690)
Decade controls	No	No	Yes	Yes	Yes
Constant	4.150***	4.230***	3.952***	3.990***	4.498***
	(7.571)	(7.157)	(3.627)	(3.455)	(3.389)
R-squared	0.036	0.030	0.051	0.077	0.011
N	152	152	149	111	56

Source: Probate inventories and genealogies, own calculations.
Notes: Zero asset values are replaced with 0.000000001 to find the natural logarithmic term. The results are robust whether these are included or excluded. T-statistics in brackets.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

mainly the sons of established farmers, and to a smaller extent, the newly discharged servants of the Company. . . resolved to cross the mountain ranges and settle on the inland plains.' This meant a new generation could easily move to a new area in the Colony and settle farms there, explaining this high mobility in the Cape's land-holdings.

The significant and high levels of mobility are also counter-indicative to many complaints against the system of inheritance at the Cape. The system of partible inheritance ensured equal division of the estates between the surviving spouse and the children. However, with fixed farm sizes, farms were continually subdivided into smaller farms, eventually becoming unproductive and incorporated into larger farms (Dooling, 2005). The evidence presented here, however, shows that father's land ownership was not a barrier to upward mobility. At least, it suggests that for successive generations it was relatively easy to secure land-holdings. This lends itself

more to the qualitative evidence found in Newton-King (1994) and Dooling (2005), who found generations were often successful in consolidating wealth on the frontier.

The same was true for slavery at the Cape. The number of slaves at the Cape increased throughout the eighteenth century, especially in the last quarter (Fourie and Van Zanden, 2013). Table 3.3 shows that for all five specifications, more than 80 percent of the second generation's slave wealth was not inherited from the father. This suggests low persistence and very high mobility in slave wealth. Fourie and Von Fintel (2010:239) describe slaves as 'an important predictor of farming success and, as a result, [they] contributed positively to asset wealth in this period.' But they further found that the introduction of slaves to the economy raised inequality between the groups at the Cape and had long-term consequences. The continued use of slaves made it possible for some farmers to become very wealthy, but others could not make use of the opportunity (Du Plessis et al., 2015). My results contradict this hypothesis, and rather suggest that mobility in slave wealth remained high throughout the eighteenth century.

This brings me to the combination of land and slavery. According to the Nieboer-Domar hypothesis, slavery as an institution arises in conditions where land is abundant, but there is a shortage of labour. Green (2014:67) analyses the Nieboer-Domar hypothesis and applies it to the Cape Colony. What he found is that although the hypothesis is relevant to the Cape's economy, it needs to be modified from the original. He suggests the Company's demand for labour initially exceeded the farmers' demand for labour. But as settlement at the Cape increased and wealthy farmers rose to prominence, their demand for labour also increased. He writes: 'Slavery, which already existed as an institution in urban areas, became one of the major forms of labour employed by these farmers.' My results here support the claim that the demand for labour, and therefore slaves, increased throughout the eighteenth century. The high mobility in slave wealth suggests that later generations acquired more slaves through their own ability, and slave wealth was not persistently inherited from their fathers. The combination of high mobility in land and slave ownership suggests that successive generations could react to the factor endowments available to them, and were not limited by institutional factors that protected the privileges of the elite.

The mobility in debt between successive generations was significant, but this significance disappeared when decade controls were added. Here, the number of observations dropped to 56, which may explain the lack of significance. What should be noted here is that debt was not inherited by children but subtracted from the estate before the inheritances were paid to the

children. What I focus on here is the value of total debt for the father and the child. Around 80 percent of the value of debt for the children in the sample was from mobility rather than persistence in the value from their fathers. This high mobility in debt is be expected, though, especially given the high mobility in land and slave ownership and the correlation between wealth and debt described in Chapter 2. These levels of mobility in debt is achieved, despite the system of partible inheritance. Not only the debt levels are important when comparing debt between generations, but also what the debts are made for, a topic I return to below.

These significant results are suggestive of high levels of mobility in the Cape's economy. Taking debt as a proxy for income, and comparing the intergenerational elasticities for debt found in Table 3.3, it is higher compared to the US and England. Clark and Cummins (2014:73) found an income wealth elasticity of 0.41 for England, while Olivetti and Paserman (2015) found a 0.35 elasticity for the US. The comparable elasticity for the Cape is only 0.24 for the eighteenth century, although the studies on the US and Britain are for the nineteenth century. As far as I know, no study has looked directly at slave wealth and debt mobility as I have done here.[5] More comparable wealth indices can be found in Kearl and Pope (1986), although the period differences remain. Kearl and Pope (1986) found intergenerational persistence at 27 percent for the second half of the nineteenth century. Although my wealth measures are still less persistent, this is closer to those who owned some wealth.

These results dispute the claims, at least for the Cape Colony, made by Smith (1776) on Dutch colonies when he wrote: 'The progress of some of them, therefore, though it has been considerable, in comparison with that of almost any country that has been long peopled and established, had been languid and slow in comparison with that of the greater part of the colonies.' The low persistence in wealth at the Cape suggests there were plenty of opportunities for migrants from Europe to improve their socioeconomic status. Mitchell (2007:247) indicates that many of the settlers at the Cape came from the poorest socio-economic class in Europe. One aspect in which my research falls short is that is does not study these immigrants' social standing in Europe before they migrated to the Cape. It also does not account for the possibility that some of the very poor may have decided to move back to Europe.

Perhaps the most notable example of such mobility can be found in the story of Martin Melck (1723–1781). Melck was a German immigrant who received training as a builder in Europe, before joining the VOC and moving to the Cape. Once he arrived at the Cape, he worked

[5]For a more direct comparison using occupations and social mobility, see Cilliers and Fourie (2016).

as a *knecht*, or overseer, before becoming a free burgher. Once he achieved this status, he bought two freehold farms with cash and continued to improve economically by marrying Anna Margaretha Hop, a wealthy widow. At the time of his death, he owned 204 slaves (Giliomee, 2003:29). He also invested in alcohol *pachts* (Groenewald, 2011) to become the richest man in the Colony by the end of the eighteenth century.[6]

As I mentioned before, the value of a father's debt level is not the only concern when considering children's debt levels. Contemporary studies have found that children save and invest in similar patterns to their parents (Charles and Hurst, 2002). As far as I know, there is no study which has applied the idea and concept to history. I attempt to do so here by using the broad reasons for borrowing – consumption, production and mixed – shown in Table 2.6. Before, I showed that borrowing at the Cape mainly happened for productive purposes. Table 3.4 shows a comparison between how often fathers and sons borrowed for each of these categories. In Table 3.5, I show the mean values for the categories as borrowed by fathers, and children and compare the means using a T-statistic. The T-statistic is calculated as follows:

$$T = \frac{D_c - D_f}{\sqrt{\frac{{SD_c}^2}{N_c} + \frac{{SD_f}^2}{N_f}}}$$

Like in Chapter 2, borrowing for productive purposes happened most often. For fathers, 49 percent of loans were made for productive purposes, while this decreased to 45 percent for children. But within the groups, children were also more likely to borrow for production if their father borrowed for production. Within the productive category, 48 percent of transactions were made if the father also had productive loans, while this decreases to 27 percent for consumption.[7] This suggests that, like in Charles and Hurst (2002), children in the Cape Colony borrowed in the same patterns as their fathers and that financial literacy is transferred between generations.

Furthermore, children borrowed larger amounts for production than their fathers. In Table 3.5, I compare the mean values of these groups between fathers and children. Borrowing for production is the only category where there is a significant difference between the borrowing of fathers and children.

[6] I return to the various groups which existed at the Cape in Chapter 4 and 5.
[7] This is calculated by the diagonal divided by the father's row total.

TABLE 3.4: Patterns of borrowing between fathers and children

Father's Borr. Pur.		*Child's Borr. Pur.* Consumption	Production	Mixed	Row Total
	Consumption	8	13	10	31
		3.27%	5.31%	4.08%	12.65%
	Production	18	59	45	122
		7.35%	24.08%	18.37%	49.80%
	Mixed	9	39	44	92
		3.67%	15.92%	17.96%	37.55%
	Column Total	35	111	99	245
		14.29%	45.31%	40.41%	100.00%

Source: Probate inventories and genealogies, own calculations.

TABLE 3.5: Mean values of borrowing between fathers and children

		Father's Mean Value	Son's Mean Value	T-statistic
Consumption	Mean	60.32	124.39	1.44
	SD	312.55	758.07	
	Obs	187	399	
Production	Mean	303.81	400.38	2.17***
	SD	598.94	1011.61	
	Obs	468	847	
Mixed	Mean	1103.43	823.67	-1.03
	SD	5192.79	3961.15	
	Obs	486	863	

Source: Probate inventories and genealogies, own calculations.
Notes: T-statistic compares the mean value of the child's debt to the mean value of the father's debt.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Ample examples of intergenerational borrowing and mobility can be found in the probate inventories. I would like to share some here. The choice was made between various categories: the first, was a poor father and a richer son to show the mobility captured in the regression. The second is a wealthy father and son to show how mobility differed between the rich and poor and finally, a father and daughter to show how gender was not an obstacle to mobility. First, a slightly poor father and son pair — Johannes Fourie (MOOC8/12.47) and his son, Louis Johannes (MOOC8/58.27). Johannes Fourie was born in 1733 in Stellenbosch. In 1760, he married Cecelia Johanna Du Preez and had four children, three sons and a daughter. Louis Johannes Fourie was the youngest of these and was only one year old when his father died in 1769. Johannes Fourie owed the small amount of 180 rds to Jurgen Spengeler, for what we do not know. He only had two slaves. Louis Johannes was born in 1767, married Geertruij Maria Wilhelmina Grobbelaar in 1790 and they had seven children. He died in 1809, aged 42. Louis only had one slave and owed 396 rds to four individuals. One of these debts was the 300 rds for his slave, Geluk Van Madagascar.

The second family are the Lombards. Father Christoffel Lombard (MOOC8/21.35) was baptised in 1726 and passed away in 1796. He had sixteen children from two marriages: first, to Aletta Maria De Lange and second to Maria Johanna Walters. He owned three farms and 43 slaves. Although his debt was low at 739 rds, he had more than 6 000 rds owed to him. Daniel Stephanus Lombard (MOOC8/23.1) was Christoffel's third child and second son. He, in turn, had 14 children when he died in 1800, as well as one farm and two slaves. He owed 1 200 rds in *capitaal* (probably for land) to the Orphan Chamber and 25 rds for a summons from Johannes Ackerveld.

Finally, a father-daughter combination. Cornelis Brits (MOOC8/14.29) married Maria Magdalena De Peronne in 1724 and had 10 children.[8] He only had one slave, and also had relatively little debt, at 10 rds to the messenger of the Orphan Chamber, Jan Harmen Redelinghuijs. His daughter, Sophia (MOOC8/19.65), died in 1790. She was married to Johannes Carstens in 1740 and again to Carel Joseph Kock, although the date of the second marriage is unknown. With Carstens, she had three children, two sons and a daughter, and a fourth with Kock, a son. She lived in Cape Town and owned a house there, with three slaves listed on her inventory. Most of her debt (a total of 2 433 rds) was owed to the church for a mortgage bond. The other debts were made to Frans Matthijs Carstens, her son, and one debt to Casper Morgendaal. Unfortunately, I could not find more information about Frans Matthijs Carstens and these debts.

Although these are only a few examples of the debt patterns between fathers and their children, these cases illustrate how the children of settlers owed more than their fathers, but that they often made these debts for productive investments, like the capital debt of Daniel Stephanus Lombard or the mortgage bond of Sophia Brits. The high wealth mobility found here suggests resources were available for later generations to improve their socioeconomic standing. But it also points to another key aspect of the credit market at the Cape: networks. This is studied in Chapters 4 and 5.

3.4 Conclusion

This chapter investigated the claim that low intergenerational wealth mobility at the Cape. The historiography of the Cape argues that the settlers at the Cape were highly indebted and

[8]The genealogies do not have information on his birth or baptism.

therefore poor, but the results in this, and the previous chapter, suggest that indebtedness was correlated with wealth. I found that debt was used mainly for productive purposes, rather than consumption, and in this sense, debt was a source of potential future wealth.

Two significant wealth measures existed at the Cape – land and slave ownership. Many historical studies have shown the importance of land ownership at the Cape. The inaccurate measurement of land relative to slaves and the interwoven relationship between these two factors are reasons why both Cape historians and economic historians have turned to the use of slave ownership as a proxy for wealth. The system of partible inheritance has been blamed for low intergenerational wealth mobility and the same has been said of the Cape. I set out to re-investigate intergenerational wealth mobility at the Cape and add quantitative evidence to the ample qualitative historical evidence. I add to these wealth measures by also measuring debt levels between fathers and children.

The results show significant mobility and low persistence in wealth at the Cape. Land ownership showed significant mobility over time, although the effect was slightly less when the presence of slaves was taken into account. The mobility in slave wealth is significant regardless of the other wealth measures and also over time. In addition, there were significant correlations between the levels of fathers' debt and their children's debt, but the significance disappeared when the presence of slaves and farms were taken into account. In comparison with other regions, like the US and England, there was therefore high mobility in the Cape. But a note of caution is the difference in methodology between this study and others, as well as the difference in periods. As far as I know, there has been no study which looks at the mobility and persistence of slave wealth or debt.

Another part of intergenerational debt what these debts were made for, which is what I attempted to investigate. I also find that children borrowed more for productive investments, but it was often only if their fathers had also borrowed for production. This suggests that children did tend to borrow in patterns similar to their fathers. I provided some examples from the probate inventories of where children borrowed more than their parents for these categories.

But intergenerational mobility and similar patterns in debt between fathers and their children make up only one part of familial debt relations. Another aspect is the networks a family forms and how this makes them part of a wider network. This is the question I turn to next – who

were the central individuals and families in the Cape's debt network?

Chapter 4

'Webs of credit and obligation': A network analysis of credit transactions for the eighteenth-century Cape Colony

4.1 Introduction

Intergenerational relations are not the only connections through which wealth is transmitted. Another is the social network which a family forms part of and where families are linked together. In Chapter 2, I described Johannes Fredrik Kirsten's letter to the British government about the economic conditions at the Cape. His brother, Jan Pieter Kirsten (MOOC8/46.62), was deeply indebted and even owed his brother 3 333 rds at the time of his death in 1820. His brother was not the only influential individual whom he owed a debt to. He owed 1 600 rds to Jacob Van Reenen, father of the (in)famous Van Reenen brothers, and 1 600 to Willem Ferdinand Van Rheede Van Oudtshoorn. The latter was the grandson of Baron Pieter Van Rheede Van Oudtshoorn, who was destined to be governor at the Cape after Ryk Tulbagh, but he died at sea on the voyage to the Cape. He was also the husband of Gesina Kirsten, sister of Jan Pieter and Johannes Fredrik. This is only an example of how connections through family could provide access to the credit market at the Cape. Robertson (1945c) showed that even under Van Riebeeck, credit already played a vital role in the Cape's society. Van Riebeeck organised private lending to 'create a more closely-knit society at the Cape, where people would be bound together by their interlocking interest as debtors and creditors' (Robertson, 1945c:175).

Networks have always been an important element in debt and credit relations, especially in the absence of the intermediation of formal banks. Pagett and Ansell (1993) showed that for the Medici family in medieval Italy, it was not their pre-existing wealth that mattered, but their position in a network of marriages and business connections which gave them their prominence.[1] Even in Renaissance Florence and Venice, the birthplace of banks, networks for credit mattered, and a bad reputation could lead to ruin (Pagett and McLean, 2011).

This is only one example of the use of network analysis in a historical context. Other authors have also pointed to the importance of connections in obtaining debt, without directly measuring the networks. Ogilvie et al. (2012) provide evidence that even individuals from outside the town of Wildberg were incorporated into the town's credit network. Van Bochove and Kole (2014) note how the Amsterdam market relied on networks to link supply and demand through unstamped loan forms. Rothenburg (1985) shows how the number and average creditors and debtors per inventory increased over time, leading to a wider credit network in rural Massachusetts. And Lamoreaux et al. (2003) postulate that repeated interaction between households, shops, and stores built mutual trust and discouraged cheating and defaulting on debts. Vickers (2011) looks at the interaction between the Native Americans and the European arrivals on Nantucket Island in the late seventeenth century. He shows how Mary Starbuck provided goods and services to the Wompanoags, with little interaction in the 1680s but much more in the 1700s. This is another case where networks meant continued trade over long periods.

Vickers (2011:1055) suggests that the wide participation in credit transactions was the result of the high cost of enforcement, since 'everyone dealt with everyone else'. Muldrew (2012:6) describes the involvement of many different social classes in debt transactions for early modern England:

> Every household in the country, from paupers to royalty, was to some degree enmeshed within the increasingly complicated webs of credit and obligation with which transactions were communicated. Merchants traded on credit, tradesmen sold or worked on credit; and many of these people were in debt to the poor for wages and for small sales, or work done.

These studies all show how important networks were for debt and credit transactions in pre-industrial societies. The measurement of these networks has, however, been neglected. With a

[1] Many textbooks and courses on social network analysis use this example for its simplicity in explaing the basic concepts.

new methodology and computational power available, these networks can be measured quantitatively. This chapter aims to investigate who the central individuals and families in the Cape's credit network were. Many of these identified families are already well-documented in the Cape's historiography, but my investigations puts forward some new prominent players. Before the network is discussed and analysed, I provide a short overview of how social networks can be measured, and why this measurement is important in an economic context.

4.2 Why are social networks important in an economic context?

The recent rise in social media sites and the connections enabled through them have spurred investigations into the role of social networks in decision-making. It has encouraged economists to use social network analysis more in modeling and policy-making. Jackson (2014:3) offers the following opinion on why social network analysis is increasingly being used in economic modelling: 'Humans are fundamentally a social species with interaction patterns that shape their behaviours ... the full network of relationships affects how people behave.'[2] Goyal (2011) provides an overview of the literature on the role of social networks in an economic context.

Two seminal papers by Granovetter (1973, 1985) deserve attention in this regard. In the first, Granovetter (1973) builds and discusses the strength of weak ties or how informal ties are key to networks. He concludes that more often informal connections, or those with whom we spend little time, present economic opportunities, like acquiring job positions. In his later work, Granovetter (1985) argues that human interactions are embedded in decision-making and that new institutional economics underestimates the role of social decision-making. He suggests that 'the anonymous market of neoclassical economics is virtually non-existent in economic life and that transactions of all kinds are rife with the social connections described' (Granovetter, 1985:495). Social networks are therefore important in the institutional view of economics, that sees norms and values as part of the informal institutions which can influence economic outcomes such as growth. Acemoglu and Jackson (2015) present a theoretical model for this. They suggest that history anchors social norms, but that these norms can be changed by prominent actors in the

[2]Several studies have looked at the importance of social networks in economics. Banerjee et al. (2013) studied diffusion and microcredit in India; Jackson and Nei (2015) studied international trade during wartime and the role of alliances; Miniou and Reyes (2013) studied global banking; Elliot et al. (2014) studied financial contagion and how networks can prevent or enhance contagion.

network.

In recognition of Granovetter's embeddedness theory, Williamson (2000) acknowledges that institutional economics has yet to grasp the full impact of human decision-making on economic outcomes. He proposes a four-level framework for institutions. The first level is embeddedness and includes informal institutions that are slow to change. The second level is the formal 'rules of the game', including property rights. The third is governance or ensuring the rules are abided by, which is followed by the fourth level of resource allocation. Much is known about the last three levels, but less is known about informal institutions on the first level. One way to answer the questions on these informal institutions is to study social networks, their impact on the decision-making of individuals, and networks' formation and evolution.

The Cape Colony had specific informal institutions that governed interactions among settlers. Marriage and economic partnerships became key in explaining the position of a family in a network. Mitchell (2008:8) proposes '[s]ettlers and slaves moved through the region along a network of farms linked by family ties and reciprocal obligations' and that to optimise inheritance, families used marriage and 'intricate property networks'. Dooling (2007) presents further evidence of how marriage and family were employed by the settlers to protect wealth. He argues that 'familial and residential propinquity built local communities and an intricate web of community relations. Undoubtedly, the landed elite was in the forefront of such networks' (Dooling, 2007:40). He goes further and linked this to the culture among these settlers, saying '[s]tanding surety for kin and neighbours was an affirmation of community interdependencies and represented a willingness to share in the risks' (Dooling, 2007:130). This implies that the connections made through social networks were key to families and their economic survival. Fourie (2014:167) suggests 'the roots of prosperity' of Cape farmers came from these social networks.

This chapter aims to add to this literature. It focuses on the Cape Colony by looking at the central individuals and families in the network of the probate inventories' credit transactions. Centrality measures enable us to distinguish who the most influential individuals in the network were, and whether the individuals identified in the network here are the same individuals identified in the existing historiography of the Cape. The results show that many of the individuals identified by the existing historiography as important economic agents are also identified when social network analysis is used. However, they are more often than not only ranked third or fourth. I instead draw attention to some new individuals who should be investigated in future

historical research.

The chapter makes three important contributions. First, it shows how social network analysis can be used in a historical setting with a large number of transactions obtained from probate inventories. Secondly, it expands our understanding of the evolution of credit networks. And finally, it provides new evidence on the characteristics of the Cape credit network. It gives the qualitative evidence from history quantitative support and shows how easily informal trade withing these networks can be easily underestimated.

4.3 Data and methodology: Measuring networks in an economic context

The role of social networks in an economic context has come into focus as research has moved away from the anonymity of textbook market analysis, where people have perfect information and many buyers and sellers exist in a market. The focus in network analysis is often on the role connections play in labour market outcomes or in the spread of technological change. This section describes the methodology behind network analysis and ways of measuring the centrality of individuals. Before the centrality measures are looked at, two general network measures should be considered: the diameter of the network and the average path length. The diameter of a network is the largest distance between any two nodes, while the average path length is the average of these distances (Jackson, 2008:38). The distance between the nodes are the number of connections it takes to move from one node to the next. For example, if Smith is connected to De Beer, but not to Fourie, while De Beer is connected to Fourie, the distance between Smith and Fourie is two. The network measures of the Cape Colony, as obtained from the probate records, are presented in Table 4.1.

Table 4.1: Descriptive statistics of network of credit transactions

	Diameter	Diameter growth	Average path length	Average path length growth	Population growth
Before 1700	3.000	-	1.495	-	-
1700-1724	9.000	2.000	4.350	1.910	2.439
1725-1749	16.000	0.778	6.361	0.462	2.005
1750-1774	15.000	-0.063	6.223	-0.022	2.710
1775-1800	18.000	0.200	4.871	-0.217	1.575
1800-1824	23.000	0.278	8.174	0.678	2.142

Source: Probate inventories and genealogies, own calculations

The diameter and average path length increase over the period observed. One concern with considering only these two measures is the population growth over the period, as the network is likely to increase in diameter and average path length if more nodes (defined below) are added. If nodes are randomly added and connected to the previous nodes, the diameter should increase at the same speed as the population. But the Cape's diameter and average path length increase at a much slower rate than the population. This means the network at the Cape was becoming denser over time. A comparison between the growth in diameter, average path length and population is found in Figure 4.1.[3] It should be noted that the network measured here is a directed network, because we know whether the transaction was a credit or debt. A credit is therefore a flow into the node, while a debt is a flow to the oppposite node. It should be kept in mind that this network may exclude some of the wealthiest individuals due to the nature of the probate inventories. However, as discussed in more detail in Chapter 2 Section 2.3, the Cape's probate inventories tend to represent a median individual at the Cape. A possibility for future research is to compare the network found in the MOOC 8 series and the Stellenbosch inventories.

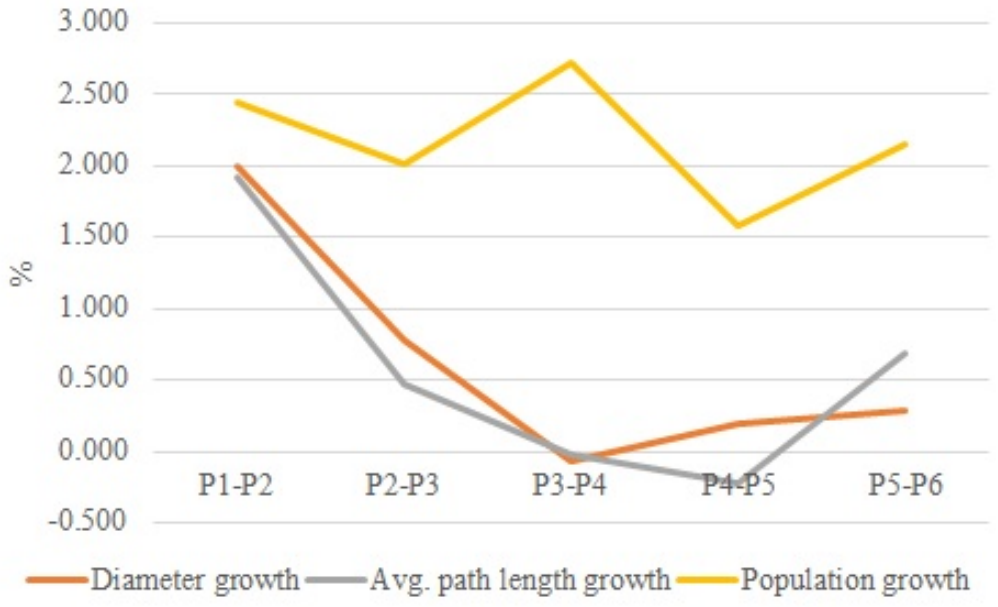

FIGURE 4.1: Networks statistics over time

The three most commonly used measures for identifying the most central individuals are degree, betweenness and eigenvector centrality. The aim, as described above, was to test whether the existing historiography accurately identified the most connected individuals in the Cape's financial network. A second step was to check whether the individuals discovered through network analysis are the same as those identified by historiography as central to the Cape's social

[3]The population figures are from in Fourie and Van Zanden (2013).

network. For this purpose, centralities are better suited than degree distributions, diameter, average path length or clustering measures of a network.

Degree centrality describes how connected a certain node, in this case an individual listed in the inventories, is. In the case of social network analysis, a node is defined as either an individual or a household connected to others in the network, and is an element of $N = 1, 2, 3, \ldots n$. The degree of centrality for a node is $\frac{d_i(g)}{(n-1)}$, where g is an $n \times n$ matrix for individuals and g_{ij} are all the possible relationships between i and j (Jackson, 2008:37,38). This measure would tell us how an individual at the Cape was connected to other individuals at the Cape, but not how important the individual was within the network. Degree is only an indication of the number of connections or transactions an individual has or was involved in.

The second measure is betweenness centrality. For betweenness centrality, the shortest path between two individuals (k and j) is calculated, and the number of paths on which individual i lies is counted. The betweenness centrality of individual i is calculated by $Ce_i^B(g) = \sum_{k \neq j : i \notin k,j} \frac{\frac{P_i(kj)}{P(kj)}}{\frac{(n-1)(n-2)}{2}}$. The closer this ratio is to 1, the more i lies on paths connecting others (k and j defined here) to one another, and thus the more central i becomes to the network. It is often an important node for information (Jackson, 2008:39). If an individual has a higher betweenness centrality, they likely have more information about others and should be intermediaries in the market.

The next measure of centrality considered for the Cape's credit network is eigenvector centrality. Eigenvector centrality for individual i is proportional to the relative position of the connection with j, or $C_i = a \sum_j g_{ij} C_j$. Eigenvector centrality gives an indication of the relative importance of individual i in the network. Eigenvector centrality increases as the node is connected to more influential and central nodes, i.e. i becomes proportionally more important if j is more important (Jackson, 2008:39). Eigenvector centrality will give an indication of the nodes with the most influence over others in the network. More influential individuals would likely have more wealth, so eigenvector centrality and wealth are expected to be correlated.

Before the results on centralities are presented, some assumptions should be mentioned. Because of the long period over which the inventories were captured, it is illogical to assume a single time period. Also, these inventories were observed at death, so no new transactions with the person could be noted afterwards. But, it cannot be excluded that individuals at the Cape

did not trade with individuals younger than themselves. The younger individuals' transactions would only be captured later in the inventories. It is also likely that individuals traded with individuals older than themselves, who may have died before them. This transaction would have been recorded before the individual's own probate inventory was taken. For this reason, the period is divided into 25-year intervals. This is likely to capture one generation of 'trading partners'.[4] The periods are: before 1700, 1700 to 1724, 1725 to 1749, 1750 to 1774, 1775 to 1799, and 1800 to 1824. The last part of the entire probate period, 1825 to 1834, is not included here. It is likely that a large proportion of the individuals who lived at the Cape and traded with others was then not yet captured in the inventories.

A few limitations and biases of the data should also be mentioned before I continue. The first is sample selection and the exclusion of the wealthiest individuals from the sample. As discussed in Chapter 2, the probate inventories are significantly poorer than the Stellenbosch inventories (Fourie, 2013). That said, a rich group, like the 'landed gentry', would not necessarily be missed by the network analysis done here. There are often individuals who transacted with the gentry or even some of the gentry's estates in the probate inventories. There are also some of the gentry's estates in these inventories. These include Hendrik Oostwald Eksteen (MOOC8/3.93), Jan Meindert Kruywagen (MOOC8/5.19), and Johannes Groenewald (MOOC8/15.23). Another limitation is the limited information on familial connections and occupations between the individuals. Groenewald (2011) and Baartman (2011) have shown familial and business links as key to network building at the Cape. This would be possible to add in the future if more sources and information on the individuals could be gathered.

4.4 Who were the central individuals at the Cape?

In the previous sections, I considered the network measures available to identify the individuals who are central in a network. But the question remains: who were the most central individuals in the Cape's financial network, and are they the same individuals as identified by historians before? The network of credit transactions found in the MOOC 8 series across the three measures are found in Appendix B, while Figure B.1 is shown here as an example. The first thing

[4]The ideal would have been to use a dynamic centrality measure, but the theory on dynamic centrality measures is still being developed. For example, Lerman et al. (2010) built a dynamic centrality measure for citations models. Another example is Braha and Bar-Yam (2006), who use email data, but their model skews toward high-degree nodes. However, a problem with applying this to the Cape's MOOC 8 credit network is that it does not allow for the death of nodes. For the sake of simplicity, I decided to stay with a divided static network. Future research can look at extending this work to include dynamic measures of centrality.

to note is the growth in the network. As explained before, the network becomes denser over time. The whiter nodes have lower eigenvector centralities, while the darker nodes have higher eigenvector centralities. The same figures can be drawn for degree and betweenness centrality.

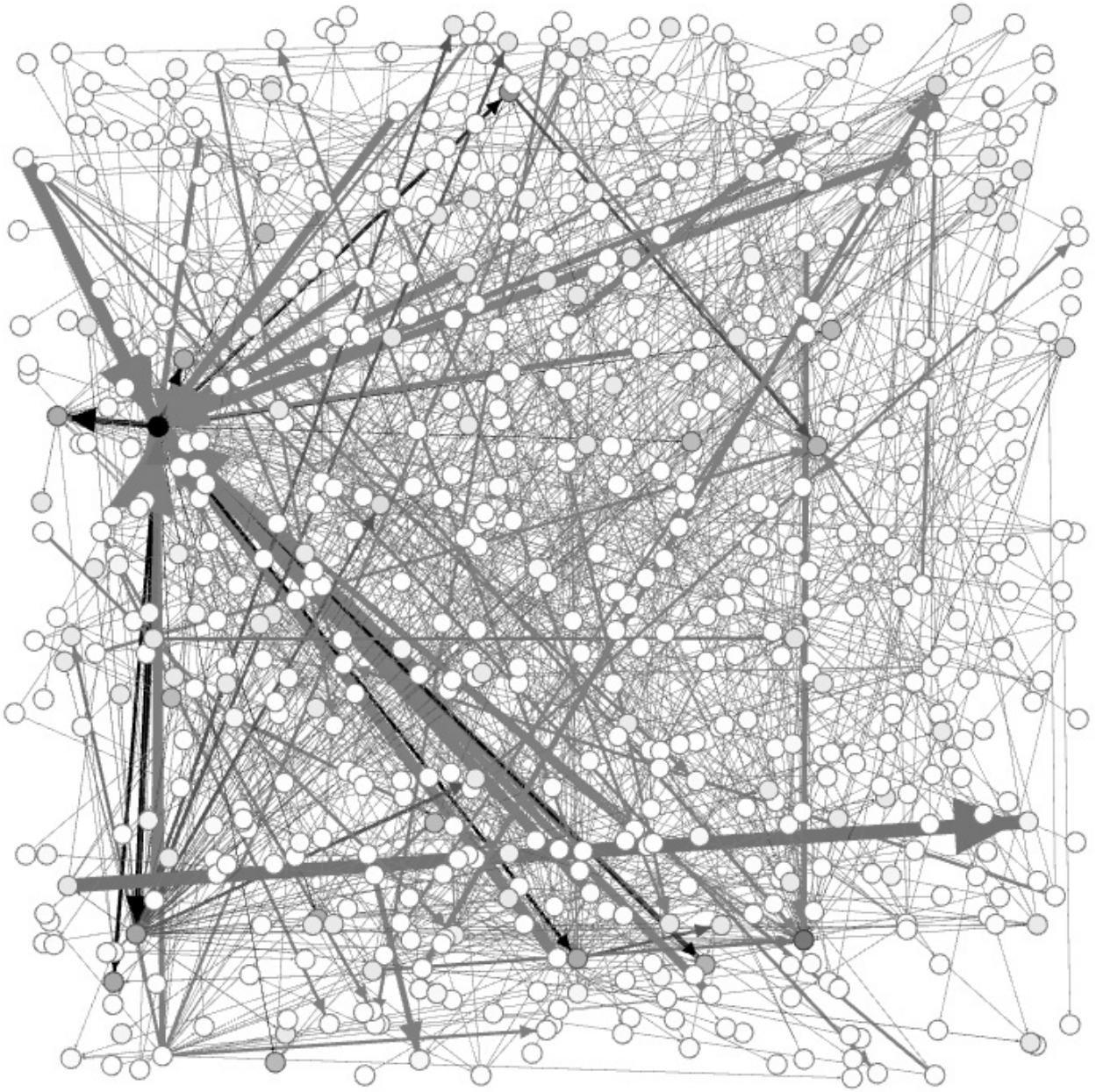

FIGURE 4.2: Network of eigenvector centralities between 1750 and 1774

What is immediately apparent is how few of the individuals identified by historians are identified in these networks as well. The more familiar Cape settlers include Jan van der Swyn (one of the alcohol *pachters* identified by Groenewald), Jan Meindert Kruywagen (son of the main creditor identified by Guelke and Shell, 1983), and Jacob Van Reenen, although his sons are noticeably absent. Table 4.2, 4.3 and 4.4 respectively list the Top 10 individuals identified

by the various measures. It also presents, where available, these individuals' slave ownership groups.

Table 4.2: Top 10 Eigenvector Central Individuals

	Before 1700	1700-1724	1725-1749
1	Lucretia van de Caab (11-24 slaves)	Pieter Meyer (11-24 slaves)	Judith Kuyp (11-24 slaves)
2	Fredrik van Zyl (0 slaves)	Barend van den Brink (.)	Jan De Wit (.)
3	Jacobus Conradie (.)	Willem de Ruiter (0 slaves)	Gerrit Olivier (11-24 slaves)
4	Matthys Bantjies (.)	Wynand Bezuidenhout (1-5 slaves)	Jan Meidert Kruywagen (1-5 slaves)
5	Dirk Trynten (.)	Martin Godlieb Eckard (0 slaves)	Jasper Raats (0 slaves)
6	Matthys Wigman (.)	Joost Reinard Schenk (6-10 slaves)	Jacob De Villiers (1-5 slaves)
7	Pieter Jans Louw (.)	Jan Dirk De Beer (25+ slaves)	Claas Kuyp (.)
8	Jan Holsmith (.)	Christina Does (25+ slave)	Gideon Slabbert (.)
9	Laurens Verbrugge (.)	Johannes Bocklenbergh (6-10 Slaves)	Susanna Joubert (6-10 slaves)
10	Martin Adriaans (.)	Christiaan Bock (11-24 slaves)	Geertruida De Wit (1-5 slaves)
	1750-1774	1775-1800	1800-1824
1	Jacob Van Reenen (11-24 slaves)	Thobias Christiaan Rönnenkamp (25+ slaves)	Johan Adam Neumeister (25+ slaves)
2	Roelof Laubscher (11-24 slaves)	Jan Jacob Meyer (25+ slaves)	Johan George Stadeler (25+ slaves)
3	Michiel Smuts (11-24 slaves)	Josua Joubert (11-24 slaves)	Johan Wiggerd Brummer (1-5 slaves)
4	Hermanus Keeve (6-10 slaves)	Christoffel Lombaard (25+ slaves)	Christiaan Fleck (25+ slaves)
5	Johannes Henricus Blankenberg (25+ slaves)	Johannes Matthias Bletterman (11-24 slaves)	Hermanus Augustinus Vermaak (11-24 slaves)
6	Theodorus Kriel (1-5 slaves)	Jacobus Scheepers (11-24 slaves)	Johannes Petrus Serrurier (25+ slaves)
7	Frans Adam Carelson (.)	Joseph De Klerk (11-24 slaves)	Johanna Cloete (1-5 slaves)
8	Fredrik Sparman (1-5 slaves)	Anna Bock (1-5 slaves)	Gerrit Van Schalkwyk (1-5 slaves)
9	Johanna Siekermans (11-24 slaves)	Francois Smit (.)	Gerrit Van Emmenes (1-5 slaves)
10	Joachim Nicolaas Von Dessin (11-24 slaves)	Johannes Mattheus Hartzog (6-10 slaves)	Andries Brink (0 Slaves)

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but were considered when the centralities were calculated.

TABLE 4.3: Top 10 Betweenness Central Individuals

	Before 1700	1700-1724	1725-1749
1	Pieter Willem van Zyl (0 Slaves)	Pieter Meyer (11-24 slaves)	Jan Meindert Kruywagen (1-5 slaves)
2	Philip Snyman (0 slaves	Wynand Bezuidenhout (1-5 slaves)	Jacob De Villiers (1-5 slaves)
3	Jan Pieters Louw (1-5 slaves)	Barend van den Brink (.)	Jan Van Der Swyn (11-24 slaves)
4	Simon Groot (1-5 slaves)	Willem Ruiter (0 slaves)	Judith Kuyp (11-24 slaves)
5	Roelof van Tonder (0 slaves)	Johannes Bocklenbergh (6-10 slaves)	Jan Christoffel Bek (.)
6	Nicolaas Walter (11-24 slaves)	Jean Roy (1-5 slaves)	Andries Bruyns (1-5 slaves)
7	Andries van Tonder (1-5 slaves)	Engela Lambert (6-10 Slaves)	Lukas Meyer (.)
8	Arie Lekkerwyn (0 slaves)	Dina Willems (1-5 Slaves)	Geertruida de Wit (1-5 slaves)
9	-	Jacob Bisseux (1-5 Slaves)	Johannes Ernst Heger (1-5 slaves)
10	-	Anna Bockelenberg (1-5 Slaves)	Jasper Raats (0 Slaves)
	1750-1774	1775-1800	1800-1824
1	Jacob Van Reenen (11-24 slaves)	Thobias Christiaan Rönnenkamp (25+ slaves)	Johan Wiggerd Brummer (1 - 5 slaves)
2	Johanna Siekermans (11-24 slaves)	Pieter Terblanche (.)	Johan Adam Neumeister (25+ slaves
3	Roelof Laubscher (11-24 slaves)	Josua Joubert (11-24 slaves)	Joseph Nietsche (.)
4	Daniel Van Reenen (11-24 slaves)	Maria Johanna Hugo (11-24 slaves)	Adriaan Louw (1-5 slaves)
5	Christiaan Victor (.)	Stephanus Stroh (11-24 slaves)	Godlieb Wilhelm Bekker (0 slaves)
6	Hermanus Keeve (6-10 slaves)	Gabriel Stoltz (1-5 slaves)	Hester Pool (11 - 24 slaves)
7	Fredrik Sparman (1-5 slaves)	Daniel Hugo (.)	Daniel Petrus Boshof (0 slaves)
8	Salomon Bosch (1-5 slaves)	Jan Jacob Jarling (.)	Andries Stockenstrom (.)
9	Jurgen Jansen (1-5 slaves)	Hendrik Christiaan Herholdt (25+ slaves)	Jacobus Slabbert (6 - 10 slaves)
10	Hendrik Ras (0 slaves)	Jacobus Scheepers (11-24 slaves)	Andries Brink (0 Slaves)

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but were considered when the centralities were calculated.

TABLE 4.4: Top 10 Degree Central Individuals

	Before 1700	1700-1724	1725-1749
1	Simon Groot (1-5 slaves)	Pieter Meyer (11-24 slaves)	Judith Kuyp (11-24 slaves)
2	Philip Snyman (0 slaves)	Wynand Bezuidenhout (1-5 slaves)	Jan Van Der Swyn (11-24 slaves)
3	Pieter Willem Van Zyl (0 slaves)	Barend van den Brink (.)	Jan Meindert Kruywagen (1-5 slaves)
4	Francois Bastiaanse (0 slaves)	Maria de Peronne (.)	Hendrik Thomas Van Hoesum (6-10 slaves)
5	Adolf Daniels (1-5 slaves)	Anna Retief (11-24 slaves)	Aletta Van Der Storm (6-10 slaves)
6	Jan Pieters Louw (1-5 slaves)	Jacques Pinard (0 slaves)	Gelyn Van Gogh (0 slaves)
7	Nicolaas Walters (11-24 slaves)	Jan Dirk De Beer (25+ slaves)	Geertruida De Wit (1-5 slaves)
8	Roelof Van Tonder (0 slaves)	Martin Meckelenberg (6-10 slaves)	Jan Jacob Grandam (6-10 slaves)
9	Willem Jans De Wereld (1-5 slaves)	Engela Lambert (6-10 slaves)	Hendrik Hoppe (11-24 slaves)
10	Johannes Pythius (6-10 slaves)	Maria Le Febre (25+ slaves)	Emma Martha Van Der Byl (25+ slaves)
	1750-1774	1775-1800	1800-1824
1	Hermanus Keeve (6-10 slaves)	Thobias Christiaan Rönnenkamp (25+ slaves)	Johan Adam Neumeister (25+ slaves)
2	Jacob Van Reenen (11-24 slaves)	Josua Joubert (11-24 slaves)	Johan George Stadeler (25+ slaves)
3	Fredrik Sparman (1-5 slaves)	Johan Adam Raubenheimer (11-24 Slaves)	Johannes Petrus Serrurier (25+ slaves)
4	Joachim Nicolaas Von Dessin (11-24 slaves)	Abraham De Haan (25+ Slaves)	Goris Janse Van Middelkoop (11 - 24 slaves)
5	Cornelis Van Rooyen (6-10 slaves)	Andries Brink (1-5 slaves)	Johan Heinrich Richter (6 - 10 slaves)
6	Johanna Siekermans (11-24 slaves)	Jan Martin Vogel (25+ slaves)	Johan Wiggerd Brummer (1-5 slaves)
7	Johannes Henricus Blankenberg (25+ slaves)	Johannes Albertus Laubscher (25+ slaves)	Maria Johanna Jurgens (11 - 24 slaves)
8	Jurgen Jansen (1-5 slaves)	Michiel Otto (11-24 slaves)	Christoffel Coenraad Prediger (6 - 10 slaves)
9	Christiaan Ackerman (11-24 slaves)	Johannes Matthias Bletterman (11-24 slaves)	Hermanus Augustinus Vermaak (11 - 24 slaves)
10	Maria Knoetse (1-5 slaves)	Jan Jacob Meyer (25+ Slaves)	Christiaan Fleck (25+ slaves)

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but were considered when the centralities were calculated.

The apparent absence of the wealthiest does not mean none of the wealthy is identified here. A key example of this is Thobias Christiaan Rönnenkamp (MOOC8/46.28), whose inventory was taken in 1793. He was an *onderkoopman* (junior merchant) for the Company, as well as the secretary of the Orphan Chamber. At the time of his death, he owed 164 640 rds in debt, but 180 679 rds of credit was owed to him from more than 1 000 transactions. He furthermore had 37 slaves, two properties in Cape Town and volumes of books on religion, law and history. His wealth is in no doubt, as his probate is over 100 pages long (transcribed).[5] Although he may be an exception, the results should not be disregarded as a network which excluded the gentry or *pachters*.

The results also show the importance of women in the Cape's financial market and economy. No less than four of the top ten from the second period are female, as are three from the third period and two from the fourth period. This provides further support for the literature on the role of widows within the Cape. For example, Von Fintel et al. (2013) found widows often used their share of inheritance to become socially mobile and were often very wealthy. Although beyond the scope of this dissertation, these centralities identified several individuals who warrant further biographical attention. One example is Johanna Siekermans (MOOC8/7.48). She was the mother of Jacob Van Reenen, yet is not mentioned when the legacy of the Van Reenens is discussed. She had no less than nine properties in Cape Town, 19 slaves and the net value of her estate stood over 10 000 rds when she died in 1756.

The final question from these centralities is whether these individuals benefitted from their wealth in terms of the network. A word of caution, though: no causation can be determined here. Jackson (2014:15,16) discusses the problem of endogeneity in network analysis and economics. He, however, says that 'rather than giving up on research in these areas, or waiting for some lucky source of exogenous variation or a powerful instrument, we must still make progress.' The centrality is determined by the number of debt and credit transactions and how the individuals are connected. But this is also influenced by their wealth and the second chapter of this study found a strong correlation between wealth and debt. The express purpose here was to to determine whether there is also a positive correlation between connectedness and wealth. An OLS regression was run on centralities, controlling for wealth with the following controls: number of farms, groups of slave ownership, whether an individual was both creditor and debtor, their gender, as well as period controls. The regression results can be found in Table 4.5.

[5]He was also an active member of the Lutheran community, and a portrait of him can still be found in the Lutheran Church archive.

TABLE 4.5: OLS Regression: Determinants of centrality measures

Dependent variable	Degree Centrality	Betweenness Centrality	Eigenvector Centrality
Control variables			
Number of farms	-0.650	-0.098	-2.665
	(-1.514)	(-0.762)	(-1.278)
Slave ownership			
0 Slaves	(ref.)	(ref.)	(ref.)
Between 1 and 4 slaves	-0.438	-0.108	4.051
	(-0.692)	(-0.421)	(0.733)
Between 5 and 10 slaves	4.428	1.512	23.074**
	(1.262)	(1.635)	(2.077)
More than 10 slaves	-0.343	-0.357	20.793*
	(-0.373)	(-1.070)	(1.839)
Both creditor and debtor	1.593	0.267	-3.136
	(0.777)	(0.528)	(-0.490)
Gender (1 if male)	1.785	0.653*	8.241
	(1.637)	(1.949)	(1.309)
Period controls	YES	YES	YES
Constant	4.214***	-0.000	89.257**
	(2.974)	(-0.000)	(2.096)
R-squared	0.005	0.026	0.009
N	1 926	827	1 165

Source: Probate inventories and genealogies, own calculations
Notes: *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

It is interesting to note how little influence wealth, in terms of the number of farms and the number of slaves, had on degree and betweenness centralities. None of the control variables was significant in determining the degree centrality. The same lack of influence can even be seen in the slave ownership groups presented in Tables 4.3 and 4.4. Very few individuals in the Top 10 for betweenness and degree were in the group of owning more than 25 slaves, and we see all the groups listed. Surprisingly, the coefficient on being both a creditor and a debtor was also not significant for betweenness centrality. The theory suggests individuals with high betweenness centralities are those who have information about others. This would mean that high betweenness centralities would be close to those who act as intermediaries. An explanation for the lack of significance between betweenness centrality and having both credits and debts, is the large proportion of individuals who had both credits and debts – 36 percent. This suggests intermediation on an official level was not important for credit transactions at the Cape, unlike areas in France where notaries played a large role (Rosenthal, 1994). This also suggests the nature of credit transactions remained personal throughout the period of investigation.

Men tended to have greater betweenness centralities than women – possibly due to the patriarchal society at the Cape. Ross (1995) gives a thorough analysis of patriarchy at the Cape in the eighteenth and nineteenth centuries. He suggests that despite the mobility of women in Cape society, men were most likely to be the head of the household and responsible for financial decisions. Groenewald (2011) also suggests men used their networks to build successful businesses.

Higher male betweenness centrality is also supported by modern studies. Burt (1998) found that men in entrepreneurial enterprises received direct benefits from their position in a network, specifically their betweenness, while women only benefitted indirectly from their position.

There is a break with the pattern of wealth when eigenvector centrality is considered. As mentioned before, eigenvector centrality is a close measure of the relative influence an individual enjoys in the network, i.e. the node becomes more important if it is connected to other important individuals. Here, wealth, proxied by slave ownership, did seem to matter. The coefficient was significant for individuals with more than five slaves. This result supports the idea that the wealthy in terms of slave ownership were also those with influence. For example, Williams (2013) concluded that the relative equality found in slave ownership in the Drakenstein district during the eighteenth century led to 'greater social standing and more political influence'. The lack of strong evidence between an individual's position in the network and wealth is contrary to the evidence in Dooling (2007), when he stated that networks were dominated by the landed elite.

4.4.1 The strength of weak ties applied

The previous section used the basic structure of the Cape's network as captured by the credit transactions in the MOOC 8 series. What it failed to take into account was Granovetter's strength of weak ties theory. In this section, I will attempt to introduce this idea, but adapt it to the Cape's credit network.

Granovetter (1973) suggests that the strength of a link between individuals would be determined by three aspects: the amount of time spent together, the emotional intensity and intimacy, and reciprocal services between the individuals. Applying the idea of tie strength to job search models, he found that more than half the respondents who found a job through a contact, found it with a contact with whom they only had occational interaction. He concludes with the following: 'weak ties [are] seen as indispensable to individuals' opportunities and their integration into a community; strong ties, breeding local cohesion, lead to overall fragmentation' Granovetter (1973:1361). Currarini et al. (2009) applied the strength of weak ties hypothesis to high school students and homophily (explained and examined in Chapter 5) and found weak ties formed bridges between social groups.

In order to apply this hypothesis to the Cape's MOOC 8 credit network, I adopted the definition by Granovetter and calculated weights for each of the credit transactions. The two aspects known about the credit transactions are the value of the transactions and the number of transactions which took place between two individuals. There would therefore be a stronger tie between individuals with more than one transaction between them, or one of a higher credit value, than between individuals with only one transaction between them, or of a lower credit value. However, individuals with more transactions should feature more prominently in the network, which is why I normalised the individual's number and size of transactions to the network's size and number of transactions by the various periods defined above. The formula applied to the credit transactions is:

$$Weight_i = \frac{\frac{value_{ij}}{totalvalue_i}}{\frac{totalvalue_i}{totalvalue_i}} \times \frac{\frac{transaction_{ij}}{totaltransactions_i}}{\frac{totaltransactions_i}{totaltransactions_n}} = \frac{value_{ij} \times totalvalue_n}{{totalvalue_{ij}}^2} \times \frac{transaction_{ij} \times totaltransactions_n}{{totaltransactions_i}^2}$$

where, $value_{ij}$ is the value of the transaction between individual i and j; $totalvalue_i$ is individual i's total debt value and $totalvalue_i$ is the total value of all transactions for the period. The same holds for the number of transactions: $transaction_{ij}$ are the total number of transactions between individual i and individual j; $totaltransactions_i$ is the total number of transactions for individual i and $totaltransactions_n$ are the number of transactions for the periods.

TABLE 4.6: Top 10 eigenvector central individuals with weights added

	Before 1700	1700-1724	1725-1749
1	Lucretia van de Caab (11-24 slaves)	Jan Le Sage (1-5 slaves)	Judith Kuyp (11-24 slaves)
2	Fredrik van Zyl (0 slaves)	Arnoldus Kruisman (25 + slaves)	Jan De Wit (.)
3	Jacobus Conradie (.)	Claas Prinsloo (0 slaves)	Gerrit Olivier (11-24 slaves)
4	Matthys Bantjies (.)	Joost Reinard Schenk (6-10 slaves)	Jan Meidert Kruywagen (1-5 slaves)
5	Dirk Trynten (.)	Jan Dirk De Beer (25+ slaves)	Jasper Raats (0 slaves)
6	Matthys Wigman (.)	Christina Does (25+ slaves)	Jacob De Villiers (1-5 slaves)
7	Pieter Jans Louw (.)	Johannes Bocklenberg (6-10 slaves)	Claas Kuyp (.)
8	Jan Holsmith (.)	Christiaan Bock (11-24 slaves)	Gideon Slabbert (.)
9	Laurens Verbrugge (.)	Dina Willems (1-5 slaves)	Susanna Joubert (6-10 slaves)
10	Martin Adriaans (.)	Maria Steyn (1-5 slaves)	Geertruida De Wit (1-5 slaves)
	1750-1774	1775-1800	1800-1824
1	Jacob Van Reenen (11-24 slaves)	Thobias Christiaan Rönnenkamp (25+ slaves)	Johan Adam Neumeister (25+ slaves)
2	Roelof Laubscher (11-24 slaves)	Jan Jacob Meyer (25+ slaves)	Johan George Stadeler (25+ slaves)
3	Michiel Smuts (11-24 slaves)	Josua Joubert (11-24 slaves)	Johan Wiggerd Brummer (1 -5 slaves)
4	Hermanus Keeve (6-10 slaves)	Christoffel Lombaard (25+ slaves)	Christiaan Fleck (25+ slaves)
5	Johannes Henricus Blankenberg (25+ slaves)	Johannes Matthias Bletterman (11-24 slaves)	Hermanus Augustinus Vermaak (11-24 slaves)
6	Theodorus Kriel (1-5 slaves)	Jacobus Scheepers (11-24 slaves)	Johannes Petrus Serrurier (25+ slaves)
7	Frans Adam Carelson (.)	Joseph De Klerk (11-24 slaves)	Johanna Cloete (1-5 slaves)
8	Fredrik Sparman (1-5 slaves)	Anna Bock (1-5 slaves)	Gerrit Van Schalkwyk (1-5 slaves)
9	Johanna Siekermans (11-24 slaves)	Francois Smit (.)	Gerrit Van Emmenes (1-5 slaves)
10	Joachim Nicolaas Von Dessin (11-24 slaves)	Johannes Mattheus Hartzog (6-10 slaves)	Andries Brink (0 Slaves)

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but considered when the centralities are calculated.

TABLE 4.7: Top 10 betweenness central individuals with weights added

	Before 1700	1700-1724	1725-1749
1	Pieter Willem van Zyl (0 slaves)	Arnoldus Kruisman (25+ slaves)	Jan Meindert Kruywagen (1-5 slaves)
2	Jan Pieters Louw (1-5 slaves)	Jan Le Sage(1-5 slaves)	Jacob De Villiers (1-5 slaves)
3	Simon Groot (1-5 slaves)	Johannes Bocklenbergh (6-10 slaves)	Jan Van Der Swyn (11-24 slaves)
4	Roelof Van Tonder (0 slaves)	Jan Jurgen Rose (6-10 slaves)	Judith Kuyp (11-24 slaves)
5	Nicolaas Walters (11-24 slaves)	Joost Reinard Schenk (6-10 slaves)	Jan Christoffel Bek (.)
6	Andries van Tonder (1-5 slaves)	Nicolaas Laubscher (11-24 slaves)	Andries Bruyns (1-5 slaves)
7	Arie Lekkerwyn (0 slaves)	Arend Gildenhuis (1-5 slaves)	Lukas Meyer (.)
8	-	Jan Gerrit van Denventer (0 slaves)	Geertruida de Wit (1-5 slaves)
9	-	Christoffelse Styntie De Bruyn (6-10 slaves)	Johannes Ernst Heger (1-5 slaves)
10	-	Christiaan Bock (11-24 slaves)	Jasper Raats (0 Slaves)
	1750-1774	1775-1800	1800-1824
1	Jacob Van Reenen (11-24 slaves)	Thobias Christiaan Rönnenkamp (25+ slaves)	Johan Wiggerd Brummer (1 - 5 slaves)
2	Johanna Siekermans (11-24 slaves)	Pieter Terblanche (.)	Johan Adam Neumeister (25+ slaves
3	Roelof Laubscher (11-24 slaves)	Josua Joubert (11-24 slaves)	Joseph Nietsche (.)
4	Daniel Van Reenen (11-24 slaves)	Maria Johanna Hugo (11-24 slaves)	Adriaan Louw (1 - 5 slaves)
5	Christiaan Victor (.)	Stephanus Stroh (11-24 slaves)	Godlieb Wilhelm Bekker (0 slaves)
6	Hermanus Keeve (6-10 slaves)	Gabriel Stoltz (1-5 slaves)	Hester Pool (11 - 24 slaves)
7	Fredrik Sparman (1-5 slaves)	Daniel Hugo (.)	Daniel Petrus Boshof (0 Slaves)
8	Salomon Bosch (1-5 slaves)	Jan Jacob Jarling (.)	Andries Stockenstrom (.)
9	Jurgen Jansen (1-5 slaves)	Hendrik Christiaan Herholdt (25+ slaves)	Jacobus Slabbert (6 - 10 slaves)
10	Hendrik Ras (0 slaves)	Jacobus Scheepers (11-24 slaves)	Andries Brink (0 slaves)

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but considered when the centralities are calculated.

TABLE 4.8: Top 10 degree central individuals with weights added

	Before 1700	1700-1724	1725-1749
1	Simon Groot (1-5 slaves)	Arnoldus Kruisman (25+ slaves)	Judith Kuyp (11-24 slaves)
2	Philip Snyman (0 slaves)	Anna Retief (11-24 slaves)	Jan Van Der Swyn (11-24 slaves)
3	Pieter Willem Van Zyl (0 Slaves)	Jacques Pinard (0 Slaves)	Jan Meindert Kruywagen (1-5 slaves)
4	Francois Bastiaanse (0 Slaves)	Jan Dirk De Beer (25+ slaves)	Hendrik Thomas Van Hoesum (6-10 slaves)
5	Adolf Daniels (1-5 slaves)	Ferdinand Appel (6-10 slaves)	Aletta Van Der Storm (6-10 slaves)
6	Jan Pieters Louw (1-5 slaves)	Nicolaas Laubscher (11-24 slaves)	Gelyn Van Gogh (0 slaves)
7	Nicolaas Walters (11-24 slaves)	Maria La Febre (25+ slaves)	Geertruida De Wit (1-5 slaves)
8	Roelof Van Tonder (0 slaves)	Johannes Bocklenbergh (6-10 slaves)	Jan Jacob Grandam (6-10 slaves)
9	Willem Jans De Wereld (1-5 slaves)	Joost Reinard Schenk (6-10 Slaves)	Hendrik Hoppe (11-24 slaves)
10	Johannes Pythius (6-10 Slaves)	Jacob Vliet (1-5 slaves)	Emma Martha Van Der Byl (25+ slaves)
	1750-1774	1775-1800	1800-1824
1	Hermanus Keeve (6-10 slaves)	Thobias Christiaan Rönnenkamp (25+ slaves)	Johan Adam Neumeister (25+ slaves)
2	Jacob Van Reenen (11-24 slaves)	Josua Joubert (11-24 slaves)	Johan George Stadeler (25+ slaves)
3	Fredrik Sparman (1-5 slaves)	Johan Adam Raubenheimer (11-24 slaves)	Johannes Petrus Serrurier (25+ slaves)
4	Joachim Nicolaas Von Dessin (11-24 slaves)	Abraham De Haan (25+ slaves)	Goris Janse Van Middelkoop (11 - 24 slaves)
5	Cornelis Van Rooyen (6-10 slaves)	Andries Brink (1-5 slaves)	Johan Heinrich Richter (6 - 10 slaves)
6	Johanna Siekermans (11-24 slaves)	Jan Martin Vogel (25+ slaves)	Johan Wiggerd Brummer (1-5 slaves)
7	Johannes Henricus Blankenberg (25+ slaves)	Johannes Albertus Laubscher (25+ slaves)	Maria Johanna Jurgens (11 - 24 slaves)
8	Jurgen Jansen (1-5 slaves)	Michiel Otto (11-24 slaves)	Christoffel Coenraad Prediger (6 - 10 slaves)
9	Christiaan Ackerman (11-24 slaves)	Johannes Matthias Bletterman (11-24 slaves)	Hermanus Augustinus Vermaak (11 - 24 slaves)
10	Maria Knoetse (1-5 slaves)	Jan Jacob Meyer (25+ slaves)	Christiaan Fleck (25+ slaves)

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but considered when the centralities are calculated.

For the period before 1700, the addition of weights re-orders the individuals who are central to the network. No changes occur after 1700, whether weights are added or not. The reason for this is how the network is connected. Golub and Lever (2010) found that when a network is well-connected, centrality measures are not affected by small changes in groups. The giant component of a network is the largest part of the network with connected nodes and excludes single connections.[6] It is an indication of the connectedness of the network. When the giant component's visibility (the proportion of nodes and edges in the giant component) was compared across the periods, the first period was markedly less connected than the periods after. This is shown in Table 4.9. Two reasons for the high connectedness in later periods are the role of institutions (many individuals are connected through the VOC, church or Orphan Chamber) and how many individuals were connected to others through a central individual like Thobias Christiaan Rönnenkamp.

TABLE 4.9: Proportion of nodes and edges in giant component of network

Periods	Nodes	Edges
Before 1700	67.34	74.9
1700-1724	93.29	97.63
1725-1749	92.27	99.24
1750-1774	92.32	96.4
1775-1800	94.85	98.03
1800-1824	86.78	93.38

Notes: Calculated by author using Gephi, giant component topology filter applied

This section focused on individuals' centralities and asked whether the wealthy were the most central. The results were two-fold: first, by using network analysis, some of the central historical figures could be identified. Although the results presented several familiar names, it also revealed unfamiliar individuals. Some of these were women. The results also showed that slavery continued to matter at the Cape, as the correlation between eigenvector centrality and slave ownership shows. But the link between overall wealth and centrality is generally weak. The next section shifts the focus from individuals to families.

[6]The entire network includes single connections between nodes or small networks. The figure below shows two such cases found in the first period. If these 'disconnected' nodes and networks are taken into consideration for centrality measures it skews the measures to them. For example, the individual connected to the three others in the small (star) network will have a very high betweenness centrality, but he/she is only connected to three others. The giant component excludes any small star networks and single connections.

4.5 Families versus individuals: Central families and their impact on centrality

As the previous sections have shown, the strength of weak ties has had little influence on the Cape's centralities, mainly due to the high level of connectedness in the Cape's MOOC 8 credit network. However, social networks are not only individual-based, but also determined by familial connections. For this reason, I present the most central families based on the surnames of the individuals in the probate inventories.[7]

Figure 4.3 shows the network of surnames for period 3 (or between 1750 and 1774) with eigenvector centralities. There was a large decrease in the number of nodes due to the clustering of names under one surname. Figure 4.4 shows how the network looks for borrowing within a family.

The two families shown in Figure 4.4 who borrowed within their family are the Keeves and the Ackermans. The transactions between the two Ackermans can be found in the probate inventory of Christiaan Ackerman (MOOC8/7.18), who died in 1751. This is an example of not only interfamilial debt, but also intergenerational debt. The debt was between Christiaan Ackerman and his eldest son, also Christiaan, for a bond (*onderhandsche obligatie*) worth 1 229 rds. Christiaan senior was the *burgher commissaris* at the Cape, had many properties in Cape Town and owned 18 slaves. Young Christiaan's estate inventory was not in the MOOC 8 series. Christiaan Ackerman also had a debt from Christiaan Godhard Ackerman (MOOC8/6.89), who died in 1745. Christiaan Godhard Ackerman was probably Christiaan Ackerman's father, but there is some doubt. This debt was worth 808 rds according to the bond, with four months' interest, and would have been paid in 1745 (before Christiaan Ackerman's death in 1751).

The Keeve debt shown in the figure was between father and son for an inheritance owed to the latter. Hermanus Keeve (MOOC8/10.71a) died in 1760 with a debt to his son Petrus from his mother's inventory worth 333 rds. But Hermanus Keeve also owed debts to Jacob Van Reenen, who was part of the gentry, and Jan Serrurier, also part of a rich family which owned many farms in and around Stellenbosch. These are two examples of how important familial networks were in the Cape's credit network – not only to gain access to credit, but also to form part of

[7] A limitation of the results presented here is that they do not take marriages into account, but with future merging of the genealogical records and this network data, these links can be added.

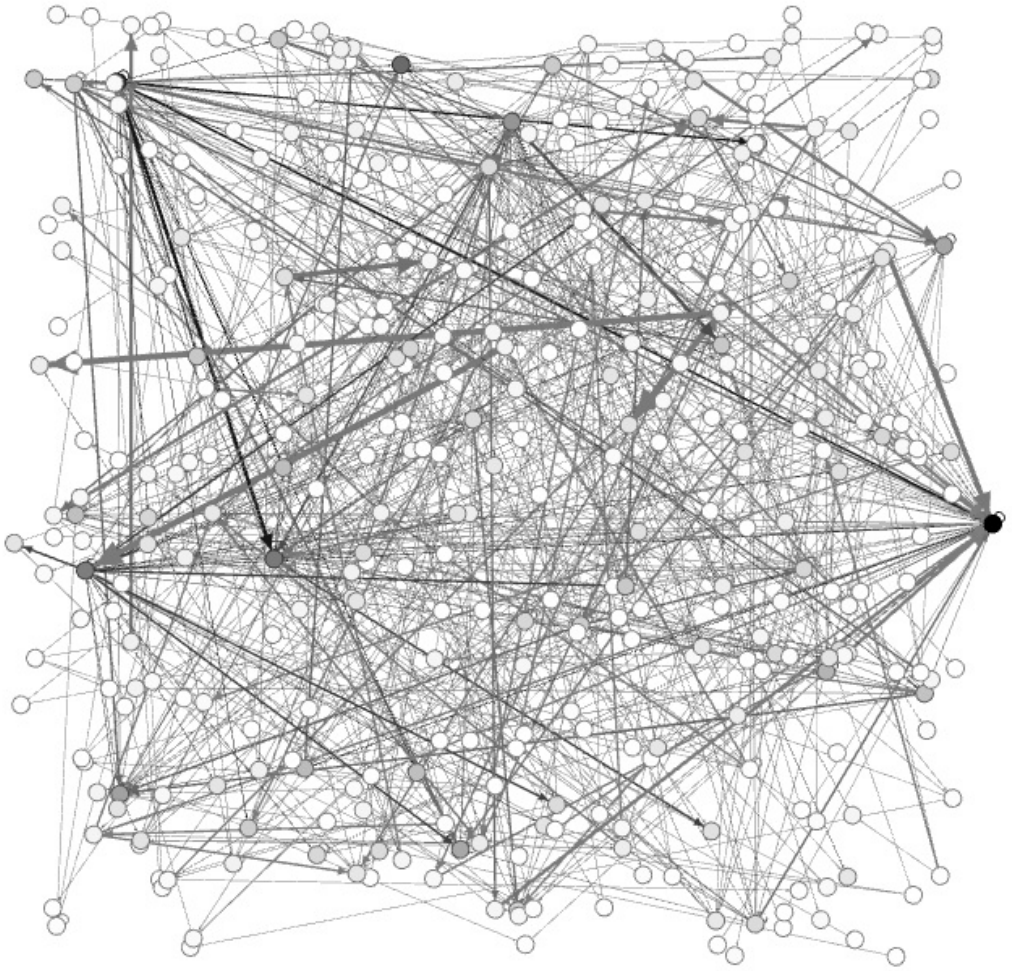

FIGURE 4.3: Network of families for 1725 to 1749, with eigenvector centralities

a larger network.

A concern when looking at large families in a social network context is that the analysis will only identify the largest families – in this case, at the Cape. However, when I compared the surnames that had been identified using social network analysis to those in the genealogical records[8], they did not correspond. In fact, few of the large families in the genealogical records are present in the families identified through social network analysis. Cilliers (2016:44) shows that larger families were wealthier than smaller families during this period at the Cape. But as shown before for individuals, there is little correlation between wealth and centrality in the Cape's credit network. The same holds for families: wealthy families (in terms of slave ownership) were not the most central.

[8]The list of large families in the genealogical records can be found in Appendix B.

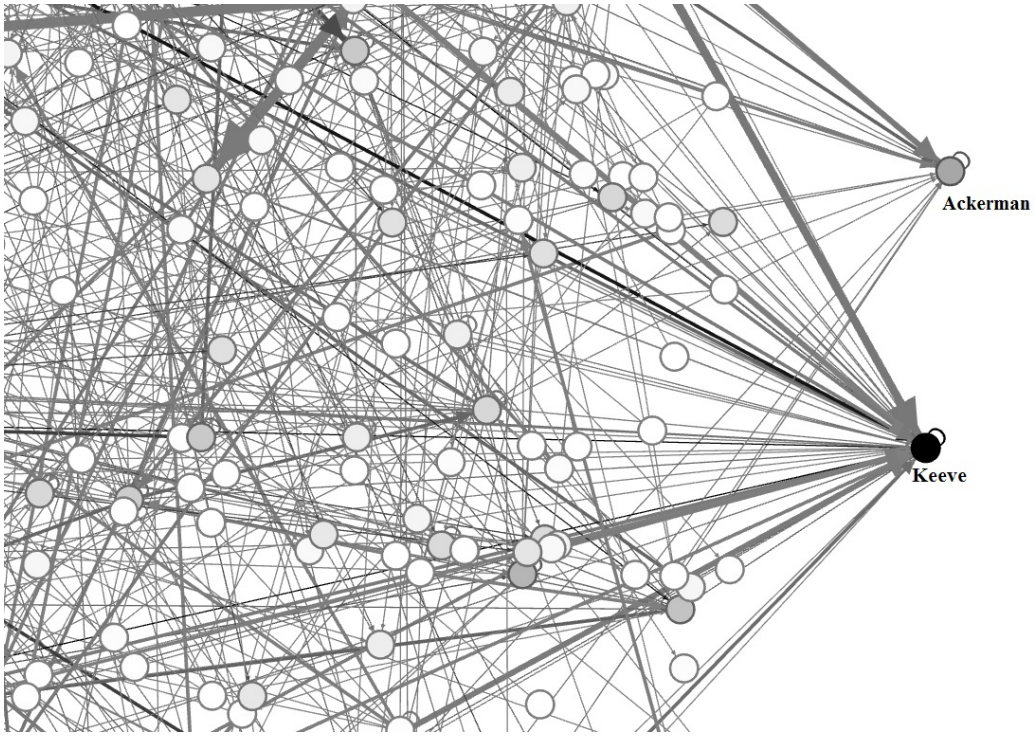

FIGURE 4.4: Examples of borrowing within a family

TABLE 4.10: Top 10 eigenvector central surnames

	Before 1700	1700-1724	1725-1749	1750-1774	1775-1800	1800-1824
1	Venter	Laubscher	Laubscher	Keeve	Rönnenkamp	Stadeler
2	De Beer	Schenk	Van Dyk	Mulder	Brink	Smit
3	Kruywagen	Van Dyk	Pfeyl	Serrurier	Joubert	Van Der Merwe
4	Knockers	Kruisman	Smith	De Villiers	Meyer	Louw
5	Loos	Bockelenberg	Frits	Van Reenen	Laubscher	Burger
6	Snyman	Bothma	Lekkerwyn	Jansen	Smith	Coetzee
7	Pretorius	Van Der Heide	Van Der Merwe	Blanckenberg	Botha	Van Wyk
8	Lessing	Van Staden	Van Staden	Ackerman	De Villiers	Brummer
9	Maree	Sanders	Schenk	Van Schoor	Herhold	Serrurier
10	Slabbert	Van Der Merwe	Bothma	Artois	Lombaard	De Villiers

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but were considered when the centralities were calculated.

The next aspect to note when comparing the families in a social network context was the persistence of the families who appear in the tables. The Laubscher family appeared in the top of the eigenvector centrality over three periods. The Schenk, Van Dyk, Smith, Bothma, Van Der Merwe, Serrurier and De Villiers are families which all appeared twice. This suggests once a family became central it was more likely to stay central, even with changes in their relative position.

But the fact that a central individual within a central family is important should not be underestimated. For example, in period 2 (between 1700 and 1725 with weights added), Nicolaas Laubscher (MOOC8/4.35) was the sixth most central individual (degree and betweenness). He

TABLE 4.11: Top 10 betweenness central surnames

	Before 1700	1700-1724	1725-1749	1750-1774	1775-1800	1800-1824
1	Snyman	Kruisman	Schenk	Mulder	Rönnenkamp	Louw
2	Venter	De Bruyn	De Bruyn	Van Reenen	Joubert	Smit
3	Van Zyl	Bothma	Bothma	Keeve	Smit	Van Wyk
4	Morkel	Laubscher	Mulder	De Villiers	Botha	Jansen
5	Bestbier	Everts	Laubscher	Jansen	Rossouw	Du Plessis
6	Louw	Coetzee	Bissieux	Eksteen	Van Der Merwe	Van Der Westhuizen
7	Walters	Pfeyl	Visser	Beck	Pienaar	De Villiers
8	Hugo	Bockelenberg	Claas	Van Rooyen	Du Toit	Vermaak
9	-	Schenk	Bock	Blanckenberg	Van De Caab	Neumeister
10	-	Bezuidenhout	Van Wyk	Van Wyk	Gous	Van Der Merwe

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but were considered when the centralities were calculated.

TABLE 4.12: Top 10 degree central surnames

	Before 1700	1700-1724	1725-1749	1750-1774	1775-1800	1800-1824
1	Snyman	Kruisman	Laubscher	Keeve	Rönnenkamp	Smit
2	Groot	Laubscher	Schenk	Mulder	Joubert	Louw
3	Van Zyl	Retief	Appel	Jansen	Botha	Van Der Westhuizen
4	Daniels	Pinard	Retief	Van Reenen	Meyer	Neumeister
5	Bastiaanse	De Beer	Visser	De Villiers	Brink	Stadeler
6	Louw	Appel	De Bruyn	Blanckenberg	Raubenheimer	Van Wyk
7	Van Tonder	Schenk	Mulder	Van Rooyen	Smit	De Villiers
8	Walters	Bockelenberg	Bissieux	Du Plessis	Van Der Merwe	Vermaak
9	Venter	Gansvanger	Van Staden	Le Roux	Du Toit	Du Plessis
10	Cortje	Vliet	Gildenhuis	Ackerman	De Haan	Van Der Merwe

Source: Probate inventories and genealogies, own calculations
Notes: The three main institutions (VOC, Orphan Chamber and church) are not shown here, but were considered when the centralities were calculated.

owned five houses in Cape Town, 18 slaves, had no less than 20 bonds owed to him and had only one debt to the Orphan Chamber when he died in 1721. His son's inventory was also in the MOOC 8 series. Johannes Laubscher (MOOC8/4.5), when he died in 1720, was owed 650 rds by his father, but had two debts to doctors. In period 4, we find Johannes Laubscher's son, Roelof Laubscher. He had a net estate of 6 990 rds, with credit worth 8 815 rds and 1 825 rds debt, much of it for bonds. Roelof was also central when considering the individuals for the fourth period, ranking second for eigenvector centrality and third for betweenness centrality. The Laubscher family likely owe their central status to these individuals.

A word of caution. While most surnames are of individuals that are related, some may have had the same surname but be unrelated. Many former slaves took the surname 'Van De Caab'. The reason for the high betweenness centrality of the Van Der Caabs was because of a link to Thobias Christiaan Rönnenkamp. He owed a debt to Silvia Van De Caab and her granddaughter, Sophia Christina Wilhelmina Van De Caab, but also extended credit to Eva Van De Caab, widow of burgher Pieter Zeeger (MOOC8/19.22): a bond worth 100 rds for capital. This connection between Rönnenkamp and the Van De Caabs made the other connections of the Van De Caabs, like that with the Kannemeyers, part of the bigger network without which they

certainly would have been excluded.

This is an illustration of how clustering at family level can bring intricate connections to the fore in network. Based on this analysis, central families tended to stay central. What remains to be discovered is what determined this position.

4.6 The central role of institutions

Table 4.9 showed how few nodes and connections are lost when we consider the giant component of the network. I mentioned that this was because of the three major institutions at the Cape – the Company, the Orphan Chamber and the church. The 'church' here refers to the Dutch Reformed Church, which had a monopoly on organised religion until the establishment of the Lutheran Church in 1780.

The Cape was not unique in that these institutions were involved in the provision of credit. In other Dutch colonies, like Makassar and Batavia, these institutions also played a role. Gelderblom and Jonker (2009) showed how institutional investors in Amsterdam were key in Dutch financial development. At the Cape, they provided initial loans for capital (mainly farms) and labour (imported slaves). Ross (1989) showed how large contributions to the credit market came from Company employees, like Joachim von Dessin (MOOC8/10.76). But providing credit on a large scale is not equal to being central and well-connected in a network. Pagett and Ansell (1993) showed that the Medicis' connectedness was more important than their wealth in medieval Florence. I would like to show here how the connectedness of the Company, Orphan Chamber and church was key to the credit market at the Cape. The Orphan Chamber's capital came from the inheritances of minors they were put in charge of.

Over the entire period, with the exception of period 2, at least one of these institutions was in the Top 10 centrality measures. The degree centralities show that the institutions were often involved in many transactions, but not in the most. Here, the Orphan Chamber appeared the most. Whether this was because the probate inventories were taken by the Orphan Chamber, which would have skewed the data, cannot be known for sure. But the precision with which

TABLE 4.13: Position of the three main institutions at the Cape in the Top 10 centrality measures

	Before 1700	1700-1724	1725-1749	1750-1774	1775-1800	1800-1824
Degree Centrality	8 Orphan Chamber	Not in Top 10	2 Orphan Chamber	2 Company 4 Orphan Chamber	2 Company 7 Orphan Chamber	5 Orphan Chamber
Eigenvector Centrality	3 Company	Not in Top 10	2 Orphan Chamber	2 Company 6 Orphan Chamber	2 Company 3 Orphan Chamber	1 Orphan Chamber 2 Church 5 Government
Betweenness Centrality	5 Company 6 Church	Not in Top 10	1 Orphan Chamber 3 Church	1 Orphan Chamber 2 Church 4 Company	2 Company 3 Orphan Chamber 5 Church 10 Lutheran Church	1 Orphan Chamber 4 Church

Source: Probate inventories and genealogies, own calculations

many of the personal transactions were captured in the probate inventories suggests these measurements are accurate.

More important for the structure of the network are the eigenvector and betweenness centralities. The Company and the Orphan Chamber both had high eigenvector centrality rankings. A reason for this is that Company employees often borrowed from them. For example, Thobias Christiaan Rönnenkamp owed almost 13 000 rds to the Orphan Chamber and 3 200 rds to the Company; Hendrik Oostwald Eksteen owed 800 rds to the Company; Nicolaas Laubscher (mentioned before) owed 800 rds to the Orphan Chamber. These are just a few examples. Borrowing from the Company happened almost exclusively to purchase land, again a case for why it became influential in the market, while the Orphan Chamber and church were involved in borrowing for production purposes.

The high rankings of these institutions in terms of betweenness and eigenvector centrality at the Cape meant they were important for settlers to built connections through, and bound many individuals in the network together, despite not always being involved in the most transactions, as shown in Chapter 2.

4.7 Conclusion

Historians have long showed that social networks were important for the access to and use of credit in pre-industrial economies, where formal intermediation by banks were absent. However, the quantitative measurement of these networks has not featured prominently. This chapter was an attempt to show how the methods of social network analysis can be used to view the Cape's credit market through its social interaction. I focused on three measures of centrality:

degree, betweenness and eigenvector centrality, and on individuals, families, and institutions.

The network for individuals grew rapidly over time. The regression results showed that within the patriarchal society of the Cape, men featured as conduits of information, while the wealthy (in terms of slave ownership) were somewhat more influential. The weak support for the link between networks and wealth was contrary to previous evidence that networks were dominated by the wealthy. The high level of connectedness in the network due to the role of the Company, church and Orphan Chamber was the reason for the small impact of the theory of the strength of weak ties on the analysis.

When families were considered, the lower number of nodes in the network helped to better identify relationships and what their connections meant. Many of the central families stayed central once they became central, and what remains to be determined is what caused this centrality. The results also showed how the three institutions at the Cape – the Company, the Orphan Chamber and the church – were central to the network. This meant many more individuals became part of a single network because of borrowing from these institutions, and because of the connections individuals made through them. This chapter was a basic illustration of how the methodology of social network analysis can be used to quantify networks in an economic context. It should be extended to other countries and periods, to compare how networks and their structures differed across institutional arrangements.

Chapter 5

Ties that bind: Family, background and credit transactions

5.1 Introduction

In the sixteenth century, a new proverb was coined by William Turner. In 'The Rescuing of the Romish Fox', he wrote: 'Byrdes of on kynde and color flok and flye allwayes together', better known today as 'birds of a feather flock together.' The expression came from the observation that people with the same characteristics, tastes, and background tend to associate more with each other (Speake, 2008:58). More recently, social network analysis has provided empirical evidence for this observation. Homophily is the occurrence in observed networks where more ties are formed between nodes who share similar characteristics than would be predicted by random networks. Empirical evidence of homophily was found by Fryer (2007), who calculated significantly lower rates of interracial marriage in the US than would be predicted by theory. Schrum et al. (1988) found that students in high schools tend to disproportionately form friendships (strong or weak) with peers of the same race.

Centola et al. (2007) found three major reasons for homophily in a social structure: similar beliefs, similar culture, and induced homophily, such as geography. Ruef et al. (2003) found individuals tend toward similar individuals because of trust, attraction and understanding. Homophily also tends to be self-perpetuating. McPherson et al. (2001) found 'homophily tends to get stronger as more types of relationships (across race, for example) are introduced.' Many of

these causes are known by economists as informal institutions (Williamson, 2000).

This does not explain why it is important to study homophily in social contexts. Currarini et al. (2009) built a model not only to measure homophily but also to present a prediction of its effect on welfare. They found that the weight given to diversity will determine the benefit or loss to general welfare if more groups are introduced to the society. Another important aspect of homophily is its influence on communication. Golub and Jackson (2012) found that as homophily becomes greater and closer to one, communication tends to zero and consensus becomes infinite. They further found that communication is greatly influenced by a network's diameter. This has consequences for, for example, voting in democratic societies.

Homophily also influences choices in human capital. Calvó-Armengol and Jackson (2007) discuss the labour market in terms of social networks. They show how different types of jobs (which require different levels of educational attainment) determine the choice of educational attainment. Specifically, if an individual has more educated friends, they are also more likely to invest in education and find a more highly skilled job.

Another important aspect of networks influenced by homophily is diffusion. Diffusion refers to the speed at which an idea, or a new technology, spreads through the network. Jackson and López-Pintado (2013) found that homophily can facilitate or hamper diffusion. This will depend on the population and the relative desire for diffusion; for example, new technologies will carry a higher desire for diffusion relative to disease. Halberstam and Knight (2014) similarly found that information spreads more quickly in groups with similar characteristics.

I propose another aspect of homophily – trading among European settlers in a new colony. In developed countries, inter-personal trading or lending is virtually non-existent today, while in developing countries it still occurs regularly. An example can be found in Banerjee et al. (2013), who studied microlending in India. Here, many households still borrow various goods, like kerosene and rice, from each other. But research on social networks is data-intensive, as micro-level information on individual interaction is needed. For this reason, I propose to use historical data with detailed information on individual trading and connections to study homophily.

The Cape Colony was a settler/slave economy where immigrants came mainly from three regions in Europe: the Netherlands, Germany and France. Historical evidence suggests that these cultures assimilated into each other within two generations. However, when I used social network analysis and to analyse credit transactions in terms of homophily, a different picture emerged. In this chapter, I show that these cultures only integrated toward the second half of the eighteenth century. To explain this, I propose that familial trading on credit was low at the start of colonial settlement and increased at the same time as the cultures started to integrate.

The chapter is set out as follows: I first discuss the historiography of the Cape and the various groups which emerged with the development and expansion of the settlement. I then shift the focus specifically to the regions in Europe from where the settlers immigrated from, and how these cultures interacted with each other. I then show evidence of homophily in trading on credit between these cultures, with increasing levels over the entire eighteenth century. A possible reason for this is increased trading within families, which I explain before concluding.

5.2 The Cape Colony's wealth groups and their European nationalities

The Cape was first settled by the Dutch East India Company, not with the purpose of becoming a full colony, but to serve as a refreshment station for ships between Europe and India. Cattle would be traded from the local population and fresh vegetables and fruit would be produced around the fort built in Cape Town. Demand quickly outstripped supply, and the Company made the decision to release nine of its employees to become free settlers. It was well known that the Company drew its employees from all over Europe, including Germany and the Scandinavian countries. But at the Cape, Dutch and German settlers remained the dominant groups. In fact, with the release of the employees to become free burghers, it was only Dutch and German immigrants who were considered (Moodie, 1960). The Cape saw as many as 4 000 German settlers arrive during the eighteenth century (Shell, 2005).

Another group soon arrived at the Cape. After the Revocation of the Edict of Nantes, Huguenots from France scattered across Europe, often fleeing to the Netherlands in search of better economic opportunities or to avoid prosecution. In 1688, the first Huguenots arrived

at the Cape. The Huguenots have been studied and recorded extensively in Cape history (for example, Botha (1939) and Nathan (1939)). Fourie and Von Fintel (2014) found the French used their wine-making skills to become a part of society, and many became very successful and influential.

These three European groups are of interest here. The Dutch and German immigrants are often seen as a contrast to their French counterparts. With the arrival of the Huguenots, the plan for them was to be integrated as quickly as possible by scattering their farms between those of the Dutch. But according to Whiting-Spilhaus (1949), the French wanted to remain as close to each other as possible. The French also resisted efforts to assimilate into society – they kept their language and complained about not understanding Dutch sermons, even though a common Protestant faith was shared between the groups. These efforts seem to have been in vain, with De Kiewiet (1941) saying: 'In two generations or less, the two groups (Dutch and French) had grown together and become one.' This is the research question I wished to investigate here: Did the French really assimilate this quickly, or did groups continue to trade within their own European nationality rather than with others?

Another group, differentiated not by their European origin, but rather by their wealth, is often mentioned in the Cape's history: the gentry. These were individuals who owned many farms, often large in size, and also many slaves. Research into who these individuals were was started by Guelke and Shell (1983). The gentry is described as socially mobile and they often consolidated wealth over generations. One of the main individuals and key to the gentry was Hendrik Oostwald Eksteen (Guelke and Shell, 1983; Groenewald, 2009). Johannes Kruijwagen was another member of the gentry, described as the main creditor by Guelke and Shell (1983). Groenewald (2009) suggests this title is an overestimation and was probably based on the large number of debt transactions he was linked to at the time. Wouter de Vos and Martin Melck are other members often associated with this group. Schoeman (2011b:276-277) suggests that it was networks at the Cape that enabled a mutual dependence between the poor and the rich. Dooling (2005:130) also suggests that 'the extension of credit was closely tied to the dominance of the gentry over Cape economy and society.'

A problem with a too-narrow focus on the gentry is that it ignores the largest part of the population. Williams (2013) argues that '[a] focus on the wealthiest landowners in the Cape and Stellenbosch Districts leaves out of the picture Drakenstein, where most of the farmers lived and where more wine was produced than in either of the two other wine-producing areas.'

Recent research has shown that although not to the levels of the gentry, the average wealth at the Cape was relatively high (Fourie, 2013; De Zwart, 2011; Du Plessis and Du Plessis, 2012).

With regard to credit, the only financial innovation came toward the end of the eighteenth century with the introduction of the '*slagtersbriefjes*'. These were promissory notes given to cattle and sheep farmers on the eastern frontier, which could be converted into cash upon delivery of their meat in Cape Town. However, this endeavour came crashing down with the first financial crisis experienced at the Cape between 1788 and 1793 (Havemann and Fourie, 2014). The individuals who took centre stage with both the invention and the subsequent crash, were the Van Reenen brother and their father. Jacob Van Reenen, father to Dirk, Jacobus Gijsbert and Sebastiaan, built a large estate in the meat and alcohol business of the Cape. His sons continued this legacy by controlling a monopoly on the supply of meat to the Company and invented the '*slagtersbriefjes*' (Havemann and Fourie, 2014).

The alcohol *pachters*, or urban merchants, were another prominent group of settlers at the Cape. The main research on them has come from Groenewald (2007, 2011). These were alcohol monopolies bought from the Company at auctions, but from which the Company also gained the largest portion of its direct income. One distinction between the *pachters* and the gentry was the nature of risk in their business – a large concern for the *pachters* was creditors calling in loans. In fact, Groenewald (2007) calls these pachters a social group in their own right, different even from the *pachters* traditionally observed in the Netherlands. Another aspect to note of these *pachters* is that many of them were of German origin, including Martin Melck, whom many consider as the wealthiest man at the Cape (Guelke and Shell, 1983).

The relationship between these groups shows how important networks were at the Cape, and often these groups were interrelated with each other through marriage. For example, Hendrik Oostwald Eksteen married the daughter of Jan Meindert Kruijwagen, also father to Johannes Kruijwagen (Groenewald, 2009). But it also extended to friendships, for example, Martin Melck was close friends with the Van Reenen brothers (Groenewald, 2011). Baartman (2011) also acknowledges this integration of groups through networks. He studied a group of *burgher* protestors in 1779 and concluded that networks were based on familial and business relations. This presents the opportunity to apply the social network methodology to the Cape. It also makes sense, then, to use the credit records in the probate inventories to explore social groups and the connections between them.

The short literature review provided here offered evidence that homophily is often present in societies and its networks. Distinct groups existed at the Cape: Dutch, French and German. But as discussed before, the Dutch, who were in the majority, wanted the French to assimilate to their culture as quickly as possible, while the cultural discrepancies between the Dutch and the Germans were negligible (De Kiewiet, 1941:6,7). This is the question this chapter turns to next. Is homophily observed at the Cape and did it dissipate over time? Or more specifically, did trading on credit happen randomly between the different nationalities, or was there a tendency to trade with those who came from the same European region?

One aspect of trading on credit is trust, and a mutual reliance on each other (Muldrew, 2012). But trust is also an important aspect of homophily (Ruef et al., 2003). If the two are combined, homophily should be present in credit networks. Two arguments have been established in the Cape's historiography. The first argument is that the settlers of different European nationalities quickly drew to each other at the Cape and became similar (De Kiewiet, 1941). The second argument, by contrast, is that some skills continued to be dominated by some groups throughout the eighteenth century (Fourie and Von Fintel, 2014). This chapter adds to these arguments by testing homophily in the Cape's credit network. If the first argument is accurate, less homophily should be observed over time, while more homophily should suggest that culture and European background may have been more important than earlier thought.

5.3 Ties that bind: Homophily and trading on credit in the Cape Colony

To identify which group an individual belonged to, surnames were first standardised in terms of spelling and then traced back to their origin in Europe. Many of these were captured in the genealogies, but others were added by Cilliers (2016:48). These surnames were then matched to the credit transactions in the probate inventories. A transaction between someone with the French surname Du Plessis and someone with the French surname Du Preez would therefore be a French-French transaction, while a transaction between a Du Plessis and a De Beer would be a French-Dutch transaction, and so forth. A transaction between two individuals with the same surname was classified as a familial transaction. Although this latter strategy was not completely accurate, since two first arrivals with the same surname were not necessarily related, it was the simplest way to identify transactions within families. At the time this research

was done, the data did not allow for the tracing of marriages and intermarriage between these groups. I return to why this is important later in the chapter.

If transactions occurred randomly between groups, the theory predicts that the proportion of transactions within the same group would be the same as their proportion to the population. So, if the Dutch constitute 28 percent of the population before 1700, and if transactions happened at random, 28 percent of transactions involving Dutch should be with other Dutch. However, a proportion higher than the proportion to the population would be an indication of homophily. Throughout the period, there is evidence of homophily in all three groups, i.e. the actual proportion of transactions between the groups are highter than the expected proportion. The Dutch group moves from a negative of 4.95 percent in period one to a maximum of 24.17 percent in period four and 17.22 percent in the final period. The German group moves from 10.81 percent in the first period to 17.18 percent in the final period and the French group from 25.68 percent in the first period to 15.55 percent in the final period. A summary of this is presented in Table 5.1, while Figure 5.1 shows the whole network for period 4 (between 1750 and 1774), and the seperate European origin groups' networks.

TABLE 5.1: Homophily: Expected and observed number of transactions by origin groups

		Before 1700	1700-1724	1725-1749	1750-1774	1775-1800	1800-1824
Dutch	Expected	28.38	15.08	20.77	26.68	19.90	33.42
	Actual	33.33	20.00	33.33	50.85	47.83	50.64
	Difference	-4.95	-4.92	-12.56	-24.17	-27.93	-17.22
German	Expected	39.19	19.05	21.92	34.24	36.96	37.10
	Actual	50.00	40.00	40.00	42.55	42.21	54.28
	Difference	-10.81	-20.95	-18.08	-8.31	-5.25	-17.18
French	Expected	24.32	65.08	55.77	38.03	42.40	27.55
	Actual	50.00	86.84	64.47	57.32	68.82	43.10
	Difference	-25.68	-21.76	-8.70	-19.29	-26.42	-15.55

Source: Probate inventories and genealogies, own calculations

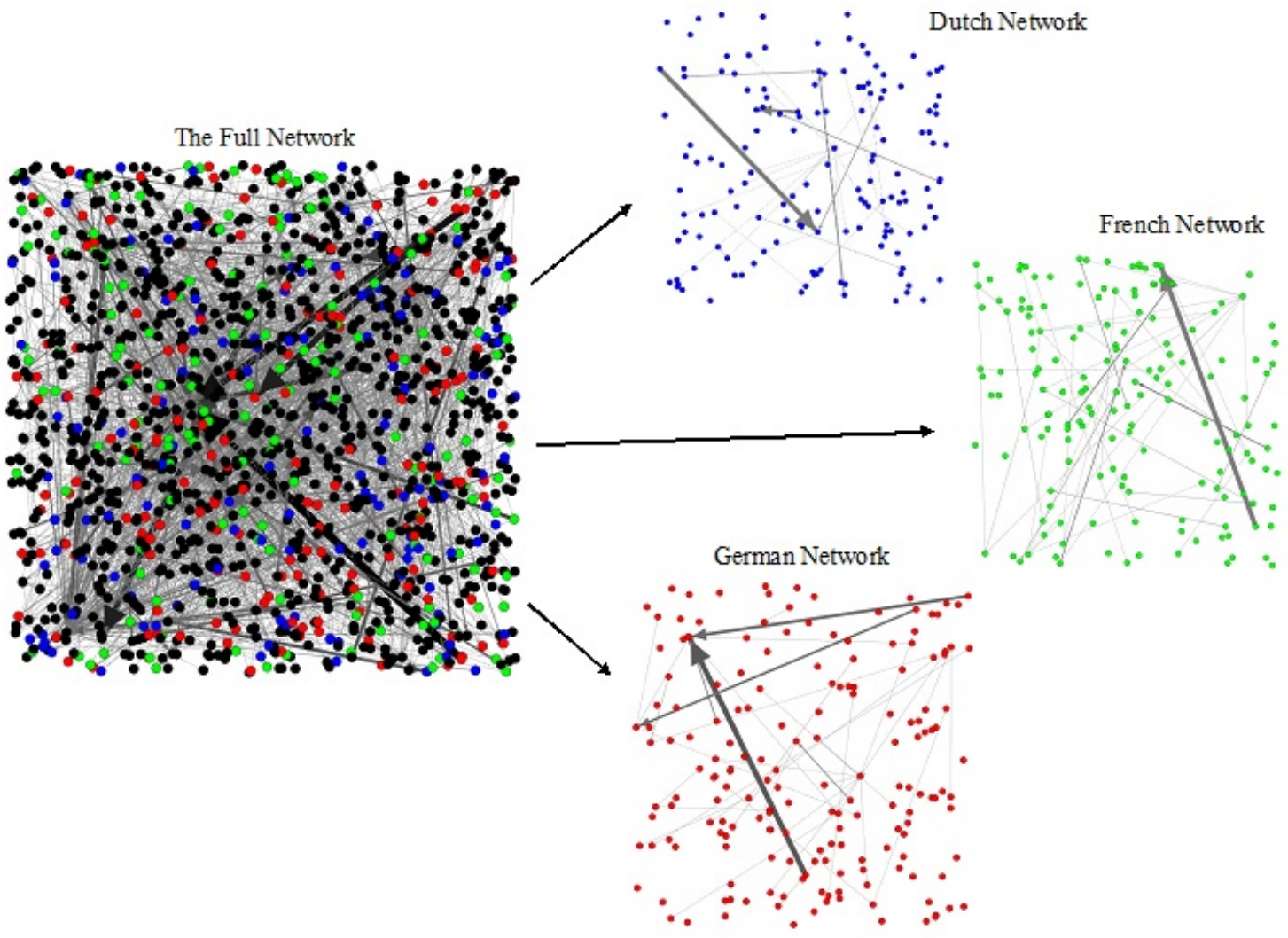

FIGURE 5.1: Network between 1750 and 1774 and the respective European origin groups' networks

It is clear that homophily was present at the Cape in terms of European background and trading on credit. The observed number of transactions between groups was consistently higher than the expected number of transactions for the groups. Figure 5.2 presents the differences for the various periods with a fitted polynomial (to the second degree) line. The groups who experienced less homophily over time and therefore integrated into the other groups are the French and German surnames, but the German trend was much stronger than the French. The German surnames had an initial increase in homophily, followed by a long period of deteriorating homophily, before it increased slightly. The French initially experiences less homophily, but this quickly returns to the initial high levels of homophily. The Dutch experienced more homophily throughout the period, with slighly less homophily toward the end of the period. At the start of the nineteenth century, the groups were at the same level – 15-17 percent more transactions within the group than expected under random networks.

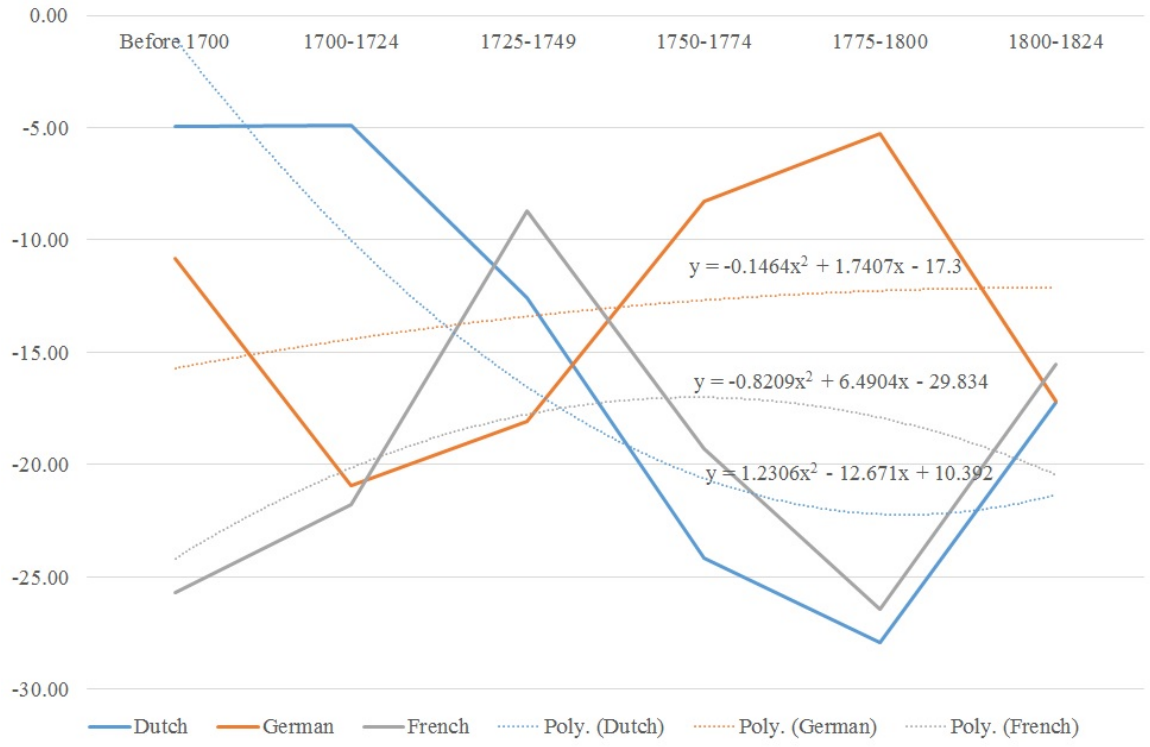

FIGURE 5.2: Homophily trends at the Cape Colony over time

To determine when the cultures moved toward each other, I calculated the turning points for the various groups. The Dutch turning point was only in the final period, while the French and German turning points were close to each other in the fourth period (the mid-eighteenth century). This suggests that initially the French and German surnames experienced less homophily, but turned and experienced more homophily in the second half of the eighteenth century.

Although this should not be taken as evidence against the observed cultural assimilation, it is evident that trading was at least reserved for those with the same background, as can be seen through the high levels of homphily trends throughout the eighteenth century (the measurement never becomes zero). This suggests the groups remained distinct when it came to credit transactions. Settlers tended to trade with others who shared their European nationality, rather than with groups from a different nationality. This is further support for studies like Fourie and Von Fintel (2014), who found the French protected their skills, and showed divergent levels of productivity between Huguenots and Dutch wine-makers. It also supports historians like Whiting-Spilhaus (1949) who stated that the French 'wanted to be together'.

If it is assumed that the final levels are the steady state, this raises questions on what will happen if another group is introduced. In 1820, the Cape Colony experienced another influx of immigrants, this time from Britain. This came after the British government took control of the Cape for the second time in 1806 and promoted immigration to the eastern frontier. Tensions between the British and Dutch settlers (given German and French assimilation) are notorious, and even cited as a reason for the Dutch migration toward the north of the country in the 1830s. This is beyond the scope of this study, but it adds another dimension to the study of homophily and how social networks evolve over time.

5.4 How do we explain this homohily at the Cape?

The evidence that trading on credit continued to occur between settlers of the same European nationality can be explained by two factors – wealth and family trading. Wealth has been shown throughout this dissertation as an important determinant of credit and debt at the Cape. The Huguenots became wealthy and influential through their wine-making skills (Fourie and Von Fintel, 2014) and many of the 'gentry', like Hendrik Oostwald Eksteen, and *pachters*, like Martin Melck, were of German descent. In this selection of probate inventories, however, there were no significant differences in the wealth of individuals, measured by the number of slaves owned. Figure 5.3 shows the proportions of origin groups by each of the slave wealth groups.

To test whether the homophily explained in the previous section is related to wealth homophily, I present the levels of homophily for these groups in Figure 5.4. Only weak homophily existed for the wealth groups at the Cape. Three of the five groups showed between zero percent and

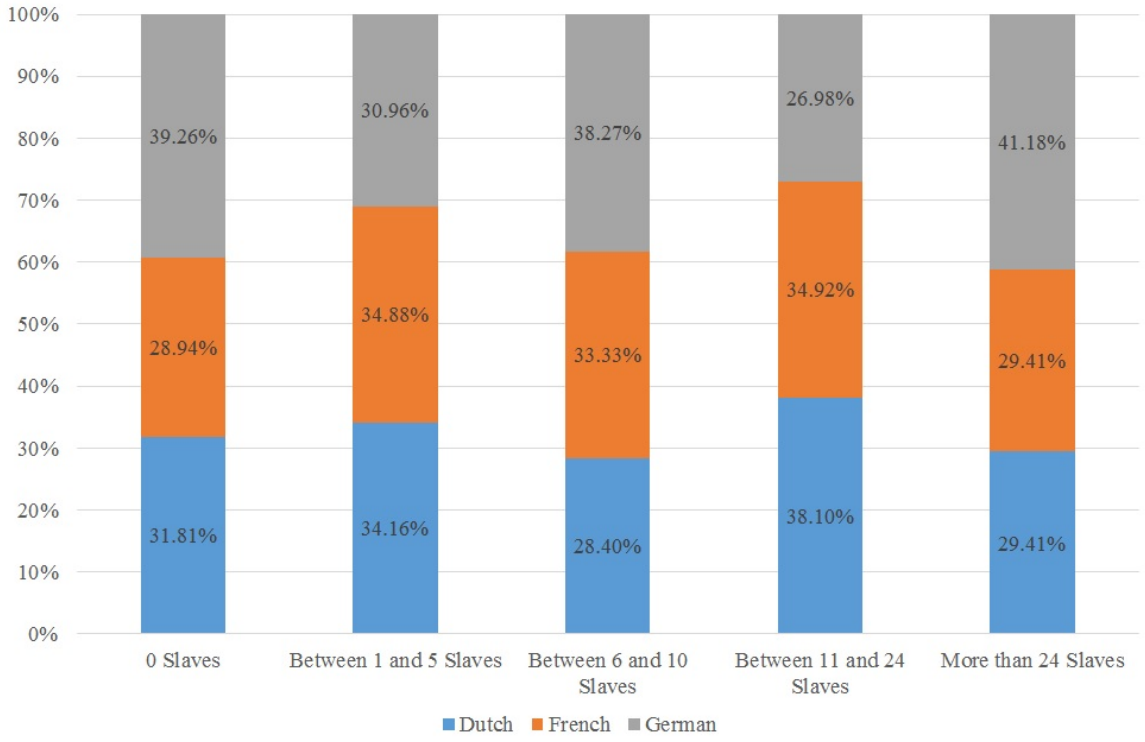

FIGURE 5.3: Proportion of each European background to the respective slave ownership groups

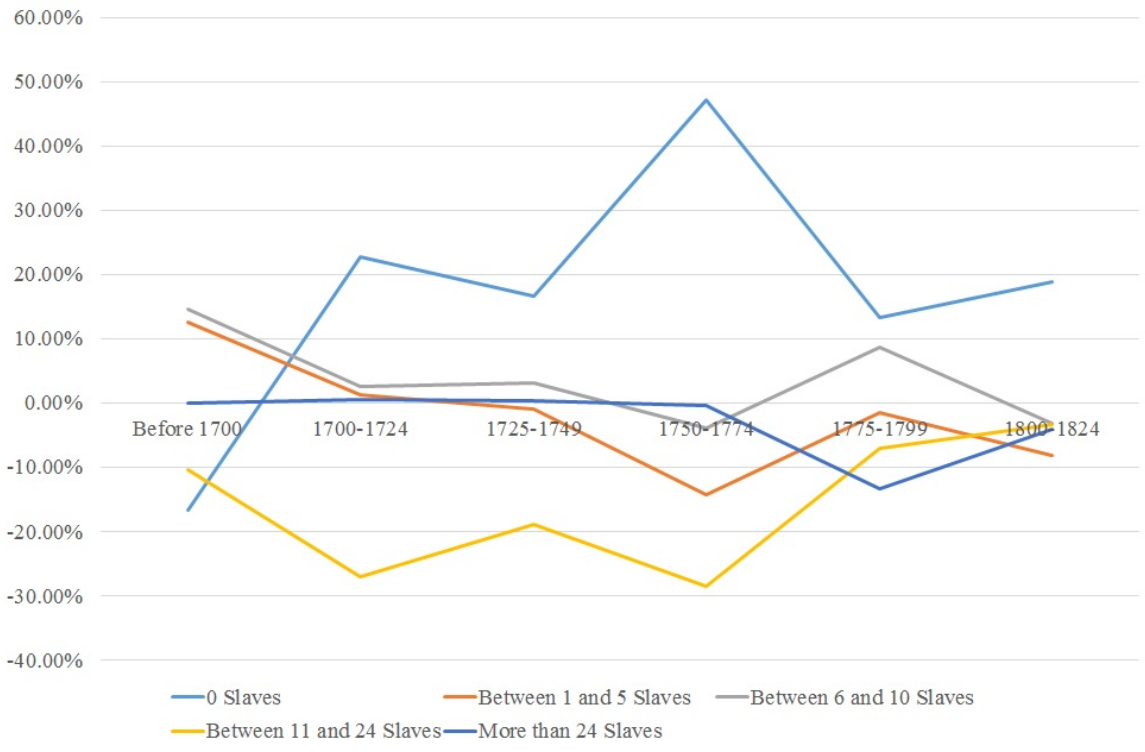

FIGURE 5.4: Homophily proportions within slave ownership groups at the Cape

ten percent trading within the same group while those with no slaves showed much more trading with the other groups. This was to be expected; the poorest borrowed from the wealthy in many societies. Guelke (1989:81–82), for example, states poor, small farmers 'were tied to wealthier ones by debts' at the Cape. This is, however, evidence against Dooling (2007), who suggested the gentry dominated the market.

A second possibility is that my earlier results on homophily within European nationality may encompass family trading. During the earliest phase of Cape settlement, when the settler population would have been small and tenuous, most of the trading would have happened between settlers who share a common background. This would have been the case as long as new migrants arrived. However, in 1717, immigration to the Cape was actively discouraged by the Company. As families grew larger, it is likely that familial relationships replaced national origin. The Cape's population continued to grow due to high fertility. Within the three groups of interest here, the Dutch settlers experienced the lowest fertility (Cilliers, 2016:49). However, even after 1717, I continued to observe new surnames and control for these when I considered the number of transactions within families. Figure 4.4 shows an example of trading within families in a social network context. A transaction was classified as within-family if the two parties involved had the same surname.

To test whether increased trading within families can explain the pattern in homophily at the Cape, I used the total number of transactions for the different periods, the number of transactions classified as within a family and the number of surnames observed for each period. I calculated the proportion of within-family transactions as follows:

$$\%\text{Within-family transactions} = \frac{\text{Number of within-family transactions}}{\text{Total number of transactions} \times \text{Number of surnames in the period}}$$

Table 5.2 shows the results from this formula, while Figure 5.5 shows these results with a fitted polynomial line. Figure 5.5 shows the same turning point in the middle of the eighteenth century as Figure 5.2, where the increased homophily among the three groups expanded in the previous sections. This increased trading within-family was likely the result of larger and more settled families, which was also the cause of more homophily between the three European nationalities at the Cape.

TABLE 5.2: Homophily: Expected and observed number of transactions by origin groups

	Before 1700	1700-1724	1725-1749	1750-1774	1775-1800	1800-1824
Total number of transactions	323	994	1938	2154	4898	7518
Within-family transactions	14	20	42	101	195	601
Number of surnames	208	449	699	802	1205	1733
Proportion of within-family transactions	2.08%	0.45%	0.31%	0.58%	0.33%	0.46%

Source: Probate inventories and genealogies, own calculations

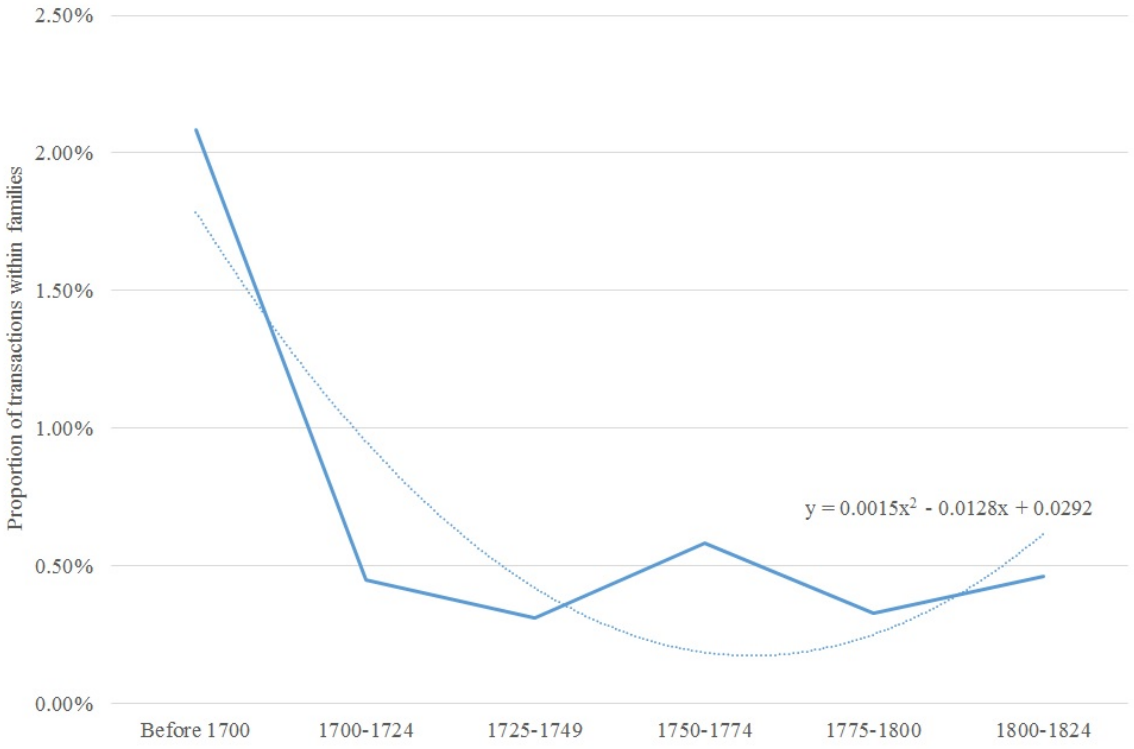

FIGURE 5.5: Proportion of credit transactions classified as within-family over the period

One area where this research now falls short is the influence of marriage on integration and homophily. Historians have suggested marriage was key to social mobility at the Cape and also for cultural assimilation (Botha, 1939; Nathan, 1939). It would be possible for future research to add information on marriages and business relations to the existing network data and re-estimate these results.

5.5 Conclusion

This chapter set out to test the implications of homophily in social networks for credit transactions. Homophily is the observation in social networks that nodes with the same characteristics tend to link together. Many modern empirical studies have shown evidence of homophily in different settings in social networks, like marriages or friendships. A limitation of modern data

sets is the limited micro-level data available on the individual connections, but history offers rich information on such transactions. I used such a historical data set of the Cape Colony's probate inventories to test homophily over the eighteenth century.

I identified many of the groups described as important in the Cape's economy and credit network. These varied from different groups from Europe to distinct wealth or trading groups. Historical literature suggests that within the Cape there was rapid cultural assimilation between the three main cultures: Dutch, French, and German. Yet, in this credit network of the Cape's probate inventories, high and constant levels of trading within groups were observed. This suggests a level of trust was reserved for those with the same European background when it came to providing credit. As an explanation for this increased homophily and trading with those with the same background characteristics, I tested whether this can be explained by a similar pattern in wealth or by within-family trading. Wealth homophily showed little support and was almost non-existent at the Cape, while within-family trading first decreased and then increased at the same time as the increase in homophily was observed.

As far as I am aware, there is yet to be a study done on long-term homophily and its evolution. These results provide the first indication and support for Williamson's assumption that informal institutions, like trust and culture, are notoriously stable over time (Williamson, 2000). My results showed little change over a century. Future research should add more information especially regarding marriage and occupational relationships within this network, and their effect on homophily, and integration of cultures. This will lend itself to testing the cultural assimilation at the Cape more directly.

This chapter was the first application of a new methodology to the Cape's MOOC credit market and the influence of social networks on these transactions. Yet it only touched the surface of the possible questions that can be addressed by using social network analysis. These include more research on homophily and the slow-changing nature of informal institutions. My research ignores marriages and how they related to credit transactions, like the Medicis' case, where marriage was important. Did occupations play a role in network formation, and how do these differ between occupations. These are only a few of the questions which can still be answered by using social network analysis.

Chapter 6

Which property rights matter for debt – *de jure* or *de facto*? Evidence from colonial South Africa

6.1 Property rights: the theory and empirical evidence

In order for any transaction, including debt transactions, to occur, an economic system, according to North (1989), needs 'well-specified and well-enforced property rights'. Coase (1960), too, concluded that without the delimitation of initial rights, no market transactions can take place. Such property rights systems evolve, suggested Demsetz (1967), from the 'laws, customs and mores of society'. These authors formed the beginning of scholarship into property rights as an economic institution, and how important these rights are for economic development and transactions.

More recently, studies have focused on presenting empirical evidence for the long-run impact of property rights on economic development. One such study was by Acemoglu et al. (2001). They used settler mortality as instrument for the initial property rights systems installed by colonial powers, and show that this initial system mattered for long-term development. This research in turn has spurred research into how property rights systems developed and mattered in different regions. The aim here is to add to this debate and consider the Cape's land market in the context of property rights literature.

Sokoloff and Engerman (2000) compared different New World economies and found that regions where land had been acquired with relative ease are more affluent today. A key to their hypothesis is land abundance and the unequal distribution of factor endowments. Fenske (2012) studied land abundance in nineteenth-century Nigeria and found, similar to Sokoloff and Engerman (2000), that land abundance caused weak property rights in land. A weak property rights system in land then caused slaves to be used as collateral for market transactions rather than land. Yet, the outcomes are also affected by the region in which the system is observed.

In India, land abundance and the land tenure systems related to it, caused different long-run outcomes in different regions. Banerjee and Iyer (2005) show that in the historical districts where large landlords (equated with relatively weak property rights) were in control, less investment and productivity were observed post-independence. Dell (2010) shows the opposite: large landowners in Peru had well-defined and secure property rights. They had the ability to protect the workforce from the forced labour, and in the long run, these regions had more public provisions like schools and roads. These cases show how the social environment (of laws and norms) in which a property rights system develops will have different effects on it in the long run. Land relative to labour was abundant at the Cape, but the focus here is on the laws which governed land ownership rather than the impact of land abundance on property rights. Although not the focus of their study, Dye and La Croix (2014) states the loan farm system of the Cape was a way to quickly integrate the vast lands into production.

The social environment includes laws, which govern land ownership. The evolution of these laws on land ownership was the subject of investigation in De Soto (2001) and Lamoreaux (2011). De Soto (2001) studied how property right laws changed over time in the US and concluded that property law was successful once it took the social norms of settlers on the frontier into account. Focused on the effect of one particular law, the Homestead Act of 1834, Lamoreaux (2011) showed that the allocation of land by government would be fruitful as long as individuals continued to believe that the underlying property rights to land were secure.

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continued to believe that the underlying property rights to land were secure.

These laws include two parts: the right to use land and the right to own land. These are often defined in terms of *de jure* and *de facto* property rights. On the frontiers in the US, Brazil and Australia, the enforcement of property rights became key to development due to continual expansion. Alston et al. (2012) built a model to investigate *de jure* and *de facto* property rights and enforcement. They found conflict can arise when there are opposing claims on the land, and that often systems evolve from *de jure* to *de facto* property rights systems. When these are aligned, the protection of the land also becomes important. Hornbeck (2010) demonstrated that it is equally important to protect land from encroachment than it is to have legal ownership over it.

Dye and La Croix (2014) expand this model by applying it to the colonial South African case. They found the Cape's case to be different to the US, Australian and Brazilian model studied in Alston et al. (2012). Their conclusion is that a new form of land ownership evolved – the loan farm. This system was a response to the declining threat of the Khoikhoi and was a system going from *de facto* to *de jure* property rights. This was because the settlers moved outside the official colonial border, where they did not have formal protection of their land. The settlement outside the official border later became an opportunity for the Company to charge rents and extract revenue.

This chapter builds empirically on Dye and La Croix's model by applying tools to test whether the type of property rights regime mattered for economic transactions. Feder and Feeny (1991) suggest land is only valuable as collateral where uncertainty is absent with regard to the rights on land. In line with Alston et al. (2012), this would mean the *de jure* and *de facto* rights need to be aligned and enforced. If these theories hold, the freehold farms of the Cape, with their more secure property rights, would be more valuable collateral and the owners should have more debt.

One problem with this theory is endogeneity concerns, especially reverse causality. More assets with better property rights mean better collateral and more debt, but debt may have been incurred to obtain these assets. To solve this problem, an instrumental variable, namely being the eldest son, was used. In a patriarchal society like the Cape, eldest sons were more likely to own freehold farms and other sons the loan farms, despite the Roman-Dutch law for equal inheritance between children. The results support other scholars like De Soto (2001), who found

that norms matter and that these are often more powerful than the prescriptions defined in law.

6.2 Land policies at the Cape

Land is an important asset for production and a valuable form of collateral for debt transactions. When the European settlement started, farms were modeled on the small-scale farming found in the Netherlands. The first farms were placed under the ownership of nine employees of the Company, and were released when the demand for fresh produce outstripped the supply. The weather patterns and low soil quality forced the Company, under the leadership of Simon Van Der Stel, to expand European settlement toward the mountainous Stellenbosch region. Under the freehold policy of the Company, farmers could claim any size of land cultivated within three years – the only requirement was to relinquish one tenth of the produce as a tax to the Company (Duly, 1968:14). Many of these large landowning farmers became known as the 'landed gentry' (Guelke and Shell, 1983). Besides the large swathes of land owned, they also owned many slaves. Under the freehold policy, all rights to the land were transferred from the Company to the individual - making them tradable and inheritable. The prices of these farms increased throughout the first century of European settlement (Guelke, 1989).

The main determinant of claiming land was the soil quality, and although it is unlikely that all the farms had the same soil quality, most had access to a river (Guelke and Shell, 1983). The unavailability of more suitable soil in the region made new claims almost impossible, and the policy was terminated in 1717. The settled farms, however, continued to be sold from settler to settler or inherited over generations (Newton-King, 1999:18). Guelke created a map of the freehold farms to show the extent of these farms up to 1750 (Guelke, 1987).

The second-most used form of farms, which emerged after 1717, was loan farms. Loan farms were obtained with relative ease: they were loaned from the Company for three, six or twelve months at a fixed, low rate. The size of each farm was determined by riding half an hour on horseback in each direction. However, this new distinct land policy was different from the freehold system in legal terms. Legally, the only parts of the loan farm which could be sold were fixed improvements, while the ownership of land remained with the Company. Duly (1968:15)

makes the observation that 'the system was a form of legalized squatting'.[1]

Yet what happened in actuality was that the ownership between the two systems became indistinguishable. Guelke (1976:31) argues that '[i]n practice there was little distinction between freehold land and *leeningsplaatsen* (loan farms).'[2] In fact, he goes further by saying 'the leases became so secure that the fixed improvements (which could be sold)[3] came to reflect the value of the whole property.' Newton-King (1999:99) comes to the same conclusion: the loan farms were similarly secure to the freehold farms. In economic and property rights terms, this meant the two land ownership systems at the Cape had distinct *de jure* property rights, but *de facto* the property rights were considered the same.

A concern here would be the strength of the *de jure* property rights, especially of the loan farms. The Company in *de jure* terms had the rights to reclaim the land at any time, despite the fact that the settlers *de facto* saw them as the same. Gie (1963:153) says this rarely happened, and would only happen if the government wanted to establish a town in the area. In this case, the loan farm was not just claimed by the Company, but the farmer was fully compensated for the land. This is more support that the loan farms were in fact as secure as the freehold farms in terms of property rights.

In comparing the two systems, Guelke (1976) concluded that the freehold farms were more valuable because of their relative closeness to Cape Town. The first-mover advantage of these farms also secured more protection. Initially, the Company provided ample military protection to the freehold farms, but as the colony expanded, the cost became too large. This coincided with an ebbing threat from the Khoikhoi. The new farms on the frontier, the loan farms, enjoyed less protection (Fourie et al., 2013).

But the European expansion also had a significant impact on land 'owned' by the Khoikhoi. The Khoikhoi as a pastoral people had communal property rights. Schapera (1930:127) shows how the Khoikhoi families banded together and lived on a stretch of land, with 'equal right to hunt and collect over any part of it and to use the water in it.' The settlers often claimed to

[1] It should be noted here that the system which developed at the Cape was different from the *leening* system found in the Netherlands. The system in the Netherlands was closer to a freehold system than the system at the Cape (De Vries and Van Der Woude, 1997:160–162).

[2] parentheses mine

[3] parentheses mine

have purchased land from the Khoikhoi. With their understanding of property and land ownership, these transactions were probably misunderstood by the Khoikhoi and rather seen as a temporary arrangement (Boonzaier et al., 1996). But with continued pressure, the rights of the Khoikhoi were often ignored, especially after the smallpox epidemic greatly reduced the number of Khoikhoi, and with the introduction of the loan farm system their voices were drowned out (Penn, 2005:42).[4]

This chapter looks more closely at the role of property rights in the Cape's credit market. Newton-King (1999) found a large role for land as a form of collateral at the Cape. However, no study has looked at the differences between the freehold and the loan farms in terms of property rights and their effect on debt. This study will focus on these differences in terms of property rights to test whether they had noticeable effects on debt. In terms of property rights, the freehold and loan farms were clearly distinct in *de jure* terms. In theory, the freehold farms *de jure* had more secure property rights – they were tradable and inheritable, while legally the loan farms were not. Despite this, there is ample anecdotal evidence that *de facto* property rights were the same.[5] The aim here is to exploit this difference between the two systems to see which type of property rights, *de jure* or *de facto*, was considered when trading on credit. The hypothesis is that if freehold farms enjoyed more secure property rights relative to loan farms, they were more valuable as collateral and wealth indication, and should therefore be linked to more debt. This study contributes to the existing literature in two ways. Firstly, by testing the effects of property rights on immediate transactions and not long-run economic outcomes. Secondly, by providing further evidence that the local context in which the property rights are observed matters for debt.

6.3 The freehold and loan farm data

The data obtained from the genealogical records and the probate inventories combine assets with demographic information. Important for this chapter, is the information on birth and

[4]These works and others have looked at the influence of European settlement on the Khoikhoi, but due to data limitations, the focus here remains on the property rights of the European settlers and their debt. This is not say private property rights were superior, only that it remains an area of future study on how communal property rights influenced the Khoikhoi's ability to produce and compete with the European settlers.

[5]The definition used for *de jure* property rights is the rights defined by law, while *de facto* property rights are what is observed in society.

death dates and occupations. Additional to this, the genealogical records can be used to inform birth order, the instrumental variable of choice. I explain this choice and assumptions below. The probate inventories list all assets including land owned and under which policy it was obtained. Although not without bias, these two sources are used extensively in Cape historiography, for example by Newton-King (1994). She studied material life on the frontier and found that poor farmers were in the minority. Mitchell (2008) also studied families on the frontier using the probate inventories. Further support for this is found in Fourie (2013), who found the wealth in the inventories to be 'remarkable'. Additionally to this Schuurman (1980) concluded that probate inventories 'enable the study of property according to occupation, age and number of children.'

The main concerns raised regarding the use of probate inventories for the study of wealth are the exclusion of the poor, women and the young. None of these was a concern for this study. By focusing on land ownership, the poorest and landless at the Cape were automatically excluded. But the probate inventories did not contain the wealthiest individuals at the Cape either. Fourie (2013) compared the MOOC 8 series to a series of inventories from Stellenbosch collected by Krezensinkski-De Widt (2002). The Orphan Chamber inventories were collected for individuals without wills, or where minor heirs were involved. The individuals in the Stellenbosch inventories were significantly more affluent. Women were excluded from the current study as well, since its focus is on sons, either the eldest or born later. Finally, age is not a concern either. Chapter 2 showed there is no age effect on debt at the Cape. There are also observations across various age groups, and no differences between ages of sons born first and sons born later in terms of mean age or distribution. Chapter 2 also discussed the biases arising from matching the probate inventories to the genealogies. The main conclusion was that the matched sample, also used here, captured a median individual at the Cape, not the wealthiest nor the poorest. The general occurrence of debt in the inventories also suggests land ownership was not a prerequisite for entrance to the credit market.

The inventories offer information on the land owned, under which policy it was owned and in some cases the value and size of the farms. But as discussed before, the size and value are problematic to use. Firstly, due to the sporadic inclusion of these, and secondly, due to the way in which these were determined. For example, the size was half an hour's horse ride in each direction for loan farms, but more often it was the case that farmers could use any land as long as they did not intrude on their neighbours' land. The recorded sizes on the inventories often reflected these prescribed sizes, but the true size would almost certainly have differed.

The land values included also do not reflect true market values and are often clustered and rounded amounts. Here is an example of how land was recorded in the probate inventories: Trijntjen Hillebrants (MOOC8/1.12) had one farm named Soetewijk situated in Drakensteijn, which was 60 morgen (the standard prescribed size of farms) and valued at 600 gulden (200 rds), when she died in 1695. A more detailed entry would include under which policy the farm was obtained from the Company. The two policies, which form the focus here, are the freehold farms (*eigendom*, *erfgrondbrief* or *transport*) and loan farms (*leeningsplaatsen* or *in leening*). Some inventories even show if and when both of these policies appeared in the inventory, like the entry which states that Josua Joubert (MOOC8/21.32) owned one farm Welbedagt, situated in the Wagenmakersvalleij in the Stellenbosch district, owned in freehold when he died in 1795. He also owned two loan farms, Elands Jagt situated next to the Molenaars River in Du Toits Kloof and another Varkens Kop situated in the Sneeuberge. Table 6.1 provides a summary of the information available on land ownership found from the inventories.

TABLE 6.1: Descriptive statistics on land ownership, with and without policies

Property category	Number of farms	%	Farms with known policies	%	Loan farms	Freehold farms
No land	1135	54.15	-	-	-	-
One farm	621	29.63	362	64.64	272	90
Two farms	209	9.97	127	22.68	95	32
Three farms	58	2.77	33	5.89	19	14
Four+ farms	73	3.48	38	6.79	15	23
Total	2096	100	560	100	401	159

Source: Probate inventories and genealogies, own calculations

Almost 54 percent of the inventories did not list any land. Looking across other measures of wealth, we find further evidence of left truncation. Table 6.2 also provides summary statistics on debt, credit, whether the individual was both a creditor and a debtor, the total number of bonds observed and other household characteristics, by the type of land owned. The two groups excluded from the analysis below were the individuals with no land listed, and the individuals whose farms were listed, but of which the policies are unknown.

The individuals with no land listed were by far the poorest individuals at the Cape. They were however not excluded from debt transactions. They owned on average one slave, while the individuals in the other categories owned more than five slaves on average. The mean debt value for those individuals were 368 rds, while their credit value was even higher at 692 rds. 43 percent of the individuals with no land were both creditors and debtors, while 12 percent had debt bonds in the inventory. More than three quarters had spouses listed (lower than other groups) and they had a low 3.12 children. By the end of the seventeenth century,

TABLE 6.2: Descriptive statistics on land ownership, with and without policies

	No farms				
	Obs.	Mean	Std. Dev.	Min	Max.
Number of farms	755	-	-	-	-
Number of slaves	755	1.38	3.38	0	36
Value of debt	755	367.94	1 275.19	0	20 167
Value of credit	755	691.69	5 612.89	0	103 424
Both debtor and creditor	755	0.43	0.5	0	1
Debt bonds present	755	0.12	0.72	0	11
Spouse listed on inventory	755	0.76	0.42	0	1
Number of children	755	3.12	3.75	0	19
	Farms with unknown policies				
	Obs.	Mean	Std. Dev.	Min	Max.
Number of farms	281	1.73	1.27	1	9
Number of slaves	281	7.77	10.59	0	73
Value of debt	281	3 732.94	12 594.28	0	135 755
Value of credit	281	4 297.27	17 754.66	0	150 775
Both debtor and creditor	281	0.48	0.5	0	1
Number of debt bonds	281	0.46	1.39	0	13
Spouse listed on inventory	281	0.87	0.34	0	1
Number of children	281	3.01	3.49	0	16
	Loan farms				
	Obs.	Mean	Std. Dev.	Min	Max.
Number of farms	259	1.47	0.9	1	8
Number of slaves	259	5.68	7.75	0	45
Value of debt	259	2 318.19	6 967.87	0	85 922
Value of credit	259	1 076.98	5 945.41	0	92 246
Both debtor and creditor	259	0.52	0.5	0	1
Number of debt bonds	259	0.35	1.1	0	11
Spouse listed on inventory	259	0.8	0.4	0	1
Number of children	259	4.34	4.27	0	23
	Freehold farms				
	Obs.	Mean	Std. Dev.	Min	Max.
Number of farms	113	2.06	1.72	1	12
Number of slaves	113	9.81	10.26	0	60
Value of debt	113	2 875.35	5 414.77	0	35 197
Value of credit	113	5 444.71	27 661.71	0	256 425
Both debtor and creditor	113	0.5	0.5	0	1
Number of debt bonds	113	0.55	1.07	0	6
Spouse listed on inventory	113	0.9	0.3	0	1
Number of children	113	4.26	4.19	0	16

Source: Probate inventories and genealogies, own calculations

the average household size was 6.92 (Cilliers and Fourie, 2012). There are two possibilities for no land being recorded: either they did not own any land, or the land they did own was not recorded. But they were excluded from the analysis. The focus on freehold and loan farms made the exclusion of these individuals less problematic than for studies of overall wealth levels.

The second group of individuals that was excluded was more problematic. These were the individuals for which some land was listed, but the policy under which the land was acquired was not mentioned. From the other indicators, there was also no way of telling if these were more likely freehold or loan farm owners. In terms of the wealth indicators (slaves and debt),

their levels were higher than the loan farms, but less than the freehold farms. The proportion of individuals with debt bonds was also between the freehold and loan farm levels. Due to the uncertainty created by the lack of information on the policy, I decided to exclude them from analysis rather than add them or create another group.

In short, the summary statistics show the freehold farmers were wealthier than their loan farm counterparts.[6] They owned on average more land and slaves, had more debt, extended more credit, and a higher proportion of them had bonds. The differences were less pronounced when the number of children and the proportion with spouses listed on the inventory were considered. Figure 6.1 presents the distribution of the natural logarithm of debt for the two groups considered in the analysis.[7] It provides further support that the freehold farmers were wealthier. Before the instrumental variable results are presented, it is important to look at the correlations between land ownership and debt. If no correlation exists, the instrumental variable would be unlikely to carry value.

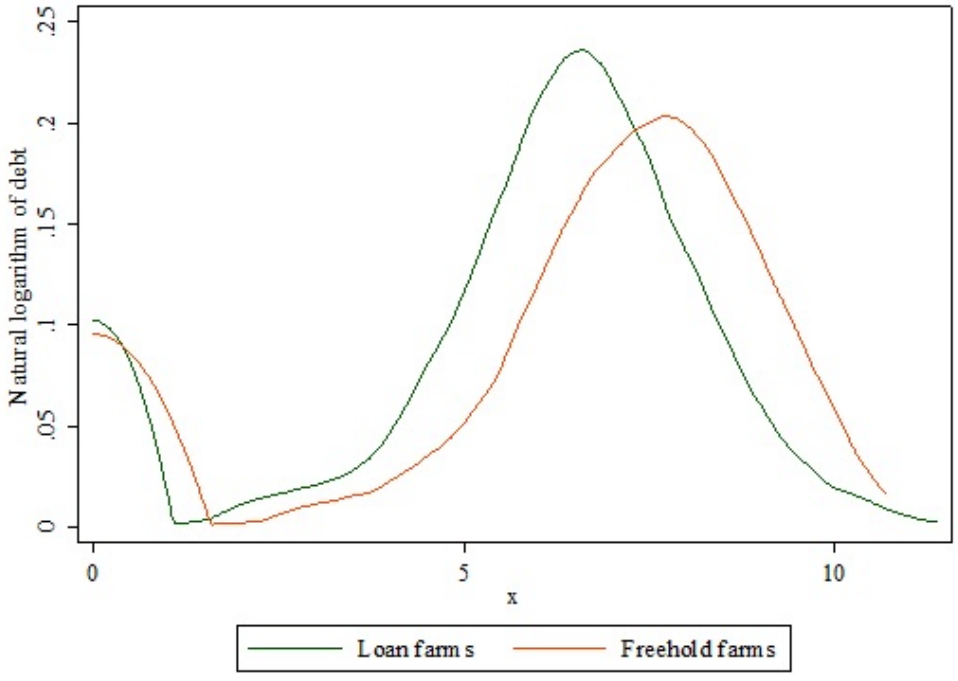

FIGURE 6.1: Debt distribution of freehold and loan farms

[6]If individuals owned both a freehold and a loan farm, the observation was added to the freehold farmers. The results remain robust whether these are included or excluded.

[7]A zero debt was replaced by $1 \times 10e^{-10}$ for positive logarithmic values, which caused the spike at the left side of the distribution.

6.4 Correlations between land ownership and debt

The descriptive statistics from the probate inventories suggest freehold farms were owned by the wealthier individuals of the Cape. It was important to consider the correlations between debt and land ownership, before the hypothesis that secure property rights cause debt could be tested. The first correlation considered the number of farms on debt, and the second the difference in debt between freehold and loan farms. It was important to consider these correlations due to the general occurrence of debt at the Cape. Since many individuals had debt and transacted on credit, land might not have been an important factor in securing debt. At this time, the Cape Colony had almost no towns outside the fledgling community in Cape Town, and farms were therefore a more important measure of real estate. Because of this, I did not distinguish between real estate within towns and farms. The town properties captured in the probate inventories were almost certainly also held under freehold.[8]

Additional control variables were added to remove wealth effects on debt. In Chapter 2, I argued that the wealthy at the Cape, or those with some form of collateral, were most likely to have debt. The controls therefore included are: the number of slaves owned, the number of debt bonds, if an individual was both a debtor and creditor, and also if a spouse was listed on an inventory. Gender was not considered here because of the instrument used later in the analysis. These correlations were also only focused on inventories of males. Slave ownership was divided into the following groups: 0 slaves, between 1 and 4 slaves, between 5 and 10 slaves and more than 10 slaves. The number of debt bonds was important to consider for two reasons: because bonds are highly correlated with incurring debt to purchase land, and because it was likely larger debt transactions. Bonds were more formal loan contracts witnessed by an independent third individual.[9] Individuals with both credit and debt were more likely to have more collateral (either land or slaves) and their debt levels were expected to be higher. The extension as well as the acquisition of debt would require some assets. If a spouse was listed on the inventory, debt was also likely to be higher, as it was the debt accumulated by both husband and wife before death and not just a single individual. Individuals with more children were more prosperous; as Cilliers (2016) showed South Africa's fertility decline happened after the mineral revolution in the late nineteenth-century.

[8] See footnote 2 in Chapter 2 for more details on towns in the colony.
[9] More information on these bonds can be found in Chapter 2.

The first regression – Table 6.3 – shows a strong correlation between the number of farms listed on the inventory and the debt level of the inventory. One additional farm was associated with a 58.1 percent increase in debt. The other wealth variables, slaves, number of debt bonds and whether the individual was both a debtor and creditor were also strongly correlated with the individuals debt level. Having a spouse listed on the inventory was also correlated with debt levels. One consideration here was that if the spouse was also listed on the inventory, the two individuals may have passed shortly after one another. This would have made them riskier borrowers. However, considering the generality of debt at the Cape, it is unlikely that this would have a significant impact on the results. The number of children did not have a significant correlation with debt levels.

TABLE 6.3: OLS regression between the number of farms and debt

Dependent variable	Natural Logarithm of Individual Debt	
	Coefficient	Std. error
Number of farms	0.4578***	0.0641
Zero slaves	Ref.	-
Between 1 and 4 slaves	0.3585**	0.1617
Between 5 and 10 slaves	1.0346***	0.1997
More than 10 slaves	0.8551***	0.2493
Number of debt bonds	0.6386***	0.069
Both debtor and creditor	2.5466***	0.133
Spouse listed on inventory	0.7352***	0.1805
Number of children in household	-0.0121	0.0185
Constant	1.7651***	0.1711
N	1408	
R-squared	0.3719	

Source: Probate inventories and genealogies, own calculations
Notes: The dependent variable is the individuals level of debt in log-linear terms, that is, the total debt of an individual or household listed on the inventory, not individual transactions.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

Table 6.4 shows the differences in debt for individuals with freehold farms relative to loan farms. This is the first evidence to support the hypothesis that individuals with freehold farms were wealthier, had better-protected property rights and more debt. The individuals with freehold farms had on average more debt than individuals with loan farms. Slave ownership continued to matter for the debt of freehold farmers, while being both a creditor and a debtor was correlated with more debt, and inventories with both spouses listed also had more debt. When comparing these two groups, individuals with more children had less debt.

These OLS correlations point to different outcomes for freehold and loan farms and debt, suggesting there was at least some role for property rights to play in determining value for debt.

TABLE 6.4: OLS regression between debt of freehold and loan farms

Dependent variable	Natural Logarithm of Individual Debt	
	Coefficient	Std. error
Farms owned under freehold policy (1 for freehold farms, 0 for loan farms)	0.8801**	0.3593
Zero slaves	*ref.*	-
Between 1 and 4 slaves	-0.0241	0.3506
Between 5 and 10 slaves	0.6151*	0.3713
More than 10 slaves	0.8602**	0.3694
Number of debt bonds	0.5593***	0.0796
Both debtor and creditor	2.5967***	0.2547
Spouse listed on inventory	1.2711***	0.4191
Number of children in household	-0.1176***	0.0348
Constant	2.9941	0.4811
N	327	
R-squared	0.3457	

Source: Probate inventories and genealogies, own calculations
Notes: The dependent variable is the individuals level of debt in log-linear terms, that is, the total debt of an individual or household listed on the inventory, not individual transactions.
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

At first glance, the individuals with freehold farms were more prosperous and had more debt, supporting the hypothesis that they had better-protected property rights. There is also support for this in existing historiography, which claims the wealthy individuals at the Cape lived in and around Cape Town had at least one freehold farms and often also had loan farms on the frontier (Groenewald, 2009). A concern with these correlations was reverse causality. Individuals with freehold farms had more debt because they had more collateral due to better property rights, relative to individuals with loan farms. But the reverse is also true: individuals with freehold farms may have had more debt because they used debt to purchase these farms in the first place. Because of this concern, and to remove the endogeneity caused by this, the next section turns to using an instrumental variable.

Another possible channel for freehold farms to have more debt was the income channel. The freehold farms may simply have been more profitable, because they did not need not pay the rent the loan farmers had to pay. This seems unlikely – the cost of loan farms (24 rds per year) was low relative to wages (156 rds per year) and average debt levels (mean of 2 300 rds). The data lacks richness to test this in more detail, and would have to be matched to, say, the annual tax censuses (*opgaafrolle*).

6.5 An instrumental variable approach: Eldest sons, freehold farms and debt

Due to the possibility of reverse causality and endogeneity in estimating the effect of property rights regimes on debt levels, an instrumental variable approach was used here to estimate the effect of owning a freehold farm on an individuals debt level. The instrument of choice was being the first-born son in a household relative to second-born sons or sons born later. Many studies have used the random variation of birth order to study different economic outcomes, including schooling or returns to education (Black et al., 2005b), income (Kantarevic and Mechoulan, 2006), labour market outcomes like employment (Black et al., 2005a) and the decision to migrate (Abramitzky et al., 2013). As far as I am aware, there have not been any studies done on property rights using first-born sons. For the purpose of this research, birth order was considered exogenous and a random event.

To estimate the instrument, a two-stage least squares regression was used. The first stage was focused on the probability of first-born sons owning a freehold farms, and the second stage looked at the relationship between owning said freehold farms, and the effect of this on debt (in natural logarithmic terms). A vector of other wealth characteristics was also controlled for due to the relationship between wealth and debt at the Cape established before. These included: slave ownership, whether an individual was both a creditor and a debtor, and the number of bonds owned by the individual. It further included whether the eldest son had a spouse listed on his inventory, and his number of children. An additional controls which could be added in future is the land ownership of the father, but the restricted data on father-son combinations in the data did not allow for this in the current study.

My instrument for estimating the local average treatment effects (LATE) had to comply with the following four assumptions: independence (exogeneity), exclusion restriction, first stage (relevance) and monotonicity (Angrist and Pischke, 2009:153). The independence assumption required that the instrument be as good as randomly assigned. This means first-born sons should not have had an innate higher ability (which cannot be observed) which made them more likely to own a freehold farm. Although not directly testable, there was no evidence that first-born sons were innately better suited to own a freehold farm. Other studies have also concluded that birth order is a random event, and I believe birth order was sufficient to pass the independence assumption.

The exclusion restriction required that birth order not have a direct causal effect on the level of debt. In Chapter 2, it was shown that debt was a general occurrence at the Cape. The best way to support the exclusion restriction was therefore to look at the debt distribution of the eldest sons versus sons born after him. Figure 6.2 shows these distributions. Table 6.5 provides the t-test for the size of the debts. This showed no significant difference between eldest sons and sons born later. Since there was no significant difference in either the distribution or the size of debt between eldest sons and other sons, the assumption cleared the first hurdle.

TABLE 6.5: T-test of eldest sons vs. non-eldest sons, debt size, owning a freehold farm and age

	Debt size		Owned a freehold farm		Age	
	N	Mean	N	Mean	N	Mean
Non-eldest son	638	1535.01	169	0.1834	1152	48.6946
Eldest son	681	1692.86	179	0.4302	1238	49.8334
Combined	1319	1616.02	348	0.3103	2390	49.579
Difference		-156.79		-0.2467		-2.4818
t	-0.4110		-5.1443		-1.4662	
p-value	0.6811		0.0000***		1.4662	

Source: Probate inventories and genealogies, own calculations
*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

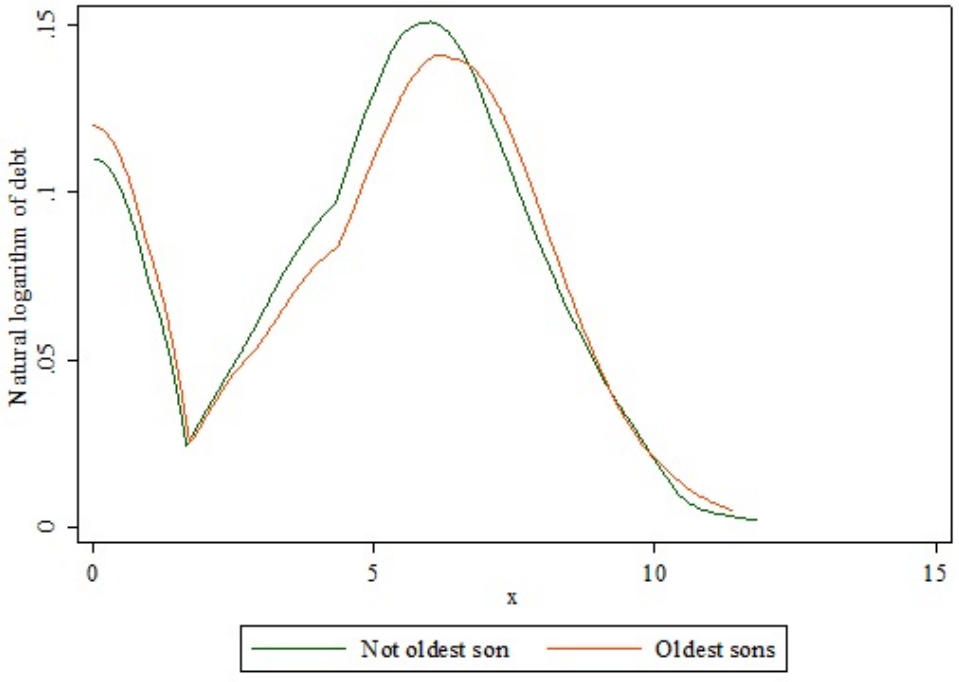

FIGURE 6.2: Debt distributions of eldest and non-eldest sons

Two other channels through which the instrument may have had an effect on individual debt were longevity and occupation, both characteristics that could be observed from the genealogical records. For occupation, more highly skilled occupations may have presented less risky borrowing and therefore the ability to obtain more debt. First-born sons may also have had more opportunities to join these more higly skilled occupations. The occupations I observed can be divided into different skill levels: unskilled or low skills, farmers, medium skilled, highly skilled and professional. To test if elder sons had higher-ranked occupations, an ordered logit was run (Table 6.6). The elder sons did not have a significantly larger share in more professional skills relative to sons born later.

TABLE 6.6: Ordered logistic regression for eldest sons and sons born later

	Skill level			
	Coefficient	Std. error	Odds ratio	Std. error
Eldest Son	0.1165	0.2182	1.1235	0.2451
N	313		313	

Source: Probate inventories and genealogies, own calculations

A second possible channel through which being the eldest sons could affect debt was through longevity. Individuals who were older when they died had a longer time over which debt and more farms could have been accumulated. First-born sons may also have had higher longevity because resources reverted to the eldest son rather than sons born later. However, there was no significant difference in the ages of eldest sons relative to sons born later. Eldest sons expected age for the period (conditional on reaching 16 years of age) was 49.83 years, while sons born later lived an average of 48.69 years (see Table 6.5). Figure 6.3 shows the age distribution of eldest and non-eldest sons. Neither the mean ages nor the distributions of ages between first-born sons and sons born later differ significantly. Neither ages nor occupations show significant differences between the eldest sons and sons born later: the strongest evidence that being the first-born son was an appropriate instrument.

For the first stage assumption, the eldest sons needed to have a higher probability of owning a freehold farm. The system of inheritance at the Cape was one of partible inheritance derived from Roman-Dutch law, as mentioned before. This meant the individuals estate was divided, with one half going to the spouse and the other half divided equally among the children. Most often, the estate was sold in its entirety at auction and the proceeds distributed between the heirs. Despite this, anecdotal evidence has been provided by Newton-King (1994) and Dooling (2005, 2007) that the eldest son was favoured when it came to the inheritance of property and freehold farms. Newton-King (1994) suggested that elder sons inherited freehold farms, while

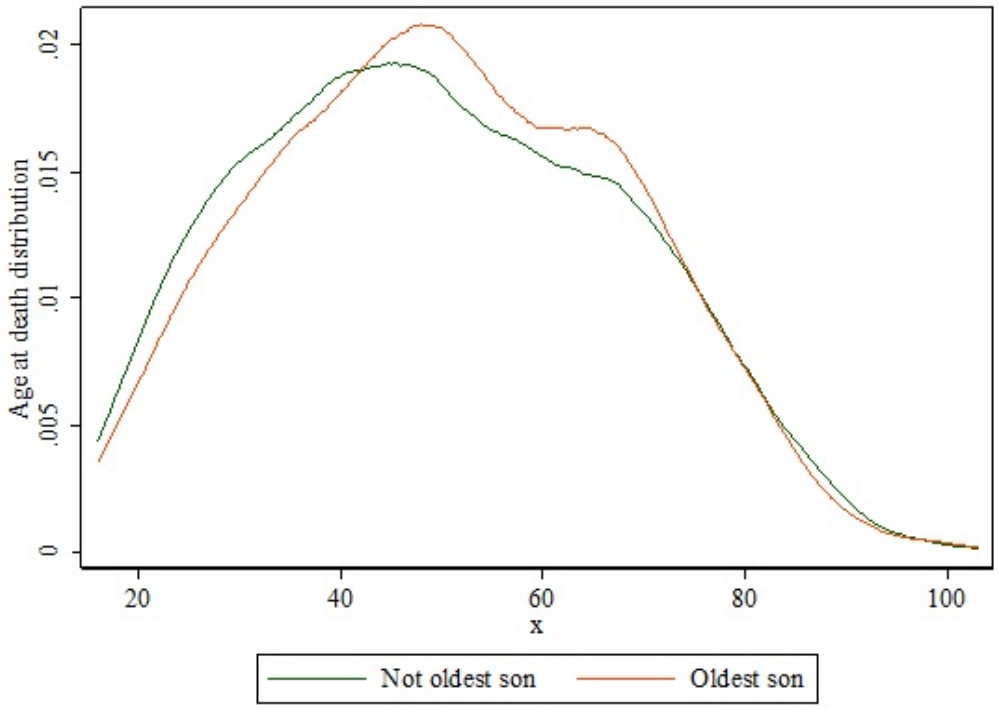

FIGURE 6.3: Age at death distributions for eldest and non-eldest sons

sons born later inherited loan farms. Dooling (2005) and Dooling (2007) refer to how, in this patriarchal society, sons were inevitably favoured over daughters when it came to inheritance of land. With this anecdotal evidence at hand, I tested the likelihood of elder sons owning more freehold farms and indeed found a higher probability among eldest sons of owning freehold farms, at 48 percent, while of sons born later, only 18 percent owned freehold farms (see Table 6.5).

Finally, monotonicity required that the instrument affect all the treated in the same direction, that is, being the eldest son should always make one more likely to own a freehold farm rather than less likely. The historical evidence presented above not only supports the first stage assumption, but also the monotonicity assumption. Eldest sons were always more likely to own farms relative to their brothers born later and not the reverse, across both time and districts.

Being the first born son appears to have been a valid instrument for the probability of having a freehold farms relative to sons who were born later. Table 6.7 presents the regression results for the instrumental variable estimation. The result support the hypothesis that the eldest son had a 23 percent higher probability of having a freehold farm relative to sons born later, significant at the one percent level. Individuals with more slaves were also more likely to own freehold farms. Having a spouse listed on the inventory was also associated with higher probability

of owning a freehold farm, but none of the other characteristics was associated with a higher probability of owning a freehold farm.

TABLE 6.7: Instrumental variable results between ownership type and debt value

First stage regression Owning a freehold farm		Second stage regression Ln(Debt Value)	
First son	0.2338***	Owned a freehold farm	-1.6521
	-0.0494		1.2138
0 Slaves	(ref.)	0 Slaves	(ref.)
Between 1 and 4 slaves	0.1595**	Between 1 and 4 slaves	0.1034
	0.0693		0.4329
Between 5 and 10 slaves	0.2344***	Between 5 and 10 slaves	0.7512
	0.0704		0.506
More than 10 slaves	0.3469***	More than 10 slaves	1.0783*
	0.0785		0.6346
Both creditor and debtor	-0.0392	Both creditor and debtor	2.0072***
	0.05		0.292
Total bonds present in inventory	-0.0021	Total bonds present in inventory	0.6539***
	-0.0225		0.1292
Spouse listed on inventory	0.1861*	Spouse listed on inventory	1.3521**
	0.0853		0.5636
Children	-0.0069	Children	-0.0348
	0.0063		0.039
Constant	-0.1003	Constant	3.5116***
	0.093		0.5185
N	330		
Under-identification test			
Anderson canon. corr. LM statistic	21.519		
Chi-square(1) p-value	0.000		
Weak Identification test			
Cragg-Donald Wald F-statistic	22.392		
StockYogo weak ID test critical value	16.32		

Source: Probate inventories and genealogies, own calculations. Dependent on son reaching 16 years of age.

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

The second stage regression, however, revealed that, given the instrumental variable of being the eldest son, owning a freehold farm did not matter for the individual's debt level. The coefficient of owning a freehold farm was negative – individuals with freehold farms had less debt – and the coefficient was insignificant. These negative and insignificant effects were due to two possible reasons: measurement error in the instrument, or the debt levels of loan farms relative to freehold farms and the number of these in the sample. I found evidence for the latter, but not the former. In the genealogical records, birth order were recorded from the birth and baptism dates of the children. Unless the children had been baptised on the same day and the birth order had been incorrectly recorded then, measurement error in the instrument was unlikely. However, debt increased over time at the Cape (see Figure 2.10) and the number of loan farms increased, while the freehold farms remained constant after 1717. The debt values of loan farms grew exponentially, while the growth of debt related to freehold farms remained

constant over time. Figure 6.4 shows this relationship.

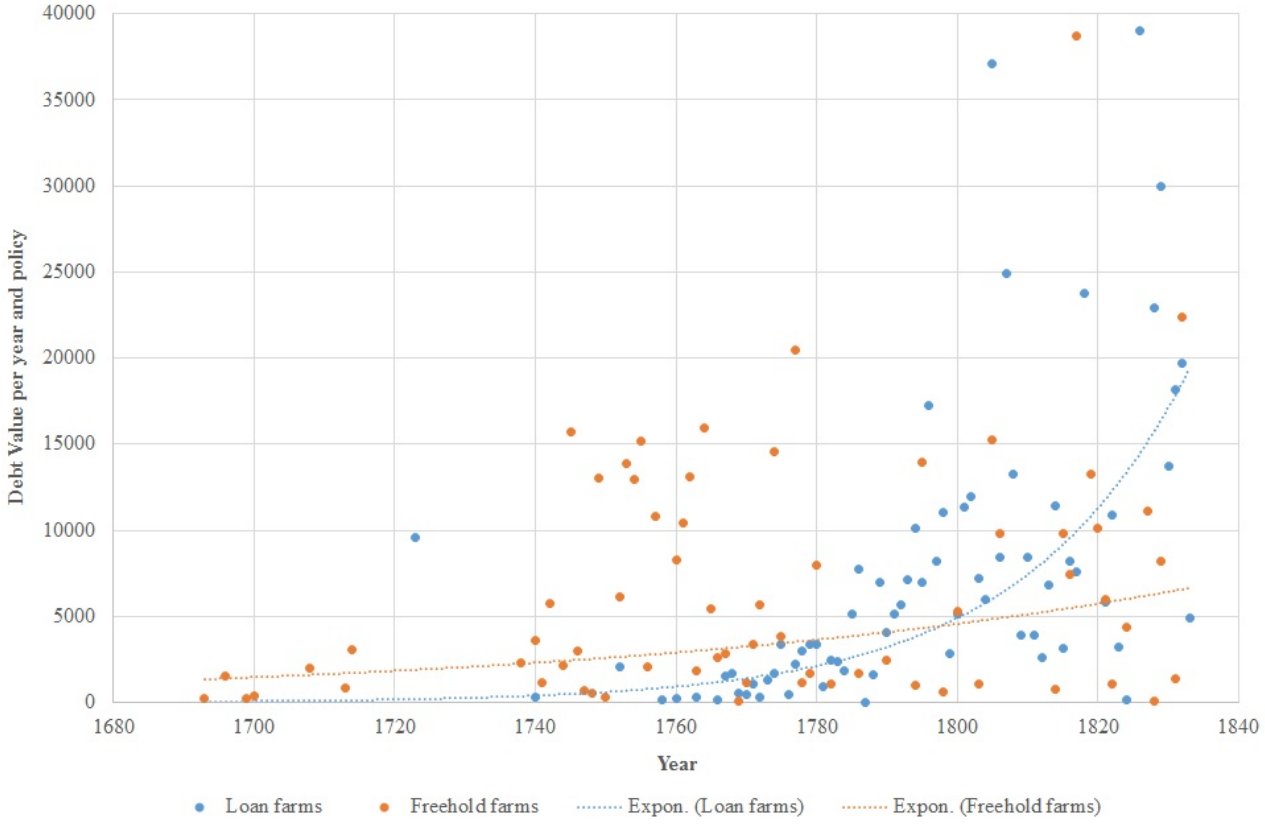

FIGURE 6.4: Debt values of farm policies over time

As a robustness check, I included all the farms without information on policies as loan farms. The result for freehold farms remained insignificant, and the negative effect was smaller with this inclusion. This was further support for the instrumental variable analysis, and that the results were not driven by the exclusion of these farms. These results are shown in Table 6.8.

In the property rights framework sketched in Sections 1 and 2, the debt market at the Cape considered the *de facto* property rights of land more important for transactions. This means the property rights observed by society, i.e. what was followed in practice, rather than what was prescribed by law, was more important. This supports the existing historiography of the Cape, in which authors like Guelke (1989) and Newton-King (1999) have provided evidence that the property rights of freehold farms were similar to those of the loan farms. It also advances the international literature, by focusing on microeconomic information, and the recent literature which suggests social norms and *de facto* rights are important when *de jure* rights are established.

TABLE 6.8: Instrumental variable results between farms status and debt value

First stage regression Owning a freehold farm		Second stage regression Ln(Debt Value)	
First son	0.0915***	Owned a freehold farm	-0.7871
	0.0353		1.5310
0 Slaves		0 Slaves	
Between 1 and 4 slaves	0.0759	Between 1 and 4 slaves	-0.1065
	0.0482		0.2211
Between 5 and 10 slaves	0.1428***	Between 5 and 10 slaves	0.5069*
	0.04985		0.3002
More than 10 slaves	0.1961***	More than 10 slaves	0.9914***
	0.0531		0.3723
Both creditor and debtor	-0.0160	Both creditor and debtor	0.1419
	0.0355		0.1419
Total bonds present in inventory	0.0024	Total bonds present in inventory	0.4632***
	0.0141		0.0559
Spouse listed on inventory	0.0341	Spouse listed on inventory	0.0210
	0.0653		0.2692
Children	0.0047	Children	-0.0317*
	0.0046		0.0181
Constant	-0.0224	Constant	6.1391***
	0.1717		0.2782
N	489		
Under-identification test			
Anderson canon. corr. LM statistic	6.745		
Chi-square(1) p-value	0.0094		
Weak Identification test			
Cragg-Donald Wald F-statistic	16.38		
StockYogo weak ID test critical value	6.713		

Source: Probate inventories and genealogies, own calculations. Dependent on son reaching 16 years of age.

*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

For my other variables of interest, only the highest group of slave ownership had a significant effect on debt, suggesting the combination of slaves and land ownership mattered for debt. Individuals who were both creditors and debtors had more debt than individuals with only debt, and additional bonds caused higher debt. The spouse remained significant for debt levels. This suggests it was individuals with some form of collateral – those who owned land, slaves, bonds, or who were both creditors and debtors – who had debt. If the individual had a spouse listed, it meant additional resources, which the creditors could use to assess riskiness and additional collateral from the combined estate. This is more support for the recent literature on early credit markets which suggests credit and debt were not used more by the poor, as suggested before, but by those with the greatest number of assets (see, for example, Muldrew (2012) and Ogilvie et al. (2012)).

A Hausmann test between the instrumental variable regression and the OLS regression rejected the null hypothesis (Chi-squared = 253.3, p=0.000) that the estimators are similar in favour of the instrumental variable regression. The specification tests are presented in Table 6.7. The

Cragg-Donald Wald statistic (22.392) was greater than the critical value of 16.38, and the instrument passed the weak instrument test. This suggests being the eldest son in the family was highly correlated with owning a freehold farm. Because I only had one endogenous regressor and one instrument, the specification was just-identified. All these tests together made the instrument a valid instrument.

By measuring the effect of property rights at a micro level, this chapter has added to the literature on property rights and economic transactions. The freehold and loan farms had distinct formal processes for claims, and their legal specifications differed. Despite the differences in *de jure* and *de facto* property rights, the economic outcomes for the two systems did not show big differences. This supports the existing historiography's view that the differences between freehold and loan farms were not as stark, and that settlers relied on *de facto* property rights for decision-making. It also means, like De Soto and Lamoreaux's findings, the local conditions under which property rights regime was observed mattered. In this case, the settlers viewed loan farms and freehold farms as equally secure in terms of their property rights, which gave them the ability to secure equal debts.

6.6 What mattered for debt?

The instrumental variable analysis above gave empirical proof that in colonial South Africa, secure property rights in land, as measured through two different land ownership policies, did not make a difference to debt. The less secure *de jure* property rights of the loan farms were offset by the perceived secure *de facto* property rights. This meant that the perceived secure property rights of both systems caused similar debt levels for individuals, regardless of the type of property. The problem with this, is if property rights in land were regarded as the same, and if this did not have an effect on debt, then what did matter for debt? Three possible facets are considered here. The first is production potential, which at the Cape was closely linked to slave ownership. The most profitable farmers owned many slaves (Guelke, 1989:79), while small farmers were unable to benefit from slave ownership (Du Plessis et al., 2015). Slave ownership was also a vital measure for the credit markets at the Cape, as shown in Chapter 2. Slaves and overall wealth were highly correlated with debt. This chapter provides further evidence for slavery's role in credit transactions. The instrumental variable analysis adds support for this link between slave ownership and debt in showing that large slave owners had significantly

more debt regardless of property type.

The second facet which may have mattered for debt is the net value of the estate, or the immediate ability to repay debt. Ogilvie et al. (2012:160) found 'people borrowed to solve cash-flow problems, not because they were fundamentally lacking in assets', and Muldrew (2012) claims most transactions in the early modern period happened on credit, not with cash. This suggests individuals with a high net worth, or the ability to service and repay debt regularly, would also have higher debts. This was also true in the Cape Colony. Figure 6.5 shows the relationship between net estate value and the debt value of the estates for which the net worth was available.

Anecdotal evidence provides further support. In the diary of Lady Anne Barnard from 1799, the following note on why she provided credit to others can be found: 'I give Ross credit on this business – his good nature makes him pay'. Groenewald (2009), in his study of Hendrik Oostwald Eksteen's economic ventures, found Eksteen was successful because he repaid his debt quickly and was given credit regularly.

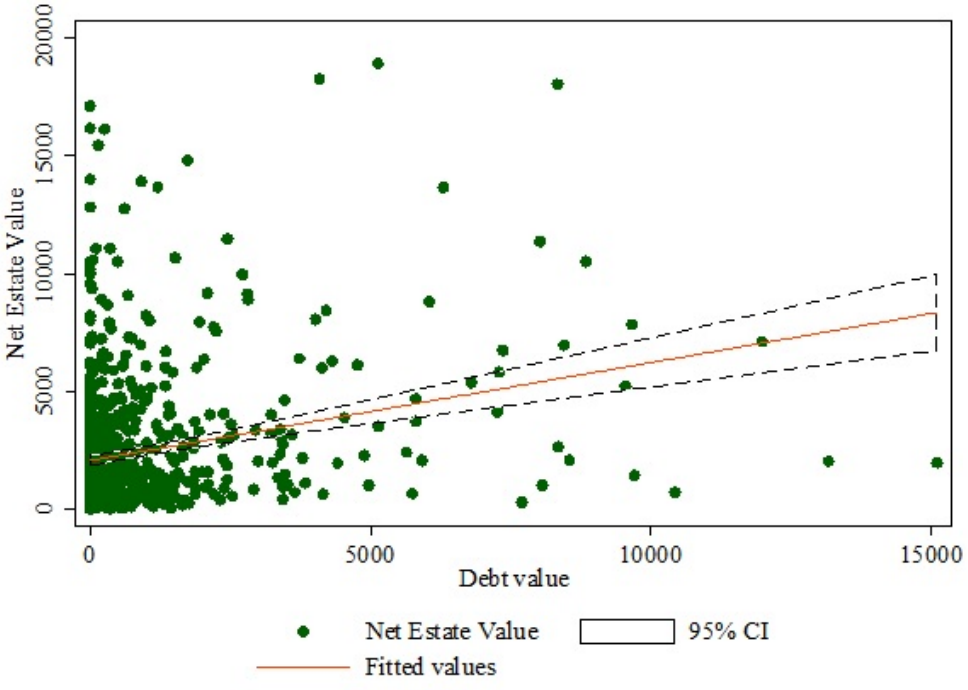

FIGURE 6.5: Net value and total debt values of estates

Groenewald (2009) also provides the third important aspect for debt and credit, namely social networks. He writes that '[Eksteen] soon started building up good networks with the farming community of the Cape district' (Groenewald, 2009:23). In Chapter 4 and 5, the elements of

social networks were considered. Chapter 4 showed how influence or eigenvector centrality was determined by an individual's wealth, while Chapter 5 showed the importance of familial trading and how this changed over time. In Europe, networks have also been shown as important in securing credit (Ogilvie et al., 2012; Van Bochove and Kole, 2014; Rosenthal, 1994).

6.7 Conclusion

For any economic transaction to take place, well-defined and well-enforced property rights are required. Economists suspect that property right regimes are rooted in the history of the region, but it has been difficult to prove the effect of this on economic development empirically. This chapter studied the effect of property rights on debt at the Cape Colony. The Cape offers an alternative to the development of *de jure* and *de facto* property rights. At the Cape, the property rights of loan farms were developed from *de facto* to *de jure* property rights, while in other case studies like the United States, Australia and Brazil, they developed from *de jure* to *de facto* property rights. The two land tenure systems of the Cape, freehold and loan farms, enabled me to study individuals with the different types of property and to compare them one another. The contribution of this research has been to focus on a microeconomic outcome, namely individual debt levels, rather than macroeconomic outcomes.

Economic theory would suggest land is only valuable for debt transactions if there is no asymmetry or uncertainty regarding land rights. Historians of the Cape have suggested the *de facto* property rights of the loan farms were the same and as secure as the freehold farms, even though the *de jure* rights between the systems differed greatly. The hypothesis was that individuals with freehold farms had more secure *de jure* property rights, and freehold farms should therefore be more valuable for debt transactions. On this basis, individuals with freehold farms should have more debt. The descriptive statistics certainly supported this hypothesis; individuals with freehold farms had higher correlations with debt relative to individuals with loan farms or no farms. However, after accounting for endogeneity concerns regarding the relationship between debt and land rights, the significance of owning a freehold farm for debt transactions disappeared. The instrument of being the eldest son was used, since eldest sons had a higher probability of owning a freehold farm. These results support the existing historiography, which suggests that property rights between freehold and loan farms were similar in *de facto* regimes, and also that individuals in a society would rather rely on these *de facto* rights when considering economic transactions. My results provide empirical evidence for what

historians have suspected: that the institution of property rights depends on the society in which it is embedded. Instead of formal *de jure* rights, how rights are perceived and used by individuals (*de facto*) is likely to have a bigger influence on economic transactions.

Property rights remain important for economic growth and development, but more recent research has started to show that it is more complex; local conditions also matter. This chapter gave another example of how local conditions matter to a property rights system and how such a system is used. Besley (1992) claimed that 'formal (*de jure*) rights might have very little to do with the ability to exercise these rights (*de facto*).' If the answer of institutional economics is to give *de jure* property rights in land to individuals, without taking into account the local *de facto* conditions, then *de jure* property rights might not lead to the expected gains in economic growth. Schlager and Ostrom (1992) already called for investigation into 'how various types of institutional arrangements perform comparatively when confronted with similarly difficult environments'. In line with the literature, this was a first attempt to show the perception of property rights at the Cape mattered more than the *de jure* property rights delineated by the respective laws.

Chapter 7

Conclusions and Future Research Opportunities

7.1 Conclusions

In this dissertation, I set out to investigate the financial history of the Cape Colony. It was specifically focused on the Cape Colony's private credit transactions from 1673 to 1834. Before summarising the separate chapters, I would like to mention the main contributions of the dissertation. Firstly, it showed how the widespread credit at the Cape Colony was indicative not of poverty, but wealth. Debt and credit had been overlooked, or only briefly mentioned, by previous historical literature. In contrast, I provided a systematic analysis of the private credit transactions between individuals. Secondly, wealth was highly mobile at the Cape. This was true whether one looked at overall wealth, land ownership, slave ownership or debt.

Thirdly, it gave empirical support to the existing historical literature that networks mattered for debt. It was not only the wealthy that were included in this network, but others like the freed slaves and women as well. Fourthly, the dissertation showed how it takes more than a century for cultures to integrate, and how trading was reserved for those who had a common nationality. This was later replaced by within-family trading. Finally, it contributed to the literature on property rights by showing how the belief in property rights, and how these are observed by society, is much more important than the property rights defined in law. The combination of these contributions exhibit how informal trading can easily be underestimated

by history and economics.

I used two data sources to investigate this private credit market. The first was the complete MOOC 8 series of probate inventories. Inventories are often used in the study of historical wealth and consumption, although they are not without limitations. They list, among other things, the debts and credits of the individual at the time of their death. It was these transactions in which this dissertation took a special interest in. These probates and transactions offered new insights into how the settlers at the Cape traded with each other, what they traded, and how reliant they were on each other. This dissertation is the first systematic evaluation of the entire series of transactions.

The second source I used was genealogical records. Genealogical records offer insight into the demographic composition of the settlers and provided additional variables that are important when considering the motivations of debt. These include age, occupation, number of children and birth order. The first three are often found to be determinants of debt, while the last was used as an instrumental variable for property rights in the sixth chapter. Matching between these two data sources also offer new research opportunities, discussed below.

The second chapter in this study used the historiography and commentary from contemporaries on the credit market and debt levels at the Cape as a starting point. The debt levels of individuals at the Cape have been described as a leading cause of poverty and are said to have often reached unbearable levels. Looking at the volume of private credit transactions listed just in the inventories, one would tend to agree with this opinion. But the volume of credit transactions is not the only consideration when debt and its economic influence are evaluated.

An international literature has shown that rather than inducing poverty, active participation in credit transactions was a sign of prosperity and the presence of assets in the economy. This dissertation re-investigated the Cape's circumstances with this in mind. The second chapter contributed to the literature by investigating the role of formal financial institutions in the Cape society, the role of wealth and assets and what settlers borrowed for. The chapter's first contribution was to show that the role of the three main institutions at the Cape (the VOC, church and Orphan Chamber) were not the largest contributors to the credit market, although they were involved in larger transactions. Instead, more than 80 percent of private credit and debt transactions were between male settlers, and secondly between male and female settlers.

The main institutions were only involved in less than ten percent of transactions. The second contribution was to show that the settlers borrowed the most with the purpose to purchase land, often with the use of bonds, or formal loan contracts. Debt was also incurred more for productive purposes, and not for survival or consumption purposes.

Contrary to other studies, this research found that the age and occupation of an individual did not determine debt at the Cape. It showed that both young and old individuals had similar debt levels, while occupations showed little difference in the size of their debts. For example, farmers and doctors had similar proportions of large and small loans. The second and main contribution of the chapter was to show debt was correlated with wealth. At the Cape, one of the main indicators of wealth was the number of slaves an individual owned – wealthier individuals owned more slaves. More than this, slave ownership showed the highest correlation with debt, regardless of price changes or the size of the debt. The result remained whether the individual wealth categories, namely land ownership and slave ownership, were used or whether these were combined into a wealth index. This suggests that debt and wealth at the Cape were related, rather than debt and poverty.

This makes the Cape's credit market comparable to the pre-industrial European credit markets in two ways. Firstly, in a chronically cash-short society, debt tends to be the main method of daily trading and becomes a replacement for cash. Secondly, debt was more often a sign of prosperity, it was related to wealth, rather than the conventional idea that debt caused poverty. This study was the first to systematically look at these debt transactions at the Cape and at how the private credit market at the Cape was structured around wealth.

Another aspect important to economic history and development is how wealth was transferred over generations. Many studies in developed countries have showed how mobility differed over time and space. In Chapter 3, I investigated how the pre-industrial economy of the Cape affected intergenerational mobility. Building on rich qualitative evidence, my results provide the first quantitative estimates of the extent of social mobility at the Cape.

The Cape's historiography is full of support for high social mobility during the eighteenth century, while some scholars have said the system of partible inheritance constrained economic growth and mobility. Chapter 3 found less support for the latter and more for the case of social mobility. In all four wealth measures used in this study (wealth index, land, slaves, and

debt), there was significant mobility and little persistence in wealth. This suggests successive generations were able to generate their own wealth and not rely on the wealth of their fathers. The result holds if a wealth index for fathers and children were created. Taking social mobility studies further, I showed that children borrowed in the same patterns as their fathers.

Intergenerational relationships in wealth and debt raised another facet which is important for debt – social networks. Social network analysis offers new insights into the interaction between economic actors. This is especially important for the study of informal institutions. Informal institutions refer to the norms and beliefs in society and are often stable and unchanging in nature, but is a topic not often researched empirically. One reason for this lack of research is the lack of data on individual interactions – an area where economic history can offer assistance. The probate inventories and the credit transactions listed in them are an example of direct evidence of social interaction between individuals, with direct and measurable outcomes.

The first chapter (Chapter 4) on social networks and debt at the Cape tested whether the same key important individuals in the historiography of the Cape are also identified when social network analysis is applied to the data. The results were mixed: some of the individuals who have been previously identified were also identified here. But the results also identified new individuals who have yet to receive mention in historical literature. Many of these central individuals were women, which links this research to previous research on the wealth and influence of women at the Cape, sometimes referred to as 'widowarchy'. There were also some slaves and blacks identified in the network. This chapter furthermore showed how families that were central in the network remained central for much longer than the individuals who were central.

Although Chapter 2 showed that the three main institutions at the Cape (the Company, church and Orphan Chamber) did not play the largest role in the market, they did play a central role. Through these three institutions, many individuals became connected to the larger network of creditors and debtors, which would otherwise not have been the case.

The second contribution this study made using social network analysis (Chapter 5) was to study long-run homophily at the Cape. Homophily is the phenomenon where individuals tend to connect with other individuals who share some background characteristic with them. This research was a first attempt to empirically test the notion of rapid cultural integration at the Cape. The results, however, run against the historiography – even after 100 years, trading

within Dutch and French groups remained high, while trading within the German population decreased. This research tried to determine why settlers at the Cape traded with each other in such a way. Two possible explanations for this were explored: increased wealth and familial trading. The results showed that relatively little homophily existed between different wealth groups, but that interfamilial trading increased when homophiliy also increased. A limitation of this chapter was the inclusion of marriage and business relations, which could offer further support for the hypothesis that homophily was linked to familial trading.

Another indication of wealth was land. Its relation to debt was not directly considered in Chapter 2. Historians have often found land ownership to be the main collateral used for debt, which meant it was also assumed to cause high debt levels. This was the backdrop for the sixth chapter of this dissertation. Land ownership at the Cape had two characteristics which could be exploited econometrically to test the causal relationship between debt and land: the type of ownership and inheritance in its patriarchal society.

In the Cape Colony, land could either be owned in freehold, or rented from the Company as a loan farm. The freehold and loan farm systems were distinct in their *de jure* property rights, i.e. the rights defined the law. The freehold farms were more secure in terms of ownership and transferability, while the loan farms legally remained under the ownership of the VOC and could legally not be sold. The implementation of the laws, or the *de facto* property rights were, however, quite different. In implementation, there was little difference between freehold and loan farms. In fact, the loan farms are described as similarly secure to the freehold farms, despite differences in their *de jure* property rights. The inheritance of farms at the Cape was used here to test the consequences of these different property right systems. First-born sons were often inherited the freehold farms, while sons born later were given a loan farm. Yet, despite the differences in *de jure* property rights, there were no differences in debt levels between the two systems. This suggests, like De Soto (2001) and Lamoreaux (2011) claimed, that the *de facto* property rights were more important for settlers than *de jure* property rights.

7.2 Possible Future Research Opportunities

During this research, I uncovered not only archival sources, but many other questions which have yet to be answered about the financial history of the Cape. With this conclusion, I would

like to mention some of these sources and questions.

The first aspect is the bonds first mentioned in Chapter 2. These formal loan contracts offer the most information on the interest rates, repayment periods and loan sizes at the Cape. The information presented here was complied from various sources and interactions with historians, but only show a small sample of the bonds, namely those that remained unpaid at the death of the individual. The exact mechanisms and use of these loan contracts remain hidden in the source material. There is little indication that the various types of bonds were the same, were used for the same purpose, and were recorded in the same manner, so assumptions had to be made. If more information, especially regarding interest rates and its effect on the quantity of credit available, is to be systematically discussed, these bonds should be digitised and studied thoroughly. Many of these bonds are housed in the Deeds Office archive in Cape Town, South Africa, notorious for its ill-kept state. Even if the entire series did not survive, the sample that did may be worth saving and studying.

Another area of financial history at the Cape that has been overlooked is banking developments. Havemann and Fourie (2014) found that the establishment of the Lombard Bank was a result of a financial crisis. It resembled a modern-day pawnshop rather than a formal bank, only granting loans against pledged items. The ledgers of the Lombard Bank contain lists of loan and the individuals involved, and can be found at the Cape archives with lists of loans and individuals involved. This institution has only been scantly studied in history – Kantor (1970) and Arndt (1928) each had less than two pages dedicated to its functioning. The discussion on pawnbroking in Europe has gained traction in recent years, with an entire session ('At the origins of consumer credit: pawn-broking in pre-industrial and developing societies. Economic concerns and moral connotations') dedicated to it at the World Economic History Congress 2015 hosted in Kyoto, Japan. More attention should be given to this aspect of South African economic history.

The probate inventories used here contained vast amount of information on credit and debt transactions at the Cape. But a complementary source of financial records would be the insolvency records. These records could serve as an alternative to the probate inventories: where the probate inventories have at least some assets, the insolvency records are those of failed farms and operations. This could present another aspect of the market at the Cape and may shed more light on the general use of credit and why a large number of transactions never made it to the courts. The insolvency records, together with the probate inventories, could provide more

insight into the functioning of credit and repayment.

A final suggestion for a source to use in future research is the auction rolls. The auction rolls contain information on the prices of household goods the settlers were willing to pay. Auction prices are often seen as the closest to market prices, as they accurately reflect the supply and demand of a product. Additionally, these rolls contain the names of buyers and sellers, which could be used to design a network of participants. This is yet another example of how social network analysis can aid in understanding the interaction of individuals and its effect on the economy.

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Appendix A

Data

Two main sources were used in this dissertation. The Cape Colonial probate inventories (MOOC 8 series) were used to collect debt, asset and wealth information, and the South African Family Registers (SAF) or genealogies were used for information on age, gender, number of marriages and number of children. This chapter will provide details on how the data was collected and how the individuals were matched.

A.1 The Probate Inventories

The probate inventories, also known as the MOOC 8 series, were collected by the Orphan Chamber at the Cape from 1673 to 1834. These 'after death' inventories were collected shortly after death for persons who (1) died intestate, (2) where minors (under the age of 25 and unmarried) were involved, (3) where the heirs were absent from the Cape or (4) if the Chamber was not excluded explicitly from the will. The Orphan Chamber had the additional purpose of administering estates where minors were involved until they came of age, and it had to locate any absent heirs. Only after 50 years did the estate revert back to the state if no heirs could be found. After 1834, private companies took over this duty as executor of estates from the Orphan Chamber. This also coincided with the abolishment of slavery in the British Empire in 1833.

The inventories followed a fixed form for collecting information on the assets of individuals. An entry always started with the individual's name and date of inventory taking. This was followed by a passage on who the person was, their husband/wife and, if minors were involved,

their names and ages. This was in turn followed by a list of real estates owned and under which policy these were owned, the location of the farms or properties, their size and value. After this came a systematic assembly of assets in each room of the house. The slaves and their names were listed next, followed by the financial assets of the individuals. The financial assets consisted of all silver and cash, credits (debts owed to the individual) and debts (debts owed by the individual). The credits and debts referred to all the transactions still outstanding at the time of death, including the amount of each debt, the second individual involved in each transaction and the purpose of the debt. In some cases the net value of the estate, after the subtraction of debts, was also recorded.

The inventories were collected, transcribed, and digitised to PDF by the TANAP project between 2004 and 2007. After digitisation, they were made available online. As an example, I present an example of such an inventory, that of Francois Chamfelaer (MOOC8/1.1) here. Figure A.1 shows the first page of the first entry. The transcribed version of the the same information is shown in Figure A.2. As mentioned earlier, the information about him says he was killed by a Khoikhoi, his wife was Catrina Oftings and he had four children. It also shows the listing of his real estate, highlighted in yellow. He had a farm valued at 2100 gulden (700 rds), all in the False Bay area of Cape Town.

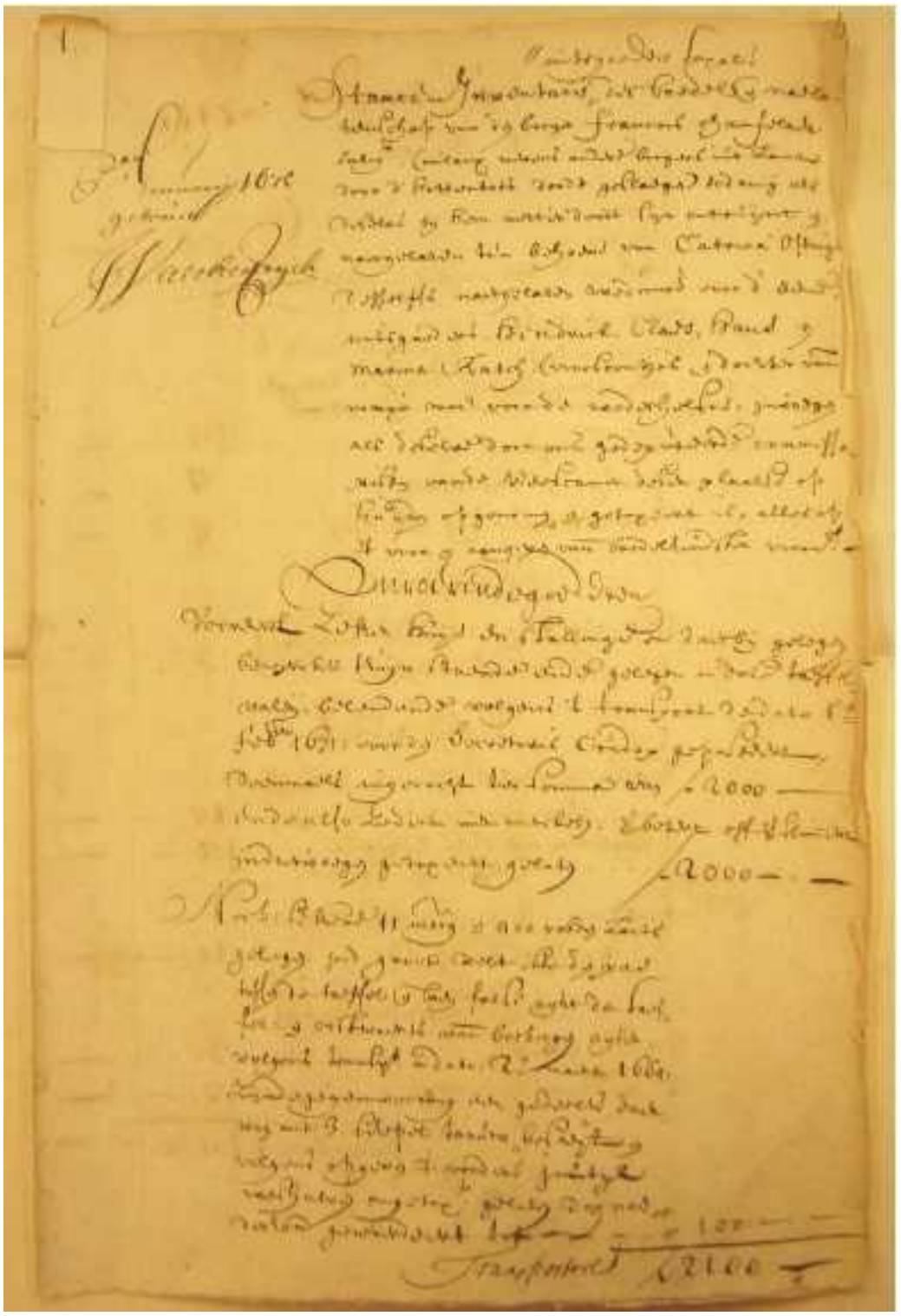

FIGURE A.1: Archival form of the first inventory, Francois Chamfelaer from 1673

MOOC8/1.1

Chamfelaer, Francois
16731020

Francois Chamfelaer
20 October 1673

In Januarij 1675 gebouct

J: Valckenrijck

Staat en inventaris mitsgaders taxatie des boedels en naelatenschap van den borger Francois Chamfelaer salig:r (onlanx nevens andere borgers in 't lant door d' Hottentots doodt geslaegen) sodanig als deselvs bij hem met t' er doodt sijn ontruijmt en naergelaten ten behoeve van Catrina Oftings desselfs naergelaten weduwee voor d' eenre, mitsgaders

Hendrick Claes Hans en Marina Rasch	(voorsoontjes en dochter van vorige man)	voor de wederhelfte

invoegen als deselve door ons gedeputeerde Commissarisen van de Weescamer deser plaatse op huijden opgenomen en getaxeert is, alles op 't voor en aangeven van boedelhoudster voorn:t

Onroerende goederen

	f
Vooreerst zeker huijs en stallinge en daerbij gelegen bewerkt thuijn staende ende gelegen in der Taeffelvalleij, belendende volgens 't transport de dato 5:e Februarie 1671 voor den secretaris Crudop gepasseert, doenmaels ingecocht ter somma van	2000
ende also zedert niet neckelen, verbetert off verschlecht indiervoegen getaxeert gelaten	2000
noch sekere 11 morg: en 400 roeden lants gelegen in 't groote velt ofte den pas tussen de Taeffel en Baij Falso agter de Taeffel en oostwaerts van Bosbergen agtervolgens transp:t in dato 2:e Maert 1664 zijnde jegenwoordig een gedeelte daervan met 3 schepel taruw besaeijt en volgens opgeven 't vordere in 't ijl weshalven ongetaxeert gelaten dog naederhand gewaerdeert tot	100

FIGURE A.2: Transcribed inventory of Francois Chamfelaer from 1673

The information in these inventories was captured from the PDFs and converted into Excel, with a final total of 4 160 inventories. The next step was to convert the different currencies recorded in them to one single currency. The currency listed most often in the inventories was the Dutch rijksdaalder (abbreviated to rds). The other currencies used in the inventories were the Dutch gulden *(f)* and the British pound (£). Following Fourie (2013), a rijksdaalder was worth 48 stuivers and 8 shillings; a gulden was worth 16 stuivers and there were 20 shillings per stuiver. The exchange rate between the rijksdaalder and a gulden fixed was kept fixed at 1:3 throughout the period. The exchange rate between the rijksdaalder and pound was more

flexible, and the values were adjusted following Denzel (2010:607). Table A.1 provides the various years and shillings per rijksdaalder. For the years where no information was available, the assumption was made that the exchange rate remained the same as the previous period.

TABLE A.1: Exchange rate between pound and rijksdaalder

Year(s)	Shillings per rds
1795	4
1803	1.5
1806–1810	3.2
1811–1815	2.2
1816–1820	1.833
1821–1825	1.5
1825	1.417

Source: Denzel (2010:607)

A.2 Matching to genealogical records

Once this process was complete, the names listed on the inventories, but not the debtors and creditors, were matched to the genealogical records. These genealogical records were captured by Cilliers and Fourie (2012). These records traced individuals through paternal lineages to the first settlers. They provide information on birth, marriage and death dates, as well as occupations. From this, various demographic variables like age, marriage status,and number of children were generated for analysis.

The names were first matched between the inventories and genealogies based on death year and surname, which provided 500 matches. After this initial matching, the names were individually matched due mainly to changes in the spelling of surnames not accounted for during the initial, automatic matching. For example, the surname 'Van Wyk' was found in the inventories, while it was spelled 'Van Wijk' in the genealogies. With the second round of matching, the individual's name, surname, death year and, if available, names of children were used. The final number of individuals matched was 2 117, and 2 043 probates remained unmatched. A matching rate of 50,8 percent is relatively high for historical records, considering that matching rates are usually less than 30 percent such as in Abramitzky et al. (2013) who had a 26 percent matching rate.

Appendix B

Network Graphs

This appendix contains all the network graphs for the credit and debt transactions found in the MOOC 8 series. The periods are: before 1700, 1700–1724, 1725–1749, 1750–1774, 1775–1799, and 1800–1824.

B.1 Centralities without weights

B.1.1 Eigenvector centralities

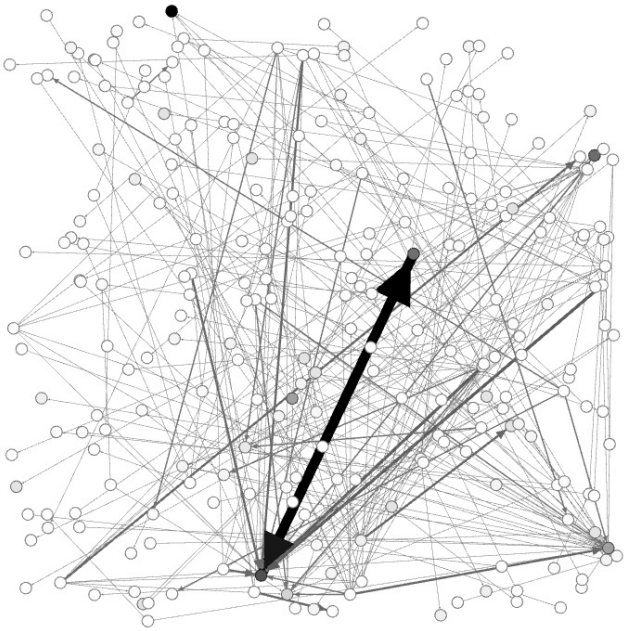

FIGURE B.1: Network of eigenvector centralities before 1700

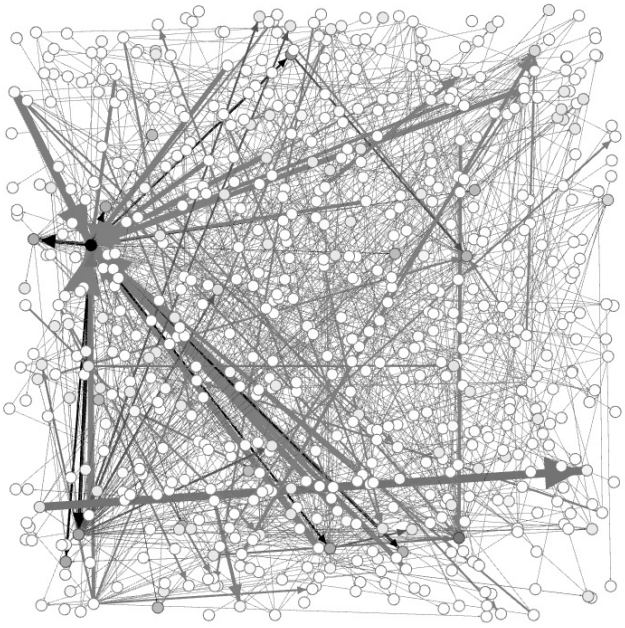

FIGURE B.2: Network of eigenvector centralities between 1700 and 1724

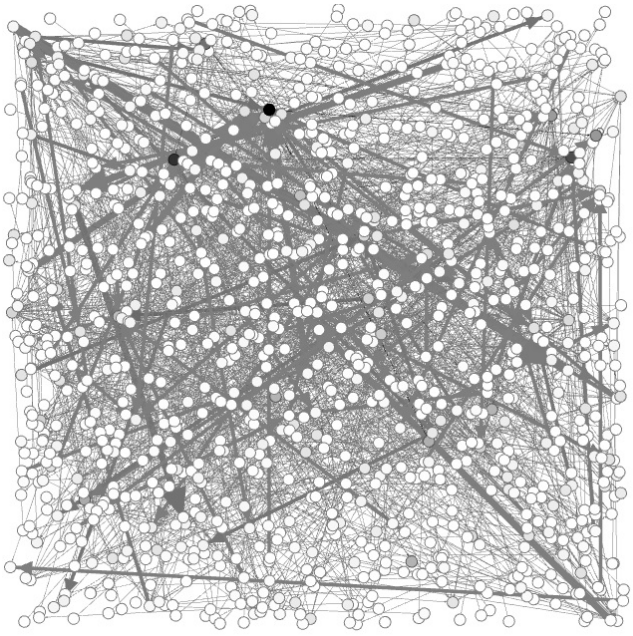

FIGURE B.3: Network of eigenvector centralities between 1725 and 1749

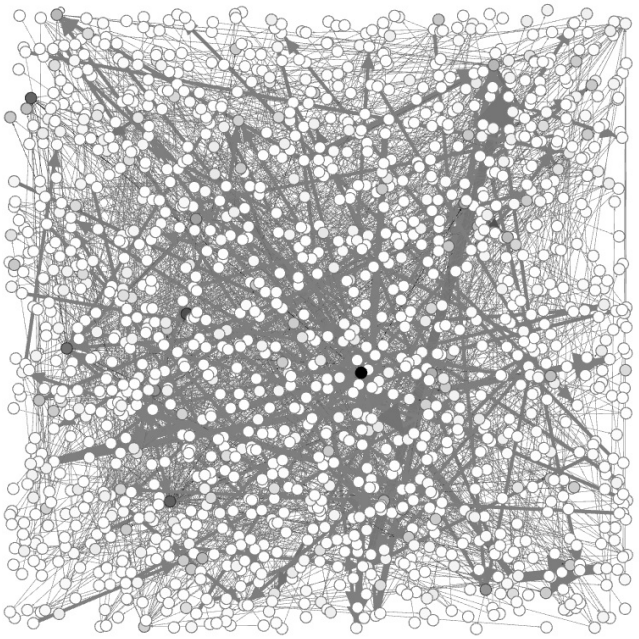

FIGURE B.4: Network of eigenvector centralities between 1750 and 1774

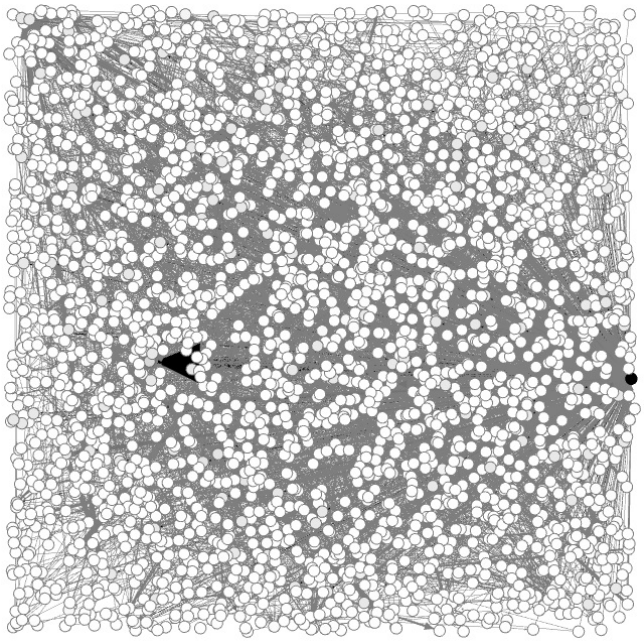

FIGURE B.5: Network of eigenvector centralities between 1775 and 1799

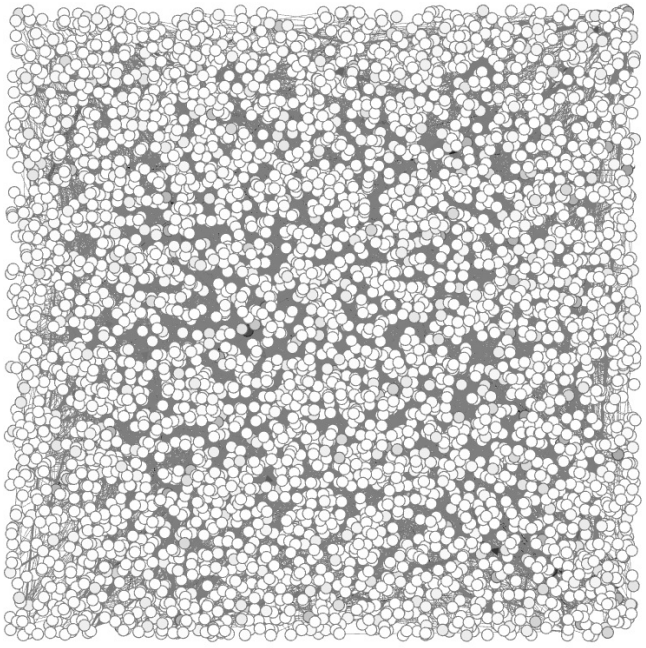

FIGURE B.6: Network of eigenvector centralities between 1800 and 1824

TABLE B.1: Top 20 surnames by the genealogical records

	Before 1700		1700-1724		1725-1749	
	Surname	Count	Surname	Count	Surname	Count
1	VAN RIEBEECK	7	OLIVIER	6	OLIVIER	9
2	TAILLEFERT	3	VILJOEN	6	DE VILLIERS	8
3	BASSON	2	BASSON	5	NEL	5
4	FOUCHE	2	FOURIE	5	CELLIERS	4
5	MOLLER	2	MARAIS	5	DU PREEZ	4
6	ROSENDAAL	2	VAN DER STEL	5	DU TOIT	4
7	VERBURG	2	STEYN	4	FAURE	4
8	BEZUIDENHOUT	1	VAN SCHALKWYK	4	HUGO	4
9	BLOEM	1	DU PREEZ	3	VAN DEVENTER	4
10	CHUBLI	1	ERASMUS	3	POTGIETER	3
11	CLAASEN	1	SMUTS	3	ROOS	3
12	CRUSE	1	SNYMAN	3	VAN DER POEL	3
13	DE VILLIERS	1	VAN RIEBEECK	3	VOSLOO	3
14	DE WEERELT	1	ZAAIJMAN	3	BRITS	2
15	DU PREEZ	1	BEZUIDENHOUT	2	CAMPHER	2
16	EKSTEEN	1	BRAND	2	COETZEE	2
17	ELBERTS	1	CORDIER	2	DU PLESSIS	2
18	GILDENHUIZEN	1	COSTEUX	2	HAUPTFLEISCH	2
19	GOUS	1	DE VILLIERS	2	JANSEN VAN RENSBURG	2
20	HULSENAAR	1	DE WET	2	LE RICHE	2
	1750-1774		1775-1800		1800-1824	
	Surname	Count	Surname	Count	Surname	Count
1	DE VILLIERS	43	DE VILLIERS	67	DE VILLIERS	168
2	VAN DER MERWE	17	DU TOIT	22	BRINK	43
3	SMUTS	10	VAN DER MERWE	20	HUGO	27
4	DU TOIT	9	VAN DER BYL	15	HAUPTFLEISCH	26
5	HUGO	9	SMUTS	14	BOSMAN	25
6	THERON	9	HUGO	13	LOUW	25
7	BLIGNAUT	8	VAN OUDTSHOORN	12	JOUBERT	24
8	CELLIERS	8	BOSMAN	11	VAN DER MERWE	24
9	MARAIS	8	MARAIS	11	SMUTS	21
10	ROUS(E)	8	ROUS(E)	11	DU TOIT	20
11	VAN DER POEL	8	JOUBERT	10	VAN DEN BERG	20
12	BOSMAN	7	LE ROUX	10	CELLIERS	19
13	FOURIE	7	THERON	10	DU PLESSIS	19
14	DU PREEZ	6	ROUX	9	DE KOCK	18
15	LE ROUX	6	ACKERMAN	8	ROUS(E)	18
16	ROUX	6	DE KOCK	8	MALHERBE	17
17	VAN DER RIET	6	HAUPTFLEISCH	8	THERON	17
18	LOUW	5	LOUW	8	KRUGER	16
19	ROOS	5	PRETORIUS	8	VAN REENEN	16
20	STRYDOM	5	RETIEF	8	DE WET	14

Source: Genealogies, own calculations