Employment, Earnings and Vulnerability In the South African Labour Market: An Empirical Investigation Based On Official Survey Data

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Dissertation presented for the Degree of Doctor of Economic and Management Sciences at the University of Stellenbosch.
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March, 2003

Declaration

I, the undersigned, hereby declare that the work contained in this dissertation is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Date: 19th February, 2003

Acknowledgements

This thesis would not have been possible without the steady, tempered influence and input of my supervisor, Professor Servaas van der Berg. Only Servaas knows how he has been able to exact the appropriate quantum of effort from me to deliver this document in its current form. I remain eternally grateful to him for this. To a number of my colleagues who have directly and indirectly influenced the thinking behind many of these vexed issues - and to name but a few - Murray Leibbrandt, Ingrid Woolard, Paul Lundall and Rashad Cassim. Most importantly though to my family for their untiring support: My mother and sister, whose background presence has always been a source of comfort. To little Taahir, our miracle boy, who always reminded me of the important things in life. And, finally to Najma who will never know her true worth in my life but whose caring, concern and support throughout this process are beyond words.

Dedication

Dedicated to my much missed father, Ismail Bhorat (1932-1994), whose incredible wisdom I am still drawing on.

Abstract

The welfare challenge that faces South Africa in the post-*apartheid* period is, at its core, defined by the high levels of poverty and inequality in the society. The labour market, as a provider of wages to individuals and ultimately households, remains the key transmitter of these poverty and inequality outcomes in the society. This specific line of reasoning is the underlying intellectual thrust of this thesis: namely that the state of poverty and inequality in a society is mirrored by, and perhaps more strongly - determined and shaped - by the state of its labour market. The thesis therefore focuses in the first instance on employment trends in South Africa since 1970, across two discrete time periods. The intention is to sketch the changing patterns of labour demand in South Africa, with a particular focus on how these patterns have yielded differential gains for different occupation, race, gender and education cohorts. Ultimately, these uneven employment patterns remain one of the most significant factors shaping South Africa's poverty and inequality challenges. The inequality challenge, so often thought of in terms of households only, is analysed here purely in terms of the employed. The starting point once again, is that it is precisely these earnings that contribute to the extraordinarily high inequality levels in South Africa. This analysis imparts information about the manner in which intra-employed wage inequality is structured and furthermore, how South Africa compares in the international context. A major contribution of the thesis is to, through more formal measures of poverty, apply these to labour market-defined individuals, rather than households, which is the norm in the literature. The point of departure is of course that poverty, or vulnerability, expresses itself through individuals in the labour market, and is thereby transmitted at the household level. Hence a significant component of the dissertation attempts a formal measurement and modelling of the degree of poverty and vulnerability in the South African labour market. These welfare challenges for a society though, should not only be analysed, but rather solved as well. Hence the final two chapters of the dissertation attempts to examine two very recent policy options mooted in South Africa, and through using simulation techniques, attempts to estimate both the costs and benefits of instituting these two alternatives which are explicitly aimed at reducing poverty, vulnerability and inequality in the society.

Opsomming

Suid-Afrika se welvaartsvraagstuk in die na-apartheidsperiode word deur die hoë vlakke van armoede en ongelykheid in die samelewing bepaal. Die arbeidsmark, as voorsiener van lone aan individue en uiteindelik ook huishoudings, is die belangrikste bepaler van die oordrag van armoede- en ongelykheidsuitkomste in die samelewing. Die sleuteluitgangspunt van hierdie proefskrif is dat die stand van armoede en ongelykheid in 'n samelewing in sy arbeidsmark weerspieël en selfs daardeur bepaal en gevorm word. Die proefskrif fokus daarom veral op Suid-Afrikaanse indiensnemingstendense sedert die sewentigerjare, in twee diskrete periodes. Die doel is om die veranderende Suid-Afrikaanse arbeidsvraagpatroon te skets, veral die ongelyke voordele wat hierdie patrone vir verskillende beroeps-, rasse-, geslags- en opvoedkundige groepe meegebring het. Hierdie ongelyke indiensnemingspatrone is uiteindelik belangrike determinante van Suid-Afrika se armoede- en ongelykheidsvraagstuk. Hierdie analise verskaf inligting omtrent die struktuur van loonongelykheid onder werkendes en hoe Suid-Afrika internasionaal vergelyk. 'n Belangrike bydrae is die toepassing van formele armoedemaatstawwe op individue in die arbeidsmark, eerder as die konvensionele toepassing op huishoudings. Die uitgangspunt is natuurlik dat armoede of weerloosheid in die arbeidsmark op die vlak van die individu ervaar word, en dat dit daarna na die huishouding oorgedra word. Daarom is 'n groot deel van die proefskrif op die formele meting en modellering van die omvang van armoede en weerloosheid in die Suid-Afrikaanse arbeidsmark toegespits. Hierdie welsynsvraagstukke moet natuurlik nie net ontleed word nie, maar ook opgelos word. Daarom poog die laaste twee hoofstukke om die implikasies van twee onlangse beleidsvoorstelle te ontleed. Deur simulasietegnieke word probeer om die kostes en voordele van hierdie twee alternatiewe beleidsvoorstelle gemik op die vermindering van armoede, ongelykheid en weerloosheid in die samelewing te beraam.

Introduction

There can be no doubt that the South African labour market is in turmoil. The poor labour absorptive capacity of the domestic economy and the inordinately high levels and rates of unemployment, have managed to shift the economics of the South African labour market to the forefront of public debate. Indeed, within the South African policy environment, it is now accepted that the labour market remains one of the central levers to unlocking long-term economic growth and simultaneously reducing absolute poverty levels. The focus of this thesis is less ambitious though. It attempts rather to explain and analyse in as much textured detail as possible, the changing nature of the South African labour market, together with the set of characteristics that identify inequality and vulnerability in the labour market, based largely on a quantitative analysis of nationally representative household survey data sets for the country.

To this end, the thesis begins by presenting in Chapter 1, an historical overview of labour demand trends in the South African economy over the period 1970 to 1995. In the first instance, this chapter attempts to describe the historical evolution of the current crisis that the labour market is in. Indeed, it is an obvious point that many of the economy's welfare challenges have been shaped and formed as a result of its deeply fractured political and economic past. The central aim of Chapter 1 is to try and understand this past in terms, primarily, of changing patterns of employment in South Africa over a 25-year, apartheid-era, period. The intention is to sketch not only altering patterns of labour demand, but also to assess which constellation of forces has resulted in the labour demand trajectory observed for the economy. Specifically the chapter identifies, on the basis of a decomposition technique, two possible sources of labour demand shifts, namely structural shifts and technological change. The contribution of each of these forces on influencing the economy's labour demand trends over time is then determined. In addition, the data and the analysis allow for a very detailed specification of the employment effects these forces have had on different cohorts in the society, identified by markers such as race, gender, occupation and education levels.

Through the first chapter then, we arrive at an appreciation for the historical source of the present nature of the South African labour market. Chapter 2 continues in a very similar vein methodologically, in that it attempts to describe

labour demand trends and the forces influencing it. The chapter though analyses these quantity shifts for the post-apartheid period, 1995-1999. We are allowed the opportunity in this chapter, on the back of the historical overview in Chapter 1, to derive an exhaustive understanding of the more recent shifts in employment that have occurred in the domestic economy. In particular, we are able to gauge the more recent labour market performance of the economy in general and labour market in particular. These trends would also provide a vital window into some of the key post-apartheid policy issues that would need to be considered in trying to improve the performance of the domestic labour market. Given that the covariates looked at include race, occupation and education levels, the chapter shows very clearly that the supply characteristics of workers demanded by firms presently and in the future, will by and large shape trends in the labour market.

Having sketched the evolution of these employment trends to the year 1995, Chapter 3 proceeds with a static analysis of the price rather than the quantity of labour using the October Household Survey (OHS) of 1995[1]. The chapter therefore analyses in detail wage premia and wage differentials in the South African labour market. In so doing, the chapter begins to unravel the differential returns yielded not only by race groups and gender, but perhaps more importantly according to different skill and occupation levels. An indirect estimate of such differentials is to be found in the sectoral overview of wage differences. In this detailed presentation of wages, we arrive at a (albeit static) description of the rewards placed on work, that twins very closely with the quantity shifts represented in the first chapter.

However, a key theme in Chapter 3 is that inequality levels amongst the employed are high even by international standards. Secondly, the absolute wage earned by a significant proportion of the employed is extremely low. It is the focus then of Chapter 4 to detail the extent of this poverty and inequality in the labour market. While the chapter begins by presenting a more general snapshot of the labour market than the previous two chapters, its core is formulated around trying to apply household poverty measurement techniques to individuals in the labour market. To this end, the chapter utilises the methodology of Foster, Greer and Thorbecke (1984) to estimate absolute and relative poverty levels as they exist in the labour market. Such a methodology delivers a nuanced ranking of who the

[1] The use of data sources and general data issues are dealt with in detail below.

most vulnerable groups in the society are, according to a series of different covariates such as race, gender, education, location and union status. This description can then be tied to the labour demand trends and wage data observed in the previous two chapters, as manifest in the scope and size of the poverty or low earnings challenge, together with how employment trends in the future may or may not offer the likelihood of lower levels of indigence.

Chapter 5 is a methodological extension to the correlates of vulnerability that are presented in Chapter 4. While illuminating, the approach of Chapter 4 is limiting in that it is incapable of comprehensively and simultaneously highlighting the different determinants and factors impinging on labour market selection and earnings processes. The next step in such an analysis therefore is to combine these differing covariates, which we identify as important, into an econometric model. Such a model would determine the relative importance of these covariates in explaining each stage of the labour market process, namely participation, employment and earnings. Chapter 5 thus provides for a thorough econometric estimation of the determinants of labour supply, from participation, through to employment and finally to earnings[2].

The last two chapters of this thesis are focused on simulating the possible ramifications of instituting specific policy interventions. The first of these, Chapter 6, utilises the poverty methodology from Chapter 4 in order to theoretically identify the direct cost of implementing an income grant scheme. Such a scheme has been touted by the union movement and more recently has been investigated by the Department of Welfare's Social Security Review Committee. This chapter tries, in the first instance, to calculate the cost to the fiscus of providing a grant that would, in comparative static terms, reduce poverty to zero in the society. This simulation is undertaken for both individuals and households, with a focus on identifying the two cohorts according to their labour market status. Secondly, the chapter outlines the relative benefits of instituting an additive versus a multiplicative grant scheme. Given the poor labour absorptive capacity of the domestic economy, and its ongoing inability to soak up the unemployed into sustainable employment, trends that we take up in chapters 1 and 2, such a policy intervention has become part of government thinking. Hence, this

[2] Chapter 5 in particular has benefited enormously from the collaborative work with Murray Leibbrandt, which can be found in Bhorat *et al* (2001).

chapter hopes to deliver empirical estimates, on the potential extent of these costs to the state as a more direct measure aimed at reducing national poverty levels.

Chapter 7 takes a look at a second important policy consideration that is currently the domain of the Department of Labour, namely the institution of a national minimum wage for two of South Africa's most vulnerable groups of workers: domestic and farm workers. While the issue was still under discussion with the Department of Labour's Employment Conditions Commission, during the writing of this chapter, it has now been formally implemented for farm and domestic workers. The notion has been simulated and tested in this chapter. The analysis in Chapter 7 therefore examines the possible impact of wage hikes for domestic and farm workers, together with workers classified as drivers as a referent group. The impact of wage increases, set at different levels, on reducing poverty on the one hand and reducing the employment of the affected occupations is then calculated. The chapter therefore tries to provide hard data to underpin the policy interventions that have been promulgated on within the Department of Labour.

Ultimately then, in outlining the economy's historical and post-apartheid labour demand trajectory and the differential rewards placed on employment, the thesis hopes to deliver a cogent analysis of the nature of both quantity and price in the South African labour market. These two chapters will suggest high levels of poverty in the labour market, and Chapter 4 thus tries to provide a detailed overview of the nature and extent of this poverty. The remaining chapters essentially try to combine the recent methodological advances in the literature with some of the key policy interventions that are being mooted in government. In so doing, we hope to arrive at a more considered approach to evaluating and understanding the possible impact such policies may have on poverty levels and employment in the labour market.

A Note on Data Sources

One of the key reasons that such a thesis is possible is the availability of a series of nationally representative household surveys since 1993. These micro data sets have allowed for detailed analysis of poverty, inequality and labour market issues, in manner that was simply not possible in the past. The first representative survey then was the 1993 Project for Statistics on Living Standards and Development (PSLSD) run under the joint auspices of the World Bank and the Southern African Labour and Development Research Unit (SALDRU). The survey covered 9000

households and was the first of its kind in South Africa. This was followed by a succession of official national surveys - the October Household Surveys - run by the government's statistical authority. Two of these, the October Household Survey for 1995 and 1999 (OHS95 and OHS99) are utilised in this study. Both surveys are based on randomly sampling some 30 000 households drawn according to 3000 Enumeration Areas (EAs). Within each of these EAs, 10 households were interviewed. In 1995, 29 700 households were eventually interviewed, resulting in information for 130 787 individuals. For 1999, the figures were 26 134 households and 106 650 individuals - interestingly a lower return given the same sampling design.

An important note about the OHS95 data is that at the time of its release, the 1991 Census weights were used as a basis to weight up the results. Since the 1996 Census though, these weights have of course become outdated [3]. Specifically in terms of Chapter 2 below, the OHS95 has been re-weighted using the final, published Census 1996 weights, yielding in the first instance a direct comparison with the OHS99 weighted sample.

In addition to the above two datasets, the other survey used in this thesis is the Income and Expenditure Survey of 1995 (IES95). The IES95 is principally a survey designed to collect information on the expenditure patterns of households in order to derive the Consumer Price Index for the national economy. However, the IES95 has the added advantage of being run in tandem with the OHS95, and contains individual characteristics data on the household head and certain covariates for other individuals in the household. This enables a more detailed exploration of the relationship between the individual and the household - a characteristic of the dataset that we exploit quite extensively in Chapter 6. As with both the household surveys of 1995 and 1999, the IES95 was based on a sample of 30 000 households, across 3 000 EAs. Ultimately, 29 595 households were captured, with about 57% of the sample being urban-based households.

The preference, in this thesis, would have been to have utilised the OHS99 instead of the OHS95, where time comparisons were not being undertaken. However, one of the key constraints in the OHS99 data is the nature of the earnings data. Unlike

OHS95, the 1999 data set did not ask respondents what their actual earnings were. Hence, the earnings data in the 1999 questionnaire are structured in such a way that individuals who do not know or refuse to provide their actual earnings are given the option of coding their earnings according to predefined income bands. The income bands are in turn classified as weekly, monthly or annual categories. This option however seems to have been a fatal mistake, as the data that was eventually captured and made public by SSA according to actual incomes represents a small proportion of the sample. Clearly, for any analysis of employment returns, wage inequality and poverty levels, this data is inadequate. Given the preoccupation here with measures of returns to labour market activity and the link to poverty outcomes, we are forced therefore to revert to the more usable wage data contained in the OHS95.

Two final data issues are relevant here. Firstly, the IES95 was unofficially updated and calibrated for 1999 - and was specifically used in Chapter 6. The details of the derivation of this unofficial 'IES99' are taken up in Chapter 6, as an important component of this chapter utilises this more recent, unofficial micro data set. Secondly, the only pre-1995 data that has been used here is the Census for 1970, that provided a very useful benchmark around which to estimate long-run employment trends.

[3] In fact, it has subsequently been found that the country's population was over-estimated through the demographic model that was used to adjust the 1991 Census figures, rendering the original 1991 Census-based weights on the OHS95 incorrect.

Chapter 1: Understanding Apartheid Employment Trends: The South African Labour Market between 1970 and 1995

Introduction

The evolution of the crisis in the South African labour market is the focus of this chapter. The present high levels of unemployment, reinforced by unspectacular growth figures, have undoubtedly evolved gradually over time. However these unemployment numbers are critically also a function of the nature of employment patterns in *apartheid* South Africa. Not only was there poor employment growth (unlike earlier in the *apartheid* period) but as the chapter will indicate, the nature of the employment growth that did take place was to fundamentally alter over this 25-year period. Thus, an important contribution here is to conceive of labour demand in a more detailed fashion, by taking account of employment levels according to different occupations and skill levels, as well as by a select set of socio-economic characteristics such as race and gender. This lends more credibility and indeed more sensitivity to the analysis.

The chapter has two key components. Firstly, it will provide an overview of employment trends at the sectoral level, focusing not only on aggregate changes but also shifts that have occurred according to occupation and a set of socio-economic characteristics in the period under analysis. Secondly, the chapter will uncover the specific forces driving these employment trends across the sectors. Here, we will distinguish primarily between within-sector and between-sector employment shifts, a distinction that will be made clear later.

Formal Employment Trends Between 1970 and 1995

The two years of the analysis, 1970 and 1995, were chosen for a number of reasons: Firstly, it was important to include the former TBVC states and the census in 1970 was the last census that contained them. Secondly, Statistics South Africa's (SSA) quarterly updates on employment could not be used because of their inadequate handling of employment in the service sector[4]. Thirdly, this time period captures the entire shift to the greater usage of microelectronics in production which represents the most significant technological development in recent times.

4 See appendix 2 in Hodge (1998) for a detailed analysis of the inadequacies of service sector employment figures in the SSA quarterly updates.

Lastly, these two surveys provide very detailed labour market information that is lacking in the standard time-series sources.

The figures used here represent those in formal employment only. The reasons for excluding informal employees include the fact that for 1970, the contribution of informal employment would have been negligible anyway, while for 1995 the survey does a very poor job of uncovering this segment of workers (Bhorat, 1999) [5]. Furthermore, current evidence on the informal sector, albeit flawed, indicates that its participants are involved largely in survivalist activities and view it is as a second-best form of employment (Bhorat & Leibbrandt, 1998). Given this nature of the sector, and that the focus of this study is to understand the shifting labour demand needs of firms in the hiring of full-time, long-term employees, the exclusion of the informal sector is warranted.

Table 1 below presents a first overview of these employment trends at the sectoral level. The data is presented according to occupational groups. We were confined by the data reporting in the two surveys and hence all descriptive statistics are at the main sector level. The occupational classification system suffered from the same problems, in addition to trying to match the narrower definitions in the 1970 survey with the more detailed divisions provided in OHS95. The data shows that between 1970 and 1995, formal employment increased by 17.6% or from about 7.5 million employees to about 8.9 million. The comparable estimate for this period is to be found in the Standardised Employment Series (SES) calibrated by de Lange and van Eeghen (1990) for the formal sector. Their figures of total formal employment were 6 164 100 for 1970 and 7 702 000 for 1995. This translates into a 24.9% growth in employment over the period. There are of course tremendous difficulties in reconciling employment datasets that stretch this far back. However, upon closer inspection it is evident that the largest discrepancy in the data for 1970 presented here (which uses the 1970 Census) and the SES is to be found in the Agriculture, Fishing and Forestry employment numbers. The Agriculture, Fishing and Forestry employment figures utilised here include the TBVC states, as stated above, and indeed, the occupational and race data bear this out. In contrast though, it appears that the SES data is drawn from the Agricultural

5 Indeed, the OHS95 includes domestic workers as part of the informal sector, a critical error that ultimately renders the informal sector data useless. An additional cohort excluded here is domestic workers, who although incorrectly categorised, were well recorded in the 1995 survey. There would

Census of 1970, which is a survey of farming units, rather than individuals. The different sources in the first instance, therefore, explain the contrasting figures. In addition, the Census for 1970 includes the TBVC states, and hence the discrepancy in the two figures for 1970. As such then, the 1970 Census figures are certainly more representative than the Census of Agriculture of 1970, which only sampled white farmers. The added advantage of using the 1970 Population Census is, as we will see below, that it presents estimates of employment according to sector-occupation cells, which allows for the decomposition technique to be utilised. In terms of the 1995 employment estimates presented here though, we can be more confident of these figures, given that they are based on a more recent and nationally representative survey, and indeed have not been calibrated from a variety of different sources.

The economically active population in 1970 was 8 114 248 and in 1995 was 12 741 868[6], which represents a 36% increase. What this means is that the labour absorptive capacity of the formal economy, at not even half this increase in the size of the labour force, has been wholly inadequate in providing jobs for all the new entrants into the labour market[7]. This is of course manifest then in the growing numbers of unemployed, from an estimate of about 570 000 in 1970 to close on 4 million in 1995.In addition to the overall poor employment performance of the formal economy, the employment gains that were made, were unevenly distributed amongst the different sectors of economy. It is powerfully evident from the table that the two primary sectors, Agriculture and Mining, have suffered huge employment losses over this 25 period . Indeed, in Agriculture 1.2 million jobs were shed, while in Mining the number is about 211 000. The only other sector to witness a decline in employment was the construction industry, where employment fell by 370 000 or almost 10%.

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have been a large number of such workers in 1970, but given that they were very unlikely to have been covered, domestic workers have been omitted from all calculations.

6 This figure is based on the number of unemployed according to the expanded definition and those in formal employment in this period.

[7] Indeed, even on the higher employment growth figure from the SES of 24.9%, the employment performance of the domestic economy over this period has remained poor.

Table 1: Formal Employment, By Sector and Occupation: 1970 and 1995

Occupation	Year	Agriculture.	Mining	Manuf.	Utilities	Cnstrn	Whol. & Ret.	Transpt.	Finance	Comm. Serv.	Total
Professionals	**1970**	1450	7806	34014	2384	9615	13077	11091	25408	251557	**356402**
	1995	3631	21791	105672	16255	22289	62891	66626	184918	983988	**1468061**
	% ch	*150.4*	*179.2*	*210.7*	*581.8*	*131.8*	*380.9*	*500.7*	*627.8*	*291.2*	***311.9***
Managers	**1970**	910	2380	29145	267	11155	40547	6996	11493	12165	**115058**
	1995	6672	13125	82567	2506	22274	162562	31982	54037	52243	**427968**
	% ch.	*633.2*	*451.5*	*183.3*	*838.6*	*99.7*	*300.9*	*357.1*	*370.2*	*329.5*	***272.0***
Clerical	**1970**	3330	17593	119226	3507	15148	318230	49915	110006	95680	**732635**
	1995	12709	37953	130009	10368	15858	276252	61316	221146	297206	**1062817**
	% ch	*281.7*	*115.7*	*9.0*	*195.6*	*4.7*	*-13.2*	*22.8*	*101.0*	*210.6*	***45.1***
Service	**1970**	4919	25448	31721	2646	6985	94736	16886	26609	1033398	**1243348**
	1995	17809	37076	79610	7246	6952	595741	41831	105612	738796	**1630673**
	% ch	*262.0*	*45.7*	*151.0*	*173.8*	*-0.5*	*528.8*	*147.7*	*296.9*	*-28.5*	***31.2***
Farmworkers	**1970**	2443353	4525	5198	456	1086	2733	864	390	63866	**2522471**
	1995	1019352	3538	8521	0	469	11615	2871	1629	107790	**1155785**
	% ch	*-58.3*	*-21.8*	*63.9*	*-100.0*	*-56.8*	*325.0*	*232.3*	*317.7*	*68.8*	***-54.2***
Production	**1970**	13163	585365	585470	18096	265197	102933	68887	3415	37268	**1679794**
	1995	21657	229466	690781	39279	255473	196518	57980	20680	93359	**1605193**
	% ch	*64.5*	*-60.8*	*18.0*	*117.1*	*-3.7*	*90.9*	*-15.8*	*505.6*	*150.5*	***-4.4***
Labourers	**1970**	8331	14101	166007	17935	150640	71959	78949	3879	76083	**587884**
	1995	19448	70498	233245	8888	82980	118860	26809	7970	69302	**638000**
	% ch	*133.4*	*400.0*	*40.5*	*-50.4*	*-44.9*	*65.2*	*-66.0*	*105.5*	*-8.9*	***8.5***
Transport	**1970**	6293	22159	47493	1226	14297	61601	102353	8322	22645	**286389**
	1995	137159	52469	119386	8072	21334	93466	184082	30091	134312	**780371**
	% ch	*2079.5*	*136.8*	*151.4*	*558.4*	*49.2*	*51.7*	*79.9*	*261.6*	*493.1*	***172.5***
Unspecified	**1970**	211	974	7677	241	1379	2019	2283	409	2944	**18137**
	1995	407	3395	6510	1466	1197	4942	2881	2215	79673	**102686**
	% ch	*92.9*	*248.6*	*-15.2*	*508.3*	*-13.2*	*144.8*	*26.2*	*441.6*	*2606.3*	***466.2***
Total	**1970**	**2481960**	**680351**	**1025951**	**46758**	**475502**	**707835**	**338224**	**189931**	**1595606**	**7542118**
	1995	**1238844**	**469311**	**1456301**	**94080**	**428826**	**1522847**	**476378**	**628298**	**2556669**	**8871554**
	% ch	***-50.1***	***-31.0***	***41.9***	***101.2***	***-9.8***	***115.1***	***40.8***	***230.8***	***60.2***	*17.6*

All other main sectors reported increases in their workforce. The largest percentage increase in employment, was in the financial and business services sector, followed by Wholesale & Retail trade. In absolute terms, both these sectors gained about 1.2 million employees. In addition, the other two service sectors, Transport and Community, Social & Personal Services, both yield significant increases in their employment numbers. Indeed, while the secondary sectors (Manufacturing, Utilities and Construction), do show a net rise in employment levels, the major uptake in employment has been in the services sectors. Put differently, while the secondary sector gained some 430 000 jobs in this period, the figure for the four service sectors stands at about 2.4 million.

The poor employment performance of the secondary sector, and in particular the manufacturing industry is worrying. For a key sector to gain only 400 000 jobs over 25 years clearly indicates an undynamic if not a struggling industry. Many details are hidden by the aggregate figures, but given that the sector's share of GDP has also remained fairly constant over the period, it is suggestive of an industry in trouble. While there are certain firms and even certain sub-sectors within Manufacturing that are dynamic and will remain so, it is evident that in the long-run the industry as a whole is unlikely to be the major source of either economic growth or, more importantly here, job creation.

The employment data above suggests that a key structural shift has taken place in the South African economy in the 1970-95 period. The economy has moved away from a dependence on the primary sectors, which have been in secular decline over these two and a half decades, while simultaneously witnessing a rapid rise in the growth of the services sector. It is the growth in output in the latter sectors and the declining or stagnant output performance of the former main sectors, that in part explains this labour demand shift. Specifically, the share of the primary sectors in national GDP declined by between 3% and 4%, while that of services rose by as much as 6% between 1970 and 1995. This is a trend that is likely to continue, and one which will establish a new South African productive base, increasingly characterised by the tertiary sectors and far less by the primary or even the secondary sectors. The following section will examine and estimate the extent to which these output patterns, manifest in what are known as *between-sector* employment shifts, help explain the overall sectoral employment trends observed.

Another part of the explanation for these employment shifts can be gleaned from the total occupational employment shifts outlined in the table above. It is evident that the distribution of employment gains by occupation was also uneven. The occupations that report the largest increases were Professionals, followed by Managers and then Transport occupations. Indeed, these three occupation categories account for an increase of close to 2 million jobs in the 25 year period. On the other hand, the number of workers in lower skilled occupations, namely farming, production work and labourers, either declined or increased only marginally. The most spectacular decrease was in farming occupations, where the number of jobs halved over this period. This fact matches with the decline in the sector's share in GDP noted above. The number of labourers only increased by about 8% over the period (amounting to a paltry 50 000 jobs), which meant that the share of labourers in total employment declined. It is evident then, that the aggregate employment shift since 1970 has not been skills-neutral. The structure of the labour demand shift shows clearly that skilled workers at the high-end of the job ladder have benefited most from output growth, while those in unskilled positions at the bottom-end have benefited least, and in some cases dramatically lost out, from the path of output expansion in the domestic economy.

It is important, however, to try and understand the labour demand shifts that have been occurring within each sector. This provides a more sensitive analysis of the changing structure of labour demand. Hence, while it is important to look at between-sector employment shifts to explain labour demand changes, it is also necessary to interrogate the degree to which changing preferences for certain labour types within each sector explain labour demand trends. Within Agriculture for instance, while the large decline in the share of those in the unskilled farming occupations explains most of the labour demand trend, there were significant shifts at the higher-end of the job ladder. We therefore see from Table 1, a large percentage rise in the number of employees in the top three skilled occupations, albeit off a small base, within Agriculture. A notable increase within this sector was for transport workers, whose share rose over twenty-fold representing some 130 000 new jobs. For Mining, similar trends are observed. Although the decline in the share of production workers explains a large part of the overall employment losses in the sector, countering this trend again is an increase in the share of higher skilled workers, notably in the professional and managerial categories. These within-sector employment shifts are a result of a number of factors including

technological change that is non-neutral in its factor demand impact, as well as lower prices on non-labour inputs such as capital equipment or computer services. Hence, in the mining industry for example, capital-labour ratios between 1970 and 1995 increased by 416%, while in Agriculture the ratio went up by about 170% (IDC,1995). The importance of these within-sector labour demand shifts, relative to between-sector shifts, will be estimated in the following section to allow for a more nuanced analysis of the weighted contribution of these two forces in explaining labour demand trends.

In the secondary sectors, within-sector employment shifts are also apparent. Hence, in Manufacturing for example, the share of the top two occupations increased dramatically since 1970, while that of production workers declined, and the share of labourers remained constant. Note, as with Agriculture, the large increase in the share of transport employees in this sector. Even in Construction, where absolute employment numbers fell by about 46 000, the skilled occupations made gains. The number of managers and professionals in this sector therefore increased by at least 100% since 1970, while it was primarily labourers that bore the brunt of the job losses.

Within the service sectors, the same trend is observed. Managers and professionals saw their numbers increase by a minimum of 291% over this period. In all four sectors apart from Community & Social Services, the share of service staff increased. The share of labourers again declined, and in the case of two sectors the actual number employed fell. This is stark reminder that even within the four fastest growing sectors of the economy, there was a high attrition rate for those at the bottom-end. While the absolute numbers are small, it is interesting to note that for production workers the results are mixed. Hence, in the Wholesale & Retail and Transport sectors, their share of employment fell, while in Finance and Community Services it increased. The majority of these workers in Community Services are employed in government, either at the central or local level. The share and absolute number of transport workers again increased across all sectors, ranging between a 52% and 493% rise over the period.

The service sectors, on the whole, are more skills-intensive than the secondary sectors or indeed the primary sectors. Hence, any growth in these sectors was going to result in a skewed preference for those individuals with a greater quantum

of human capital. However, it cannot be doubted that the onset of the microelectronics revolution, epitomised by greater computer usage, has spurred on this preference within services for higher skilled individuals. The fact that the capital-labour ratios in the service sectors rose by as much as 117% strongly supports this notion (IDC,1995). Simply put, the forces driving within-sector labour demand preferences witnessed a sharp increase in the employment of the most skilled workers, matched by an alarming decline in the demand for unskilled employees.

Before going on to the decomposition approach and results, it is useful to determine the labour demand flows observed according to race, gender and education levels. Table 2 below examines changes in employment by the four race groups and by gender. It is evident that the total employment gains since 1970 had a differential impact on the four racial groups. More specifically, the results show that the employment of non-Africans increased at a rate of between 48% and 108%,while formal employment of African workers basically remained constant through this period. This results reflects, perhaps most strongly, the poor labour absorptive capacity of the formal sector - that over 25 years the largest racial cohort of workers saw its share in employment decline drastically. In terms of numbers of jobs gained the breakdowns show this racial cleavage vividly: Africans gained about 1800 jobs, Coloureds 447 000, Asians 177 000 and Whites over 760 000 jobs.

A perusal of the figures within each main sector reveal that the key cause of the poor employment performance for Africans was the high losses in the primary sectors. Again, the issue here is whether the decline in the sectors' contribution to GDP (between-sector) or factor non-neutral technological change (within-sector) reflected in rising capital intensity in these two sectors, best explains the overall employment losses. There were though notable gains for Africans in the service sectors, with the largest increase reported in Wholesale & Retail. For Coloured, Asian and White workers, their increased employment was driven by the service sectors. Within mining, rising capital intensity is reflected in increased hiring of non-African workers, who are on average likely to be more skilled than their African counterparts. This represents a clear example of the differing skills requirements arising from technological change.

Table 2: Formal Employment Trends by Sector, Race & Gender, 1970-1995

	Year	Agriculture	Mining	Manufacturing	Electric	Construction.	Wholesale & Retail	Transport	Finance	Comm. Services	Total
Race											
African	**1970**	2259895	69790	513795	29915	289758	309859	138434	36549	1088716	5276711
	1995	930227	352996	814171	48566	239162	792128	248738	200877	1648017	5274882
	% change	-58.8	-42.1	58.5	62.3	-17.5	155.6	79.7	449.6	51.4	0.0
Coloured	**1970**	116835	7164	166105	2460	78589	77074	27559	6863	159535	642184
	1995	220111	12725	231437	7140	85472	203221	43439	47412	238884	1089841
	% change	88.4	77.6	39.3	190.2	8.8	163.7	57.6	590.8	49.7	69.7
Asian	**1970**	7317	720	64448	204	9142	50833	7286	2864	22342	165156
	1995	2167	3581	96796	1114	12442	105466	19096	29865	72432	342959
	% change	-70.4	397.4	50.2	446.1	36.1	107.5	162.1	942.8	224.2	107.7
White	**1970**	97913	62677	281603	14179	98013	270069	164945	143655	325013	1458067
	1995	86339	100009	313897	37260	91750	422032	165105	350144	597336	2163872
	% change	-11.8	59.6	11.5	162.8	-6.4	56.3	0.1	143.7	83.8	48.4
Gender											
Male	**1970**	1593046	673713	810811	45026	463980	512540	309839	115196	584753	5108904
	1995	988866	450366	1027576	82176	399399	867872	398773	346030	1338261	5899319
	% change	-37.9	-33.2	26.7	82.5	-13.9	69.3	28.7	200.4	128.9	15.5
Female	**1970**	888914	6638	215140	1732	11522	195295	28385	74735	1010853	2433214
	1995	249978	18945	428725	11904	29427	654975	77605	282268	1218408	2972235
	% change	-71.9	185.4	99.3	587.3	155.4	235.4	173.4	277.7	20.5	22.2
Total	**1970**	2481960	680351	1025951	46758	475502	707835	338224	189931	1595606	7542118
	1995	1238844	469311	1456301	94080	428826	1522847	476378	628298	2556669	8871554
	% change	-50.1	-31.0	41.9	101.2	-9.8	115.1	40.8	230.8	60.2	17.6

The gender results show that the employment of both males and females increased. However, note that the percentage increase for female workers was greater. In addition, the share of male workers actually fell, while that of females increased over the period. The declining bias against women relative to men in the workplace is again a reflection of the rise in the service sectors, where the proliferation of desk-work is more gender-neutral than in the case of the heavy industries such as mining and segments of manufacturing. An indirect conclusion from the table is that of upward occupational mobility amongst women, which is in part shown in the Finance sector numbers. More specific data for females by occupation, shows that their share in managerial positions increased from 8.4% in 1970 to 18.4% in 1995.

The final table, Table 3, in the descriptive section examines the changing sectoral preferences for workers categorised by education levels. The table makes it plain that the overall 17.6% gain in employment was not evenly distributed by the different educational qualifications. Hence the largest increase was for individuals with tertiary education whose employment rose by a huge 2028% over the period. This was followed by those with completed secondary education, whose demand increased by over 350%. Interestingly, the completion of secondary education is an important predictor of employment, relative to those individuals with secondary education (but who have not attained a matriculation certificate), whose employment rose by far less, at 53%.

Table 3: Formal Employment Trends By Education

Education	Year	Agric	Mining	Manufacturing	Utilities	Construction	Wholesale & Retail	Transport	Finance	Comm. Services	Total
None	**1970**	1584594	368642	170476	14383	147909	80993	59213	14075	440254	**2880540**
	1995	290289	34103	68516	3899	34839	57472	20012	6343	100508	**615981**
	% change	*-81.7*	*-90.7*	*-59.8*	*-72.9*	*-76.4*	*-29.0*	*-66.2*	*-54.9*	*-77.2*	***-78.6***
SubA-Std 5	**1970**	704927	212122	356954	14864	171843	205838	82303	18804	579433	**2347089**
	1995	618016	130227	258428	18028	128100	209750	76306	26135	308849	**1773839**
	% change	*-12.3*	*-38.6*	*-27.6*	*21.3*	*-25.5*	*1.9*	*-7.3*	*39.0*	*-46.7*	***-24.4***
Std6-9	**1970**	166472	84834	403834	13754	133088	331764	165914	68002	398602	**1766263**
	1995	232159	175512	611518	23220	149096	631071	187669	134598	556187	**2701030**
	% change	*39.5*	*106.9*	*51.4*	*68.8*	*12.0*	*90.2*	*13.1*	*97.9*	*39.5*	***52.9***
Matric	**1970**	23124	13124	84599	3087	19805	83950	29345	77359	138046	**472440**
	1995	61551	96124	358707	30054	62502	466611	127883	278060	686847	**2168339**
	% change	*166.2*	*632.5*	*324.0*	*873.6*	*215.6*	*455.8*	*335.8*	*259.4*	*397.5*	***359.0***
Tertiary	**1970**	2843	1629	10088	670	2856	5291	1448	11690	39271	**75786**
	1995	36829	33345	159132	18879	54289	157943	64508	183162	904278	**1612365**
	% change	*1195.5*	*1947.1*	*1477.4*	*2716.8*	*1800.6*	*2885.2*	*4353.6*	*1466.8*	*2202.7*	***2027.5***
Total	**1970**	**2481960**	**680351**	**1025951**	**46758**	**475502**	**707835**	**338224**	**189931**	**1595606**	**7542118**
	1995	**1238844**	**469311**	**1456301**	**94080**	**428826**	**1522847**	**476378**	**628298**	**2556669**	**8871554**
	% change	***-50.1***	***-31.0***	***41.9***	***101.2***	***-9.8***	***115.1***	***40.8***	***230.8***	***60.2***	*17.6*

But the biggest losers in this sample, were those individuals with no education or primary schooling. The demand for their labour decreased by 24% for those with primary education and 79% for those with no schooling. Common economic wisdom has often held that primary schooling was key to both employment and higher earnings. The results here (and those elsewhere in fact) suggest that primary schooling is a necessary but no longer sufficient human capital base for even gaining employment. The results also make it plain that those with no education have been the most severely disadvantaged in the labour market over the last 25 years.

Ultimately, South Africa's labour demand patterns show a high and more than likely increasing demand for individuals with some secondary education or more. The real winners will be those with completed secondary and individuals with tertiary education. In contrast, there is differential access to both employment and higher earnings for individuals with primary schooling or less, as their share of employment has fallen drastically since 1970. Both Chapters 2 and 3 will reinforce this role of education levels in predicting earnings levels in the labour market.

The within-sector data is also interesting. The first strong trend in the data is that irrespective of the sector, including those intensive in the use of unskilled labour, the demand for those with no education fell over the sample period. Indeed, the sectors with the largest attrition rates were precisely those with large shares of low-level workers, namely Mining and Agriculture. The same trend is observed for primary education, although in Utilities and Wholesale & Retail trade, while the absolute numbers did rise, the shares of employment still fell.

The incomplete secondary results provide an extremely useful understanding of labour demand patterns. It is clear that in the primary sectors, in Manufacturing and in Construction there was an increase in the relative demand for these workers as their shares increased over the period. On the other hand in the remaining sectors, particularly Finance and Transport, there was a significant decline in the share of employment of these workers. The differing skills requirements of these two sets of main sectors would seem to be driving this difference. Hence, in the former set, there would be a leaning towards semi-skilled over skilled workers, and thus while there was a move away from primary and no education workers, those with some secondary schooling were still in demand. In the service sectors though,

the skills profile is much more biased toward high-skilled workers, and therefore incomplete secondary education in fact becomes an obstacle to employment here.

In the service sectors, we see the demand switch occurring when examining the matric and tertiary categories. Here there are overall percentage increases in the employment of workers with these educational qualifications - ranging from 259% for matriculants in Finance to 2203% for those with degrees in the Community Services sector. Note that for the less skills-intensive sectors, the demand for these higher educated individuals also increased.

Decomposing Between- and Within-Sector Employment Shifts

The above descriptive statistics provide a wealth of detail on the broad patterns in labour demand. In various ways, and to differing degrees, the data has suggested that the labour demand specifications of individual firms and sectors as a whole, has shifted toward individuals with greater levels of human capital. The fact that we can observe the labour demand outcome, namely a higher demand for skilled and semi-skilled workers, is only half the puzzle solved. The other, perhaps more important, half of the puzzle is to try and determine the relative importance of the factors that have shaped this labour demand trajectory.

As alluded to above, it is useful to think of labour demand patterns as being driven at the sectoral level by two forces - within-sector shifts and between-sector shifts. Both these shifts are to be understood under a regime of fixed relative wages (Katz & Murphy,1992:54)[8]. Within-sector employment shifts are those changes in labour allocation that come from within the industry itself. Between-sector changes are relative employment shifts occurring between sectors in the economy. Sources of within-sector shifts include technological change in a sector that may create the need for a certain skill-type over another. A change in the price of a non-labour factor, such as capital equipment or computers, may also result in an altered preference for certain labour types. Outsourcing of non-core functions, although hard to measure, is another form of within-sector shifts that may result in changing labour preferences. Between-sector employment changes are principally explained

[8] The methodology does not allow for the inclusion of relative wage adjustments and this remains its key drawback. The result is an understatement of the 'true' between-industry demand shifts for cohorts who experience rising relative wages and an overstatement of the demand shift for those groups with declining relative wages (Katz & Murphy,1992).

through the altering shares in aggregate output of the sector under consideration. Through a growing or declining share in production of a sector, labour demand at different skill levels may alter. Within this, the share of domestic output that changes due to trade flows can also affect the degree of between-sector shifts. Finally, the shifts in product demand across industries may also play a role in explaining between-sector labour allocations. Hence a growing share of the product market by a specified sector may result in altered preferences for certain skills.

Clearly, the employment patterns observed in the tables above can be readily explained by both these factors. The issue though is to estimate the relative strengths of these two forces in explaining the employment trends observed in Tables 1 through 3 above. In order to achieve this, we utilise a basic decomposition technique drawn from Katz and Murphy (1992). The technique has its theoretical foundation in a set of labour demand equations, where labour is hired subject to a cost constraint, assuming constant returns to scale in the production function. The derivation allows the authors to arrive at a representation of labour demand where the total relative labour demand shift is represented according to a given group (occupation, for example), which is then readily decomposable into a between-sector and within-sector component. The total shift as well as the between-sector shift, according to occupation or socio-economic groups, are directly observable. Utilising this theoretical approach, one can then arrive at an empirically estimatable equation, to determine the size of these three segments of relative labour demand by any given cohort. The index of relative labour demand shifts is constructed as follows:

$$\Delta X_k^d = \frac{\Delta D_k}{E_k} = \sum_j \left(\frac{E_{jk}}{E_k}\right)\left(\frac{\Delta E_j}{E_j}\right) = \frac{\sum_j \alpha_{jk} \Delta E_j}{E_k} \qquad (1)$$

The subscripts *k* and *j* refer to occupation (or socio-economic) groups and sectors respectively. The total relative demand shift for group *k* in the period under consideration is measured by ΔX_k^d. Specifically, it is measured by $\alpha_{jk} = \left(\frac{E_{jk}}{E_j}\right)$, which is group *k*'s share in sector *j*, as a share of total employment in that sector, weighted by the percentage change in total sectoral employment, ΔE_j, in which

the weight is the group-specific employment distribution, E_k. Note that the between sector component explaining part of the shift in relative demand for group *k* is given by ΔD_k, while the within-sector shift is simply the difference between the total- and between-sector shifts. As with the Katz & Murphy (1992) approach, we normalise total employment in each year to sum to one, and so obtain a measure of relative demand shifts. In addition, the values for α_{jk} and E_k are represented in the base year, which in this case is 1970.

Employment Shifts By Occupation, Race and Education Level

The tables below presents the results from the decomposition approach outlined above. It should be noted that here and indeed in the rest of the chapter, the underlying assumption is of a perfectly elastic labour supply function. This explains also the assumption of constant relative wages. In essence then, we measure the sectoral dynamics of a shift in the labour demand function, along the labour supply curve of any given occupation or socio-economic group.

Table 4 below presents the decomposition results by occupational classification between 1970 and 1995. The total demand shift index reiterates, in a more robust form, the rise in the demand for skilled workers. Hence the highest total relative demand shift is for the clerical & sales occupations, followed by managers and then by individuals in professional positions - all of whose relative demand increased by over 15% or more in the period. The poorest performers are farm workers, production workers and labourers respectively.

Table 4: Industry-Based Relative Demand Shift Measures by Occupation, 1970-1995

Shift	Between	Within	Total	Share of within
Prof/Semi-P/Tech	0.87	14.86	15.48	96.00
Adm/Exec/Mnge	0.36	18.57	18.80	98.76
Clr & Sales	2.91	21.57	23.37	92.33
Service	2.78	12.53	14.63	85.66
Farm/Fish/For	-8.78	-19.68	-34.44	57.15
Prd wrk & oper	-0.34	-1.20	-1.55	77.42
Labourer	0.64	6.98	7.52	92.80
Transport	0.51	11.37	11.77	96.66
Unspec	0.03	10.26	10.28	99.79

The more important result from the table is the contribution of the between- and within-sector shifts to overall relative demand for the given occupation. There is a clear and strong indication that across all nine occupational categories, the within-sector component dominates over between-sector shifts in explaining the profile of relative demand in the South African economy. The last column of the table displays the percentage share of the within-sector component in explaining the overall shift. Particularly in the case of the skilled occupations, the within-sector component is the major source of the labour demand shifts observed over the 1970-95 period in South Africa.

Interestingly, while the within-sector component is more important for farm workers and production workers, its dominance is less striking. This could reflect the importance of the decline in the primary sectors' contribution to GDP in accounting for high attrition rates at the bottom-end. Table 4 above confirms that these two occupations are the largest segment of the workforce in Agriculture and Mining respectively. However, the results suggest that the employment gains at the top-end observed in the primary sectors, was primarily a result of the high adoption rates of capital, marked by a rapid rise in the capital-labour ratios in these sectors. The within-sector dominance for all skilled occupations is therefore captured partly by the classic form of machinery substituting for labour. It is though also more generally manifest in the onset of the microelectronics revolution - alluded to above. Hence, the proliferation of computer usage across all sectors of the economy, but within services in particular, is the key mechanism for the growth in the demand for higher skilled individuals. The analysis also suggests that the rise in the output share of the service sectors, over and above the primary and secondary in the last 25 years, is in fact a less important determinant of the

observed employment flows for skilled workers in this sector, than the infusion of new technologies within the different sectors of the economy.

The table below provides the decomposition results by race and gender. Hence the subscript *k* from equation (1) above now represents the race or gender of the employed formal sector worker. The first interesting result is that for Africans it is not within-sector, but rather between-sector relative demand shifts, that explain the overall demand trends. The between-sector shifts that have occurred in the economy therefore account for over 70% of the labour demand patterns observed for African workers. Given that the majority of African workers are unskilled, this is a race-specific outcome extending the evidence for farm labourers and production workers in the previous table on the importance of between-sector shifts. It suggests that when examining the high attrition rate for unskilled African workers, the key cause has been the decline in certain sectors, matched by the rise in some other sectors since 1970. Put differently, the decline in the primary sectors, which are intensive in the employment of unskilled African workers relative to other race groups, combined with the rise in the service sectors, which are in general intensive in the use of skilled non-Africans, are the dominant explanation for the loss of jobs amongst African employees. Indeed, Table 2 above confirms that the major employment trend for African workers was the large job losses in the two primary sectors. The results illustrate that it is only for Africans where both production method changes (within-sector shifts) and structural change (between-sector shifts) have caused a decline in their labour demand. All non-African workers have in turn gained from these two changes in the domestic economy.

Table 5: Industry-Based Relative Demand Shift Measures by Race and Gender, 1970-95

Group	Between	Within	Total	Share of within
African	-4.54	-1.89	-6.64	28.46
Coloured	0.50	5.08	5.52	91.96
Asian	0.37	13.90	14.16	98.13
White	3.31	12.41	14.92	83.16
Male	-1.15	-0.55	-1.71	31.83
Female	1.12	2.33	3.39	68.58

In summary, while the take-up of skilled workers, in this case proxied by non-Africans is a result of technological changes within firms, the loss of unskilled African workers is largely a function of the altered sectoral output shares in the domestic economy. This is not to say though, that technological change has not been relevant in explaining the drop in unskilled employment. Indeed, the table shows that close to 30% of the explanation for the decline in the demand for Africans is due to firms and sectors showing a preference for capital over labour - a fact borne out by the sectoral capital-labour ratio data for the period (IDC,1995). The decline in the demand for African workers in the primary sectors was a function firstly of the poor output performance of these sectors, relative to others in the economy, and secondly a lesser function of the high capital-labour substitution rates in these sectors.

The gender results show that overall, the relative demand for males has fallen by 1.7% while that for females has increased by over 3%. The male results reflect the decline in the primary sectors where most of the workers are men, and which is shown by the larger between-sector component. While the rise in the service sectors did increase the preference for female labour, it was essentially changing technology or within-sector shifts that explained the greater demand for these workers. Female workers have gained partly as production methods place a greater emphasis on pre-production planning and design, as well as the fact that the job gains from the information technology revolution are gender-neutral.

The final decomposition is according to differing education levels. The only two education categories to witness a decline in demand for their labour are those with no education and individuals with primary schooling. This is a further indication of the movement away from unskilled individuals in the economy. In turn, relative employment demand increased by at least 10.9% for those individuals with incomplete secondary education or more. It is important to note, when trying to link firms' demand needs to skills development policies, that the attainment of a matric relative to incomplete secondary education, significantly alters the demand for a worker across all sectors of the economy. As is to be expected the two largest relative demands are for individuals in the two highest education cohorts.

Table 6: Industry-Based Relative Demand Shift Measures by Education Level, 1970-95

Education Group	Between	Within	Total	Share of within
None	-4.80	-8.07	-13.92	57.94
Sub A-Std 5	-0.11	-0.24	-0.34	68.80
Standard 6-9	2.82	8.63	10.95	78.74
Matric	1.48	18.17	19.16	94.88
Tertiary	0.23	18.13	18.28	99.18

For individuals who reported either having either a matric certificate or tertiary degree, production method changes within the individual main sectors have driven the increased demand for their labour. Over 90% of the increase in the demand for these high-skilled workers in the last 25 years is a function of the rising capital-labour ratios in the different sectors. Once again then, while the dominance in the services sector is an explanation for the demand for high-level workers, it is primarily technological change within sectors that explains the altered trajectory of firms' labour demand preferences.

For the remaining education cohorts, within-sector shifts are also dominant, although between-sector shifts do play a larger role. Hence for those with primary education or no schooling, structural change in the economy explains between 31% and 42% of the total relative demand shift for these workers. Note that even in the case of those with incomplete secondary education, over 20% of the total shift is explained by the between-sector component.

Conclusion

It should be evident from the above that in general the employment performance of the formal sector over the 1970-95 period has been dismal. The chapter has shown that this poor employment performance has primarily affected unskilled workers in sectors' that disproportionately employ these individuals. In addition, it was evident that African workers lost out relative to other race groups, and low-educated workers were the primary losers in this period. In essence then, while unemployment levels increased, new job were created, but they were created in skills and in occupations not matched by those losing their jobs.

The chapter isolated two possible causes for explaining the employment losses and the new employment patterns in the economy, namely within-sector and between-

sector forces. These decomposition results showed that across all occupations, within-sector forces are the dominant explanation for the demand for each of the occupations identified. This implies that factors such as technological change within firms, or the relatively lower price of capital to labour have been some of the major explanations for the changing preference of firms from lower skilled workers to higher-skilled employees. However there is an important caveat to this result. The decomposition for lower skilled workers showed that structural change, or between-sector shifts, are more important in understanding labour demand shifts than in the case of higher skilled workers. This result is strongest in the race decompositions, where the between-sector contribution for Africans is in fact bigger than the within-sector. This suggests that in the lower skill groups, while within-sector influences are crucial, the fact that the economy has experienced a structural shift becomes a much more important determinant of the employment changes. Essentially the decline the primary sectors, relative to the services industry, bears a disproportionate responsibility in explaining the job losses at the bottom-end of the job ladder, relative to within-firm or within-sector forces.

Chapter 2: The Post-Apartheid Challenge: Labour Demand Trends in the South African Labour Market, 1995-1999

Introduction

Chapter 1 provided the important historical context for, and background to, the employment challenge that this economy faces. The mismatch between demand and supply, marked by skills-biased labour demand shifts, has clearly been the defining feature of employment trends in South Africa since the 1970s. This chapter will attempt to continue this line of enquiry in the post-apartheid period, for two specific reasons. Firstly, it is important to assess whether the long-run shifts reported in Chapter 1 are replicated in this later period both in terms of scale and direction. Typically, we would want to determine whether the skills-biased employment shifts reported over the long-run have been reinforced during this shorter, more recent, time period. Secondly, should there continue to be similar employment shifts, we would still want to assess any new features that are peculiar to this 1995-99 period, and in particular how these new features may impact on the future labour demand trajectory of the domestic economy in this post-apartheid period.

Employment Trends between 1995 and 1999: A Descriptive Overview

The analysis of employment shifts covers the period 1995 to 1999, and is drawn principally from the October Household Surveys (OHS) for these two years. In the case of the 1995 data, the 1991 census weights were used, while in the case of the 1999 OHS, the 1996 Census were applied to the data. In working with employment and other numbers that are to be aggregated up, clearly this differential weighting would pose a problem. As a result, to ensure that consistency and comparability was achieved in the data set between the two years, the 1995 OHS was re-weighted using the 1996 weights. In all the data here, both formal and informal employment was included. Despite the misgivings concerning the estimation and inclusion of the informal sector in the household surveys (Bhorat,1999b), it remained essential to include the sector in an attempt at gauging the total employment shifts that have occurred in the labour market.

Table 1 below attempts to provide the first descriptive overview of employment shifts that have occurred since 1995. The table presents total employment shifts in

the economy between 1995 and 1999, according to sector and occupation. While the 9 main sectors have been included in the table, domestic services have also been attached as a separate category. Importantly, the mining figures have been adjusted to account for the undercounting of mineworkers in hostels in the OHS95. Hence, the third quarter estimate for total employment in the mining industry, drawn from the *Standardised Series of Employment and Earnings* (SEE) of SSA, was used as our 1995 employment figure for mining[9]. The occupational weights in the OHS95 were then used to distribute the SEE estimate according to the 10 occupations classified in the table below. The table reports the changes in employment (actual and percentage), while the absolute figures for 1995 and 1999 are provided in Appendix 2. In addition, note that there is an unspecified category in both the sectoral and occupational breakdown, representing incorrect or nil returns for these codes in the questionnaire.

[9] In terms of the undercount of miners in hostels for 1995, these individuals have been added to the pool of total employed by recourse to official Chamber of Mines data (Statistics South Africa, 2002). For 1996 and 1997, mining figures from the *Survey of total employment and earnings* (SEE) were utilised (Statistics South Africa, 2000). From 1998 onwards the sampling frame was adequately adjusted to account for miners living in hostels.

Table 1: Employment Shifts by Sector and Occupation, 1995-1999 (OHS, 1995 and 1999)

Occupation	Sectors	Agric.	Mining	Manuf.	Utilities	Construction	Trade	Transport	Finance	Comm. Services	Domestic Serv.	Unspecified	Total
Managers	**Change**	24301	1918	37656	4231	20427	-9794	9993	55519	41675	-585	1223	**186564**
	% change	*369.65*	*12.26*	*50.43*	*215.43*	*88.58*	*-4.42*	*15.16*	*113.38*	*108.61*	*-100.00*	*10.48*	***36.66***
Profess.	**Change**	1744	3265	20531	207	-476	10577	4858	71116	118680	93	2387	**232983**
	% change	*257.61*	*50.32*	*152.05*	*7.32*	*-9.89*	*129.68*	*102.32*	*145.58*	*50.78*	*n.a.*	*155.91*	***71.62***
Technicians	**Change**	899	-4664	30320	-5654	-9486	26925	-13243	50879	-77318	-207	-323	**-1872**
	% change	*28.93*	*-26.02*	*38.12*	*-52.55*	*-64.28*	*54.37*	*-24.58*	*41.29*	*-11.08*	*-17.54*	*-7.96*	***-0.18***
Clerks	**Change**	-1045	-30615	-9656	-1035	832	13175	6167	23319	-59548	1178	-7655	**-64883**
	% change	*-8.63*	*-58.08*	*-7.31*	*-9.48*	*5.52*	*4.60*	*6.90*	*10.60*	*-19.91*	*n.a.*	*-31.02*	***-5.68***
Sales	**Change**	9414	-18620	4224	1858	3358	142780	11486	85583	-71608	43	2400	**170918**
	% change	*109.01*	*-51.75*	*12.61*	*48.20*	*164.69*	*29.70*	*86.24*	*116.34*	*-17.68*	*0.33*	*50.20*	***15.91***
Sk. Agric & domestic w.	**Change**	212328	604	1104	329	171	7739	1011	11134	21580	249038	-738	**504300**
	% change	*205.88*	*50.42*	*21.97*	*n.a*	*64.77*	*198.39*	*116.88*	*1510.72*	*271.11*	*36.10*	*-100.00*	***61.98***
Crafts	**Change**	14259	-45811	78309	-4612	106151	52468	-2036	6351	3548	8721	-933	**216415**
	% change	*97.64*	*-21.00*	*25.58*	*-17.14*	*39.96*	*27.28*	*-4.14*	*33.66*	*6.54*	*602.70*	*-14.86*	***18.76***
Operators	**Change**	3469	44103	-79689	-5224	-4792	-17719	53430	9826	-14282	5126	-18007	**-23759**
	% change	*2.69*	*33.84*	*-16.03*	*-36.92*	*-19.59*	*-21.09*	*39.04*	*97.26*	*-20.38*	*515.18*	*-71.30*	***-2.12***
Elementary	**Change**	-307694	-66327	-17107	2124	18478	228259	-2409	38385	-92587	-84117	-22908	**-305903**
	% change	*-33.96*	*-60.27*	*-6.26*	*18.77*	*22.48*	*71.65*	*-4.60*	*104.58*	*-29.33*	*-89.65*	*-72.13*	***-13.71***
Unspecified	**Change**	2928	1266	28808	2216	1534	4461	4636	5500	-13564	487	18468	**56740**
	% change	*377.81*	*27.54*	*472.03*	*165.50*	*128.37*	*87.21*	*175.08*	*302.36*	*-46.15*	*n.a.*	*24.35*	***44.04***
Total	**Change**	**-39397**	**-114880**	**94500**	**-5559**	**136197**	**458871**	**73893**	**357612**	**-143424**	**179777**	**-26086**	**971504**
	% change	***-3.33***	***-19.37***	***6.65***	***-6.61***	***31.42***	***27.81***	***15.75***	***61.35***	***-6.67***	***22.45***	***-13.98***	***10.17***

The first, most interesting feature of the data is the aggregate employment performance of the domestic economy. The data shows that over the period 1995 to 1999, employment increased by about 970 000 workers, representing a 10% increase over the 5-year period. While the sectoral and skills detail of this growth did of course vary, it is clear that, if this data is correct, the notion of aggregate 'jobless growth' in the South African economy is erroneous. The economy, in the aggregate, has been creating jobs rather than shedding them.

It is important though to try and place this absolute expansion of employment into context. Specifically, it is necessary to assess the number of jobs that have been created, relative to the new entrants that have come into the labour market between 1995 and 1999. The data indicates that between 1995 and 1999, the number of new entrants was about 2.9 million individuals. Over the same period, 970 000 additional jobs were created. This means therefore that about 2 million individuals - some of whom were first-time entrants into the labour market - have been rendered or have remained jobless since 1995. The upshot from this is that while we did not have jobless growth, we have clearly had 'poor employment growth' over the last 5 years. Put differently, while employment grew at 10% over the period, if all the new entrants were to have been placed into employment since 1995, employment would have needed to have grown by 31.2% over the period - more than three times the actual proportion. Ultimately, the aggregate data suggests that while employment expansion has been recorded over the last five years, in terms of the economically active population and its growth over time, this job performance has been far from adequate.

Interrogating the Employment Data: Are the Numbers Correct?

Given the strongly held belief in both research and policymaking circles that the economy has experienced 'jobless growth' it is critical that we examine this initial result of aggregate employment growth more closely. We opt here to deal with the issue in three different ways. Firstly, the issue of weights is examined, as it is possible that the imposition of 1996 Census weights on the 1995 data, may have biased the weighted employment figures derived. Secondly, the notion of formal as opposed to informal growth is examined, in the hope that this may also shed further light on the results obtained here. Thirdly, there are possible criticisms of the results obtained on the grounds of poor or insufficient coverage of certain occupations or sectors, most notably domestic workers and farm labourers. In the

analysis that follows we hope to deal with each of these critiques in one manner or another.

The table below (Table 2) presents the official estimates of employment, as derived by Statistics South Africa. Firstly, given the known difficulties with the 1995 OHS in deriving a measure of employment in the informal sector, official estimates do not publish employment according to the formal and informal sector. If one assumes, in the first instance, that the weights derived from OHS95 are incorrect, the employment growth figures for the period 1996 through to 1999 suggest a very similar pattern to that presented above: namely a growth in aggregate employment of about 12% during the 1996-99 period - amounting to approximately 1.1 million jobs. There are two important issues to raise here. Firstly, most of the employment growth over the period has occurred in the 1998-99 period, with aggregate employment expanding by 10% in this period. However, there were steady increases in informal sector employment in earlier years that accumulated across the entire 1995-99 period. Secondly, the aggregate growth is primarily driven by employment expansion in the informal sector, although there has been some growth in the formal sector as well. Specifically, over the 1996-99 period, the informal sector accounted for 84% of the net job creation.

Table 2: Official Estimates of Formal, Informal and Total Employment (SSA, 2002)

Year	Formal Sector		Informal sector		Total Employment	
1995	n.a		n.a		9,590,000	
1996	8,291,000		996,000		9,287,000	*-3.16*
1997	8,111,000	*-2.17*	1,136,000	*14.06*	9,247,000	*-0.43*
1998	8,074,000	*-0.46*	1,316,000	*15.85*	9,390,000	*1.55*
1999	8,462,000	*4.81*	1,907,000	*44.91*	10,369,000	*10.43*
1996-1999	**171 000**	**2.06**	**911 000**	**91.47**	**1 082 000**	**11.65**

It is apparent therefore where the initial scepticism of the employment creation notion originates. For on the basis of this data, it appears unlikely that in a single year such large increases in employment could be recorded. However, it needs to be remembered that in the first instance, it is wholly possible that the informal sector figures are a function of both organic growth in the sector as well as an improvement in the collection of this information across the survey years. So we may be simultaneously picking up better measurement techniques, as well as an actual growth in the sector. Ultimately, it is very difficult to derive a definitive

answer as to the population estimate (as opposed to the weighted sample estimates reported here), of employment growth since 1995. However, it needs to be added that the scepticism that the figures in Table 1 often elicit are problematic on two counts. Firstly, there is no recourse to an alternative, equally representative dataset that would allow one to seriously question the survey data results. Within this, no serious criticism of the survey designs across the years, the weighting structure and so on are currently available, although this is no doubt made much harder due to the difficulties with accessing this sort of information from Statistics South Africa. The second problem is an analytical one and possibly the more important of the two. The notion of 'jobless growth' implies an absolute reduction in the number of employed in the society over the time period considered. This is an extremely strong assumption, and one that, in labour market sense is far stronger than the trend postulated above, namely of poor employment growth.

Finally we present data below in an attempt at dealing with the difficulties in collecting domestic and farm worker data. The table below presents employment for the period 1996 to 1999 for non-agricultural, non-domestic employment[10]. It is evident that employment in the period 1996 to 1999 grew by about 9%, with close to 700 000 jobs being created outside of agriculture and domestic services. This compares to about 830 000 jobs in these sectors according to figures in Table 1.

Table 3: Official Estimates of Non-Agricultural, Non-Domestic Employment, 1996-1999 (SSA, 2002)

Year	Total	% Change
1996	7 788 000	
1997	7 862 000	*0.95*
1998	7 706 000	*-1.98*
1999	8 471 000	*9.93*
1996-1999	**683 000**	***8.77***

Ultimately then, the above suggests firstly, that we cannot determine the true, population estimate of employment growth, until the release of the 2001 Census figures, from which we then have two Census data points to confidently deal with the above issues. However, despite the rapid employment growth in the 1998-9 period, there remains evidence of a growth in the informal sector prior to this, and

[10] We have excluded 1995, as the 1996-weighted figures on OHS95 do not separate domestic workers from other employees in the services sector.

indeed it would be hard not to ascribe a significant share of this growth to organic expansion of the sector. Finally, despite the fact that we would always need to be cautious with this data, the assumption of weak employment growth remains more feasible that one of negative growth in aggregate employment.

Employment Shifts by Sector and Occupation

The above suggests that in the aggregate, positive employment growth has been reported for the domestic economy. It is important, however, to determine the distribution of these employment gains at the sectoral and occupational level. As will be made clear, in this manner we are able to determine more specifically the winners and losers from these overall employment changes.

The detailed employment shifts indicate that the national employment expansion, had a differential impact at the sectoral level. Hence, we find that the largest increase in employment was reported for the financial and business services sector, where employment grew by 61% over the 5-year period. It is worth noting that this growth rate is close to double the 31.2% 'target' employment growth rate alluded to above. The second and third fastest growing sectors were Construction (31%) and Internal Trade (28%) respectively. These high employment numbers reveal on the one hand the continued expansion of the services sector, in keeping with our long-run analysis in Chapter 1. This includes in part, the construction industry, which does have a fairly significant services component. Indeed, the growth in the services sector and the consequent positive impact on employment in these sectors is a trend that is likely to intensify and continue over the medium- to long-run in South Africa. An interesting result, and one that will be dealt with in more detail below, is that while all the service sectors reported healthy employment growth rates, Community, Social and Personal Services (referred to as Community Services henceforth) , constituted primarily by the public sector, was the only service sector to yield a decline in employment over the period.

Apart from community services, the sectors that reported a decline in employment levels since 1995 were Mining (19.4%), Utilities (6.6%) and Agriculture (3.3%). The largest employment drop therefore was found in Mining followed by Community Services. This shorter term data analysis also reconfirms the patterns observed in the long-run labour demand analysis from the previous chapter, namely that both primary sectors' were in secular decline. Collectively, the primary sectors shed

over 150 000 jobs over this period, an average of 30 000 jobs per annum since 1995. Noticeably, the economy's largest contributor to GDP, Manufacturing, has seen its employment levels rise by about 7% since 1995. While clearly a positive trend, this is below the national employment growth rate, and four times below the target employment growth rate of 31.2% over the same period.

Relative shares of sectoral employment are of course critical as a proxy for labour flows between sectors. Table 4 below presents this evidence. The share of employment in the primary sectors, Utilities and Community Services also declined in relative terms, with the largest adjustment found in the latter main sector. Noticeably, Manufacturing's share of employment fell by 0.73 percentage points.

Table 4: Share of Employment by Sector, 1995 and 1999

Sectors	1995	1999	% Point Change in Share
Unspecified	1.95	1.52	-0.43
Agriculture	12.40	10.88	-1.52
Mining	6.20	4.54	-1.66
Manufacturing	14.87	14.39	-0.47
Utilities	0.88	0.75	-0.13
Construction	4.54	5.41	0.88
Wholesale & Retail	17.26	20.03	2.77
Transport	4.91	5.16	0.25
Financial Services	6.10	8.93	2.83
Community Services	22.51	19.07	-3.44
Domestic	8.38	9.31	0.93

In contrast, increases in the share of employment was reported for Construction, Internal Trade, Transport and Financial and Business Services. The latter in particular saw the highest percentage point rise in its share of employment. Indeed, the data here does confer with the long-run analysis, indicating that significant job reallocation is taking place from the primary sectors and some secondary sectors, toward parts of the services industry.

Perhaps the most interesting trend in the data is the decline in employment in Community, Social and Personal Services and in the Utilities sector, irrespective of whether one uses the growth or the share employment data. Both these are dominated by the public sector. Hence the data reflects a public sector that is in the process of significant restructuring. For example, the Community Services sector shed over 140 000 jobs between 1995 and 1999. In addition, the share data makes it clear that the job destruction in the public service has been both rapid

and particularly large. The loss in Utilities was relatively small, but is representative of a sector that employs under 100 000 workers. Ultimately then, at the sectoral level, the growth data for 1995 to 1999 from Table 1, reveals that the employment losses that occurred were predominantly in the public sector and the two primary sectors - with all other sectors reporting a rise in employment levels. These public sector results reflect the new government's intention to reduce inefficiencies within government, reduce the size of the public sector wage bill and finally to drive its restructuring plan around the notion of outsourcing non-core functions at all tiers of government. The result of this extensive and rapid public sector restructuring programme therefore, has been significant employment losses within the sector.

The important point though is to try and determine which occupations within each of these sectors bore the brunt of the overall employment losses, or as the case may be, gained most from intra-sectoral employment growth. It is useful to begin with the aggregate occupational shifts in the labour market. Table 1 reveals that the demand for all occupational groups increased, with the exception of four skills categories - technicians, clerks, machine operators and those in elementary (unskilled) occupations. In the case of the latter, their employment fell by about 300 000 over the time period. In turn, the number of clerks fell by just over 60 000 over the same period - representing a 6% decline in employment over the period. The third poorest performers were machine operators, whose employment declined by 2% over the period, while employment of technicians was essentially stagnant. In terms of increased labour demand, the largest increases were recorded for professionals (72%), skilled agricultural workers & domestic workers (62%) and managers (38%). While we return the second of these, it is evident that the two highest skilled categories accounted for about 420 000 new jobs created over this period. Interestingly, the fourth largest increase was recorded for craft workers, whose employment rose by about 19% since 1995. The employment of sales staff also increased over this period, by 16% across all sectors. We expand on the reasons for this growth pattern in the intra-sectoral discussion below.

It should be evident that two categories have been omitted from the above analysis, namely workers in domestic services and individuals categorised as skilled agricultural workers. The reason is that the numbers presented for these categories are difficult to interpret and deserve special attention. For example,

one of the oddities in the data here is that domestic services gained some 249 000 skilled agricultural employees, while it lost close to 84 000 labourers. This is a change that is very hard to explain, and may be purely due to altering definitions of the skilled agricultural worker category from 1995 to 1999. One of the factors that may have influenced this definitional change could be, for example, the fact that many individuals ostensibly doing domestic work in rural areas, are in fact primarily farm workers. By the same token, the huge increase in the aggregate demand for this occupation of some 395 000 workers yielding an increase of 344% over the period, is simply too large to represent a pure employment shift. It may rather be the changing definitions used in the two survey years, combined with the implicitly amorphous nature of the occupation, that has resulted in these numbers. Indeed, the OHS99 reports skilled agricultural workers as 'skilled farmworkers' defined according to the crop that they are farming[11]. Rather than these workers being skilled in the generic sense then, they would appear to be farm labourers defined in a very specific manner for the purposes of the 1999 survey.

Given the uncertainty around these figures, it is probably fair to assume that the figures for elementary employees within agriculture, better reflects the changing pattern of farm worker employment. In turn, the change in domestic services employment is probably more accurately reflected by the reduction in employment of elementary employees, rather than the aggregate shift, which reports a rise in domestic service employment. The proposed solution for our purposes here and indeed for ease of exposition, was therefore to report the two occupations as a combined category.

Intra-Sectoral Employment Shifts by Occupation

The above brief discussion around domestic service and the skilled farm worker categories points to the importance of examining how aggregate sectoral shifts have indeed important nuances when dissecting this overall shift by skill levels.

Taking the primary sectors first, there was a decline in employment levels in both Agriculture and Mining. In the former, despite the overall drop in employment, the two highest skilled occupations - professionals and managers - yielded an

[11] The crops listed include groundnut, grove, mushroom, livestock, jute, hops, ostrich, potato, poultry, rice and so on.

employment expansion of over 250% for the period. Indeed, while the loss was about 40 000 workers in this period, the Agriculture created about 26 000 high skilled jobs. As should be evident from Table 1, the loss was disproportionately due to the attrition rate amongst elementary workers, whose employment fell by 307 000. Even if we assume that all these workers are simply a function of reclassification in the encoding between 1995 and 1999, from elementary workers to skilled agricultural worker, then the net loss of employment amongst farm workers would still be of the order of 95 366 workers. Ultimately then, Agriculture reveals the common within-sector trend that despite overall employment losses, gains were evident for highly skilled workers, while unskilled employees bore the brunt of the employment decline.

Within the Mining industry, the aggregate employment decline again masks the occupational breakdowns. Hence, while the industry lost over 100 000 workers, these were primarily amongst individuals in semi-skilled and unskilled occupations. In addition, there were gains, albeit relatively small, for managers and professionals in the industry. Hence, the largest declines in employment are reported for clerical staff, craft workers and those in elementary occupations. The former two occupations may have been a result of the corporate restructuring and realignment that has taken place amongst Mining houses within the industry. Nevertheless, the largest decline in employment was reported for labourers, whose number fell by over 66 000 workers since 1995. As with the labour market in Agriculture then, these short-term labour demand trends indicate that intra-sectorally, it has been unskilled (and in some cases semi-skilled) workers who have lost out. The winners in both sectors, irrespective of the aggregate employment shift, have been highly skilled workers. This is a labour demand trajectory that conforms with the long-run studies done previously and reinforces the view that since the mid-1990s within each segment of the primary sector, despite their factor choices, skilled workers are rapidly replacing unskilled and semi-skilled workers in the internal labour market.

In the secondary sectors (Manufacturing, Construction and Internal Trade), similar trends do emerge, with some important differences though. Hence, within Manufacturing it is evident that the sector has created jobs since the mid-1990s. However, the detailed statistics illustrate that the demand expansion was once again for top-end workers, namely professionals, managers and technicians.

Collectively, they accounted for almost all the new jobs created in the industry. In contrast there was a high attrition rate amongst operators and elementary workers. In the former case, this reflects most probably on sub-sectors such as the clothing and textile industry which under enormous global competition, has rapidly shed its semi-skilled workforce. Again, the manufacturing industry reveals trends that replicate the results found in the long-run labour demand studies.

The construction industry has mixed results. While skilled employment grew for managers (and notably declined marginally for professionals), the demand for craft workers was the catalyst for the positive employment figures in construction. In addition, employment of labourers also increased a little. While this sector is of course pro-cyclical, there is evidence to suggest that it can, with the right economic growth conditions, be a major source of semi-skilled employment growth. This is an important result, as it goes against previous evidence which seemed to suggest that demand was bifurcated strictly along high skilled and unskilled lines only, with semi-skilled worker demand remaining essentially dormant. Ancillary (and very informal) evidence suggests that the output-employment elasticity of the sector is fairly high with respect to semi-skilled workers, given that in this same period construction output grew by a modest 1.26%. Of course, one needs to note that these employment figures are for the short-run, and within construction particularly may not be manifest of long-term and sustainable employment growth.

Additional positive employment results emanate from the Wholesale and Retail Trade sector, where employment also grew by close to 30% since 1995. More importantly though, the big winners here were elementary workers and sales personnel. This is representative of a sector that grew fairly strongly in output terms, as growth was close to 3% in the sector. What this suggests is that expansion in the large-scale retailing industry will induce greater demand for semi-skilled (sales staff) and unskilled workers. It is also possible though that, given the focus on formal and informal employment, the rise in employment is picking up the increasing number of individuals entering the informal retailing industry for lack of a job in the formal sector.

Within the tertiary sector, the tendency for increasing demand for semi-skilled workers is partially replicated. Hence, in the Transport sector for example, the

overall increase in employment benefited machine operators (in absolute terms) more than any other occupation. This is notwithstanding the fact that the demand for the two highest skills groupings also rose. Within Transport though, elementary workers continued to be shed. Over the same period, the industry grew faster than any other main sector, with the exception of Utilities. What this suggests is that should the industry continue to grow, while unskilled workers may lose out, semi-skilled employees could be the key beneficiaries of this output expansion. The Utilities sector, while a very small employer, reflected rising demand for both highly skilled and unskilled workers, albeit off a very low base.

With the rapid growth and increasing dominance of the Financial and Business Services industry, it is natural that the employment results here would have particular importance. Not unexpectedly, the trends reveal a rapid growth in demand for professionals, managers and technicians - which in absolute terms is second only to the community services sector. Of course, given the total employment size of the sector, the shift is relatively greater than that of community services. What is very heartening to note though, is that the demand for all occupations has also risen, although of course by a smaller percentage. This then suggests a more balanced and perhaps more nuanced result on South African employment patterns: that a growing industry which is skills-intensive, will still increase its number of semi-skilled and bottom-end workers. Indeed, within Finance, the demand for unskilled workers was three times the target growth for the economy as a whole. There are of course several important caveats to this result. Firstly, the absolute number of employed within financial services means that even at higher growth rates, it is unlikely to induce significant reductions in unemployment numbers. Secondly, while sectoral growth can realise employment gains for the unskilled, it is still higher skilled workers who have a greater probability of finding employment. But the relevance of this results are that we now have some evidence to suggest that while there is skills-biased employment growth; since 1995, in certain growing sectors unskilled and semi-skilled workers have also gained. Simply put, growth is good for all occupations, but continues to be better for those at the top-end.

The Community Services sector comprises almost wholly of the public sector. As such, it represents the single largest employer in the economy. South Africa has embarked on a sustained programme of privatisation and deregulation, which has

been matched by a concerted effort to restructure the public sector. This has had an immediate and profound impact on labour market trends within this institution. The data from Table 1 displays this vividly: it has been the largest single shedder of jobs since 1995. More importantly, the brunt of the adjustment has been borne by elementary workers and machine operators. Collectively, between 1995 and 1999, the public sector has shed about 100 000 employees in these two occupations. In addition semi-skilled employees such as sales staff and noticeably skilled workers such as technicians, have also witnessed a significant depletion in their numbers. Ultimately, the public sector, through its intensive restructuring process, has ensured that unskilled, semi-skilled and skilled workers have experienced job losses. At the skilled level, technicians would include such employees as nurses, safety and quality inspectors and certain teachers. It is therefore likely that these individuals, in particular nurses and teachers, had the highest attrition rate amongst the semi-skilled and skilled work force. Despite this restructuring process though, the number of managers and professionals within the public service rose dramatically. Hence, since 1995, the number of workers in these top-end occupations increased by over 150 000 - greater than the net job loss in the sector. The public sector, through its restructuring programme has thus constricted the demand for technical staff (particularly nurses and teachers) and unskilled employees, while continuing to hire highly skilled managers and professionals.

There are two points of relevance from the above. Firstly, given the fact that the public sector is in quantity terms the largest employer in the economy, the deterioration of its work force disproportionately impacts on aggregate unemployment levels and future unskilled labour demand patterns. Secondly, these results conform with the long-run labour demand analysis in Chapter 1, indicating a high and rising demand for skilled workers, with an erosion of the bottom-end workforce. However, it is additionally clear here, that the labour demand response is very specific about the supply characteristics of skilled workers that are required. Hence, there is a heterogeneity in these characteristics, and as such the market would value, for example, a high-school teacher differently from a mechanical engineer, even though generically both are viewed as skilled workers.

Employment by Race and Gender

An important addition to the sectoral and occupational detail is of course an analysis of employment shifts according to supply-side markers, such as race, gender and education. The data would essentially try and differentiate the

aggregate growth rate in Table 1 above of 971 504 new jobs according to race and gender.

Table 5 below therefore divides the national employment trends observed in Table 1 by race. In addition, these employment shifts have been matched to the growth of the economically active population (EAP) for the different race groups. We are implicitly then measuring the relative performance of labour absorption in the domestic economy[12]. In terms of the employment by race figures, it is evident that for all groups the demand for labour increased. Hence, the highest increase in percentage terms was for Coloured workers, followed by Asians, Africans and then White workers. The racial distribution of the total employment shift between 1995 and 1999 therefore indicates that all groups gained from employment. However, it is important to present these figures in terms of relative demand shifts - something which is extended further in the detailed decompositions provided below. In essence then, one needs to measure and evaluate the employment shifts relative to the net number of new entrants coming into the labour market over the same period.

Table 5: Employment and EAP Changes, By Race

Race	Employment		EAP		Target Growth	Employment Absorption Rate
	Change	% Change	Change	% Change		
African	612146	9.94	2441841	25.50	39.65	25.07
Coloured	178515	15.95	258090	17.97	23.06	69.17
Asian	43607	12.37	88534	21.75	25.11	49.25
White	119799	6.22	170266	8.42	8.84	70.36
Total	971504	10.17	2980719	22.18	31.19	32.59

Table 5 therefore shows for example, that while African employment grew by about 10% since 1995, the net number of African entrants seeking employment grew by 26%. In other words, African employment grew, but not fast enough to provide employment to all new work-seekers. Indeed, in order for all these new worker-seekers, numbering some 2.4 million, to have found employment African employment would have needed to have grown since 1995 by 39.65%. We have termed this the 'target growth rate', as it essentially summarises the desired

[12] Note that the racial employment numbers do not sum to the aggregate employment shift, due to a fifth category in the questionnaire, denoted as 'other' into which these individuals were coded.

employment growth rate for each of the race groups. The target growth rate can be represented simply as :

$$\frac{EAP_{kt-1} - EAP_{kt}}{L_{kt}} \tag{1}$$

where EAP refers to the economically active population for group *k* and *L* is the number of employed individuals, by any given covariate. Note that because this target growth rate captures the growth required to provide employment to only the new entrants since 1995, it is essentially the rate of growth required to absorp all net new entrants, independent of the unemployment numbers existent in the base year, namely 1995. The employment absorption rate is the ratio between the actual employment growth and the desired (or 'target') rate, and is expressed as a percentage. The closer the employment absorption rate is to 100, the better the actual relative to the desired employment performance. These figures are critical as they are predictors of relative employment performance - something that the standard growth rates do not yield[13].

Using the above approach, it is evident that while all growth rates were positive, the relative labour demand shifts, as approximated by the employment absorption rate, yield contrasting results. For example, while the African growth rate was higher than White employment growth, the employment absorption rate tells a very different story. Hence, we see that the relative performance of African employment, when considering the new African entrants into the labour market, was actually far poorer. While African employment should have grown at about 40% to absorb all the new entrants, White employment only needed to expand by 9%. The gap between the actual and desired job performance for Africans (25.1) was far wider than that for White workers (70.4). Put differently, employment was generated for only 25.1% of all new African entrants into the labour market, relative to 70.4% of all White new entrants. The generic point though is that while positive employment growth was reported for all race groups, relative to the growing labour force, all races yielded poor or inadequate labour demand growth.

[13] The decomposition exercise in the following section, a replication of the methodology in Chapter 1, takes a similar approach in that it measures relative, rather than absolute, demand shifts. This is crucial in order to impart accurate information concerning labour demand shifts in the economy, beyond the basic growth rates of employment.

Underlying these race-based shifts are the sectoral flows outlined in Table 1 above. Hence, closer examination of race-employment growth by sector reveals that sectors such as construction and internal trade were particularly important in increasing the demand for African (semi-skilled and unskilled) labour. For White workers, it was high-skill sectors such as financial services, that explain much of the uptake in employment. Conversely the high attrition rate in the public service disproportionately affected African workers and is a core part of the poor relative performance for these workers. Ultimately, while the skills-biased labour demand shifts are not as intensive when examining the sectoral data, the race data suggests that even though some sectors are growing, they are clearly not expanding rapidly enough to absorb the increasing numbers of new entrants entering the labour force.

Table 6 below follows the same reasoning as that of Table 5, this time concentrating on the relative demand performance of male and female workers. It is evident at the outset that there was positive employment growth for both genders, with female workers gaining more than their male counterparts. This trend is reasoned through the sectoral data, which shows that the growth primarily of the Internal Trade sector, significantly benefited women workers. As is to be expected, the rapid rise of financial services was also a boon to female employment. In turn, male workers bore the brunt of the restructuring exercise in the public sector. Hence, while over 100 000 male workers lost their jobs in the sector, for females the figure was under 30 000. A combination therefore of high-growth sectors benefiting female workers equally or more than male employees, and declining sectors disproportionately impacting on males, led to a higher net demand growth for female workers.

Table 6 Employment and EAP Changes, By Gender

	Employment		EAP			
Race	Change	% Change	Change	% Change	Target Growth	Employment Absorption Rate
Male	287545.2	4.94	1205068	16.11	20.71	23.86
Female	676986.8	18.10	1766089	29.63	47.23	38.33
Total	971504	10.17	2980719	22.18	31.19	32.59

As with the race figures above though, it is the relative demand shifts that are important. Hence, we see that while the female employment growth rate outstripped that of males, the male labour force in fact grew less rapidly (16.11%)

than the female EAP (29.63%). In other words, in relative terms, female employment needed to grow much faster than male employment. The desired, or target, employment growth as a result for males was 20.71%, while for females it was considerably higher at 47.23%. The employment absorption rate statistics show though that the relative performance of female workers was better than that of males, with 38.3% of female entrants finding employment, relative to 23.9% of males. Hence, since 1995 not only did female workers do better in absolute terms, but in terms of relative demand shifts, their job growth was superior to male employees.

Conclusions

The above sections have tried to provide a detailed empirical overview of labour demand trends by a series of cohorts. A few trends appear to be emerging in this post-apartheid period. Firstly, in some contradiction to the long-run labour demand analysis of Chapter 1, these results provisionally suggest that most non-primary main sectors of the economy are in fact creating employment. In this first result, the notion of 'jobless growth' for the South African economy, is clearly erroneous. The important caveat to this reasoning though, is that the labour force has simultaneously grown at a higher rate than employment. In net terms then, employment expansion has been relatively poor. In addition, it is evident that across the different sectors, semi-skilled and skilled workers are gaining - a fact contrary to the long-run labour demand analysis, which suggested that it was primarily skilled employees who were gaining. Indeed, some of the sectors, such as Wholesale and Retail Trade, revealed a rise in demand for unskilled workers as well. But the data continues to suggest that skilled workers are still undoubtedly gaining more than those below them in the occupational ladder.

The one result that is directly reflective of state policy is the process of public sector restructuring. It is the set of initiatives that have characterised this downsizing of the sector, which have resulted in some 145 000 jobs being shed over the 5-year period. It is clear then that the key domestic employment shift since 1995, has been the high rate of attrition amongst public sector employees. This would seem to be the dominant trend in explaining a number of the figures observed above. The poor net performance of Africans and male employees all to a large extent reveal a public employer that is attempting to drastically shrink its work force. Indeed, as we will see below, it is the public sector's large absolute

shares of employment that have driven the relative demand shifts at the sectoral level.

Decomposing Relative Sectoral Labour Demand Shifts

The above descriptive statistics have provided a detailed analysis of the growth of employment since 1995, drawing on a set of covariates to illustrate these changes. In addition, the empirical overview tried to be diligent in measuring employment expansion *relative* to the growth of the labour force. This section attempts a more robust estimation of these relative demand shifts. Accordingly, we draw on the relative labour demand decomposition of Katz & Murphy (1992), employed in the long-run analysis of Chapter 1.

Relative Employment Shifts By Occupation, Race, Gender and Education

The tables below represent the results of the decomposition methodology outlined in more detail in the previous chapter. Each of the tables report the shifts as *relative* demand shifts, so trying to capture more accurately the magnitude of net sectoral employment growth, which absolute growth figures tend to mask. Secondly, the tables report the contribution of the between- and within-sector shifts to the total labour demand shift - with the within-sector share represented as a percentage share of the total relative change in employment.

Table 7 below undertakes the decomposition according to occupations[14]. It is evident that the relative demand for unskilled employees, notably operators, skilled farm workers and labourers, declined over the period. Note that because we are measuring relative labour demand trends, we do not have the difficulty of deriving conclusions from absolute growth rates. In turn, managers and semi-skilled staff such as clerks and sales personnel all saw a rise in their demand. This matches well with the notion in the above data of additional hiring of semi-skilled staff in growing sectors such as construction, internal trade and finance. The professional employment along with the figures for technicians may be explaining the decline in employment in the public sector. This is a point worth dwelling on, if only to differentiate between the pure growth rate figures from Table 1 and the *weighted relative shares of employment* that the decomposition technique offers. Thus, while the demand for professionals grew in the public sector in absolute

[14] The 1995 and 1999 data sets report slightly different occupational categories, and hence a consolidated set of occupations was derived to ensure a match between the two data sets.

terms, between 1995 and 1999, over the same period, the *share of public sector professionals* in total professional employment over the period in fact declined. Hence, we find that while public sector professionals were 72.2% of all professionals in 1995, in 1999, they constituted about 63.1% of professionals. This represents a drastic decline over a short period, by the single largest employer of professionals in the economy. It is precisely this dynamic which yields the negative relative demand shift for professionals in the decompositions below. In addition, as a *share of total employment*, public sector employment of technicians fell from 66.4% to 58.9% over the same period - once again a huge act of job destruction in this occupation within the public sector.

In order to try and isolate the impact of this public sector restructuring from the relative demand shifts that may have been occurring elsewhere in the economy, we also ran the decomposition for all the employed, excluding Community, Social and Personal Services. This sector would of course be mainly constituted of public sector employees. This table - Table 7a - is represented below to try and illuminate the extent to which government restructuring has influenced these labour demand results. It is evident, for instance, that the professionals and technicians results are reversed. We see a significant increase in the demand for both these occupations. The relative demand shift for professionals changes from a decrease in Table 7, to the largest increase over the period. A comparison of the data from the two tables therefore clearly illustrates the importance of the public sector in explaining the economy's labour demand shifts over the last 5 years.

Table 7: Industry-Based Relative Demand Shifts, 1995-99, By Occupation

Occupation	Between	Within	Total	% of within
Managers	0.19	3.15	3.33	94.38
Professional	-0.09	-2.50	-2.58	96.64
Technicians	-0.29	-2.38	-2.67	89.07
Clerks	0.29	2.05	2.34	87.71
Sales	0.09	0.71	0.80	88.58
Skilled Agriculture	-0.06	-5.58	-5.64	98.85
Crafts	-0.05	-0.35	-0.39	88.40
Operators	-0.34	-2.68	-3.02	88.78
Elementary	-0.38	-0.86	-1.24	69.44
Unspecified	-0.09	-8.47	-8.56	98.93

Table 7a: Industry-Based Relative Demand Shifts, 1995-99, By Occupation, *excluding community services.*

Occupation	Between	Within	Total	% of within
Managers	0.14	1.90	2.03	93.36
Professionals	0.09	6.48	6.57	98.64
Technicians	0.20	3.76	3.96	94.84
Clerks	0.40	2.11	2.51	84.05
Sales	0.31	1.75	2.06	85.01
Skilled Agriculture	-0.11	-7.21	-7.31	98.54
Crafts	-0.32	-1.82	-2.14	85.20
Operators	-0.65	-3.89	-4.55	85.64
Elementary	-0.91	-1.40	-2.31	60.61
Unspecified	-0.13	-9.33	-9.46	98.63

The real value-added from the decomposition though is its ability to distinguish between-sector forces from within-sector influences in the observed labour demand trends. The evidence from both of the above tables, makes it clear that within-sector forces have been driving employment shifts in South Africa since 1995. The figures show that for all occupations, the share of within-sector forces in explaining overall relative demand shifts far outweighs that of the between-sector forces. For all occupations, barring that of elementary workers, within-sector influences from Table 7 constituted between 88 and 99% of the aggregate labour demand shifts. Hence, the forces of technological change, the greater preference for a specific factor mix and so on, have all catalysed firms into altering their labour demand specifications in a particular manner. Put simply, forces within each sector and firm have been the primary reason for the labour demand changes that have occurred in the period 1995-1999. This decomposition result was observed for the long-run data as well, and hence we see in the estimation here a continuation of this trend. It should be noted that the smaller within-sector share for elementary workers, is picking up the high attrition rate of these workers, in the two primary sectors which in the long-run remain in secular decline.

The decomposition results by race are presented in the table below. Firstly, the tables reflect the poor relative labour demand performance of African and Coloured workers. Hence, in terms of a weighted sectoral relative labour demand performance, these two groups have seen their labour in less demand than those of Asian and White workers. For the latter, their relative sectoral demand increased over the period. Interestingly, the influence of within-sector forces in explaining this shift was dominant for all non-African workers. Hence, within-sector factors

helped explain between 79 and 96% of the aggregate labour demand changes observed for Coloureds, Asians and Whites.

Table 8: Industry-Based Relative Demand Shifts, 1995-99, By Race and Gender

	Between	Within	Total	% of Within
Race				
African	-1.04	-0.56	-1.60	34.87
Coloured	-0.04	-0.33	-0.37	88.14
Asian	0.06	1.56	1.63	96.18
White	0.27	1.02	1.29	79.26
Gender				
Male	-0.88	-0.59	-1.47	40.12
Female	0.13	0.20	0.33	60.19

For African workers however, it was between-sector shifts that were dominant, as they amounted to approximately 65% of the total relative demand shift. There would seem to be two immediate reasons for this. Firstly, the significant losses in the primary sectors of unskilled workers would have disproportionately affected African workers relative to other groups. Secondly, the high attrition in the public sector would also have impacted predominantly on African employees. While some of this public sector restructuring can be captured as a within-sector change, the sector is also declining in terms of its share in national output. For example, between 1995 and 1999, the share of general government services in national output fell from 14.75% to 13.73% (IDC,1995). This shift in output shares has undoubtedly fed into the results reported above for African workers.

The gender figures do somewhat mirror the racial breakdowns. Here, the relative demand for male workers fell, while that of females increased. We see a reflection of the dominance of the African worker employment outcome, where the primary sectors' decline together with the public sector's falling share of output have disproportionately impacted on male African workers. In turn, the share of the within-sector component to overall labour demand shift is 40%, again reinforcing this reasoning. Female employment increased, with the between-sector explanation less dominant. It is likely that the influence of firms' changing production methods which is reflected in the main by the microelectronics revolution and a growing preference for machinery over labour, has resulted in lower entry barriers for women in the workplace. In addition of course, the growth over this short period in the clerical and sales staff occupations in certain sectors, has fed into this higher demand for female employees.

Ultimately though, it is evident that for African and male workers, the between-sector segment of this relative labour demand shift is the dominant factor in explaining their relatively poor performance in the jobs market since 1995. The decline as a share of GDP, and more than likely continued decline, of specific sectors that employ large numbers of African male workers, has induced this outcome. In turn, the dominance of certain sectors, notably the services sectors (excluding general government) has resulted in a disproportionate increase in the demand for female workers as well as Asian and White employees. For these winners though, the key cause for the increased preference for their labour has been the process of firms adopting new technologies as they strive to become internationally competitive. This internal restructuring process has meant, at the sectoral level, that female workers compete more equally for employment with males. Secondly, it does mean that skilled workers who in the South African labour market, tend to be Asian or White, will gain at the expense of unskilled employees. The dominance of the within-sector forces in these results therefore has yielded relative labour demand outcomes which are biased toward female workers and, as a marker for skilled workers, toward Asian and White employees.

Conclusion

The above empirical overview suggests that the South African labour market has been creating jobs. However, it is evident that the rate of job creation has been far below the growth rate of the labour force, irrespective of the covariates that are used to display these facts. Hence, by occupation, race and gender, the data makes it very clear that the number of new entrants outstrips the number of jobs being created for these cohorts. As such then, the domestic economy in this post-apartheid period continues to be a poor absorber of work-seekers generally, but a particularly poor creator of low-end jobs. The second segment of this chapter reapplied the decomposition technique used in Chapter 1, to explain the causes for such labour demand changes. It is clear that the adoption of new technologies has remained as the dominant determinant of the economy's employment trajectory. In addition though, this shorter-run analysis did suggest that production method changes such as greater outsourcing and higher capital stock acquisition, have also contributed to the growing demand for high skilled and semi-skilled workers. The labour market environment South Africa faces in this post-apartheid period, is of a growing demand for skilled workers and in certain instances, semi-skilled workers combined with employment losses for unskilled employees. Overriding these shifts,

has been the dominance of the process of public sector restructuring in explaining the aggregate occupational and other shifts, both according to the simple growth rates and the decomposition methodology. If there is one exogenous factor that marks this period of change in the South African labour market, then it is undoubtedly the impact of the restructuring process in the economy's single largest employer.

Chapter 3: Wage Premia and Wage Differentials in the South African Labour Market

Introduction

The previous two chapters have shown clearly that the demand for skilled and highly skilled workers has increased dramatically since the 1970s, matched by an almost equal decline in the demand for unskilled workers. The chapters however, both fail to account for wages in their analysis. Hence, while Chapters 1 and 2 focused solely on the quantity adjustments that occurred over time in the labour market, this chapter attempts to derive a snapshot of relative prices in the labour market. Given that, to date, no time series of wage data by skill exists for South Africa, this chapter will present a static, yet detailed picture of wages in the labour market. The idea then is for this chapter to utilise the best available data to analyse the role of wages in a skills-constrained, yet high skilled labour growth economy. Utilising OHS95, the chapter concentrates essentially on the degree and extent of wage inequality and the existence of wage premia in the labour market.

Wage Differentials: Descriptive Statistics

The earnings data are all in standard monthly figures. The figures were thus not adjusted to derive earnings per month controlled for hours worked. The reasons for this were that firstly, 92% of the employed worked 35 hours or more in the week preceding the interview[15]. Hence the overwhelming majority of the sample did in fact work full-time. In addition, of those individuals who worked part-time or less than 35 hours, the median hours worked was 25 per week. This means that even for those employed on a part-time basis, the hours worked was quite high. Not surprisingly, the data showed that it was those in the labourer categories, who predominated amongst the part-timers. Yet, even here, the median hours worked was again high, at 21 hours per week. Therefore, given the overwhelming

15 The 35 hour week is used as the cut-off period between full-time and part-time work in the questionnaire.

predominance of full-time work amongst the employed, the decision was to present all earnings data as monthly, without recourse to their hourly equivalents.

Using the OHS95 then, the table below presents the first basic cut of wage data amongst the employed. The employed here refers to those both in the formal and informal sector, who number approximately 10 million individuals[16]. Table 1 shows that the median wage for the economy is about R1400 per month. White median wages are the highest amongst the race groups, while that of male workers is higher than that of females. Interestingly, the median wage of Africans and Coloureds are essentially the same, constituting under a third of the median White income. While the wage for Indians is distinctly above that of Coloureds and Africans, they still remain only about half of the White wage.

Table 1: Median Wages by Race and Gender

Category	Median	Ratio
Race		**% of White**
White	4000	100.0
Asian	2310	57.8
Coloured	1083	27.1
African	1082	27.1
Gender		**% of Male**
Male	1555	100.0
Female	1200	77.2
Total	1400	35.0/ 90.0

When looking at the data by gender, while the male wage is higher, female wages are, at the median, over three-quarters the value of the male wage. The median wage for White females is R2600 and for Asian females, R1600 per month - both higher than the respective medians for African and Coloured males. This basic wage differential data suggests that while the race wage gap is still very strong, the gender wage difference is not as stark. In terms of a wage-driven model of segmentation, there is a decidedly contrasting labour market operating for Africans and Coloureds on

the one hand, and Asians and Whites on the other. This form of segmentation by race is picked up in more detail in the following chapter. The gender differentiation though, appears to be less marked.

The table below extends the wage discussion, by examining median wages according to education categories. The wage structure is of course monotonically linked to the different education levels, with higher education levels associated with increased median wages. This is a result borne out in earnings function analyses done on South Africa and most other economies. It is important to note that even though individuals of all races with a tertiary degree earn the most, their median wage is still below that paid to White workers. This would suggest that race, together with education is still an important predictor of earnings in South Africa. Again though, the labour market in wage terms is segmented quite clearly by education levels: individuals with a matric or degree earn significantly more at the median, than those with a Std. 9 qualification or less.

Table 2: Median Wages by Education Levels

Education levels	Median	% of Tertiary
Tertiary	3500	100.00
Matric	2420	69.14
Std. 6-9	1248	35.66
Sub. A-Std. 5	631b	18.03
No education	501	14.31
Total	1400	40.00

While the matric median wage is close to 70% of the median degree wage, for those with less than a matric their median wage falls by 35 percentage points relative to the highest earner. What is evident is a different labour price attached to those with incomplete secondary education compared to those workers with primary schooling. While incomplete secondary education would yield a median wage that is 36% of the tertiary median, this falls dramatically when individuals have primary schooling or less. There is no significant difference in the median wage for the bottom two

16 Note that this number utilises the weights within the OHS95 data set. Using the Census 96 weights, the employed number approximately 9.4 million. In either case though, the wage data will not be

education categories. We are left then with three distinct wage segments in the labour market: one for those workers with a matric or more, those individuals who have some secondary education and finally individuals who have primary schooling or no education.

Location effects are also important descriptors of wages. Whilst the data is not presented here, urban median wages are of course the highest, followed by peri-urban and then rural wages. The median rural wage is R667 per month, which is approximately 37% of the urban median income. This makes it plain that rural labour markets offer decidedly lower wages than those in urban areas.

The table below presents median wages by nine main sectors, as defined by the SIC system. While the Utilities sector (Electricity, Gas & Water) pays the highest median wage, Financial and Business services, together with Community and Social Services, are essentially at a similar median. The lowest paying sector, by quite a large margin, is Agriculture. This is followed by the Construction sector and then Wholesale & Retail Trade.

Table 3: Median Wages by Sector

Sector	Median	% of Utilities
Agriculture	436	17.36
Mining	1500	59.71
Manufacturing	1500	59.71
Utilities	2512	100
Construction	1212	48.25
Wholesale & Retail Trade	1346	53.58
Transport	2177	86.66
Financial & Buss. Services	2500	99.52
Community services	2500	99.52
Total	1400	55.73

Noticeably, it is the three key service sectors that yield the highest median wages. The discrepancy between the two primary sectors is partly, though not solely, a function of different union density figures in the two sectors, with the mining industry being highly organised. An interesting switch

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altered.

occurs in the primary sectors when looking at the wage data: while these two sectors are relatively low-paying, White workers in these sectors have the highest median wage across all sectors for all race groups. The race figures also show that across all sectors the median wages of Africans and Coloureds are very similar, while the sector differential for Asians and Whites is smaller. The Community Services sector reflects primarily public sector employees, and this result reinforces the notion of the sector being a relatively high-wage employer.

No descriptive wage statistics would be complete without examining median wage data by occupations. Occupations here are classified according to the International Standard Occupational Classification (ISOC) system. The usefulness of the OHS95 data set is that we are able to divide the labourer categories into greater detail, hence the tabulations show six different unskilled categories. The table also presents the wage data by race, as this elicits some interesting comparisons across occupations. Note that domestic helpers, in the language of the survey, refer to domestic helpers and cleaners, helpers and cleaners in offices, hotels and other establishments and hand launderers and pressers. In other words, Domestic Helpers do not encapsulate domestic workers in private households, as these individuals are coded separately.

Looking at the total column, the wage structure is fairly predictable, with the highest median earners being managers, followed by professionals and then skilled agricultural workers. The lowest earners are domestic workers, followed by farm workers and then labourers in the mining industry. Note though that the median wage of labourers in the mining industry is still over twice as much as that earned by farm labourers as well as domestic workers. This yields the fact that the two groups of most indigent workers in the labour market are domestic workers and farm labourers - something that will be expounded on in much greater detail through the remaining chapters in this thesis.

Table 4: Median Wages by Occupation and Race

Occupation	African	Coloured	Asian	White	Total	*% of Managers (Total)*	*African as % of White*
Managers	1887	2650	N/O	4500	5400	*100*	*41.9*
Professionals	2646	3000	5000	7500	4670	*86.48*	*35.3*
Skilled agriculture	3379	4000	5433	6588	3724	*68.96*	*51.3*
Technicians	2646	3085	3500	4670	3180	*58.89*	*56.7*
Armed forces	1600	1500	2000	2500	2177	*40.31*	*64.0*
Clerks	1249	1200	1600	2500	2000	*37.04*	*50.0*
Craft	755	1100	3333	6612	1625	*30.09*	*11.4*
Services & sales	1200	1346	2000	4500	1438	*26.63*	*26.7*
Machine operators	1280	1200	1500	3283	1323	*24.5*	*39.0*
Transport Labourer	1140	950	900	4667	1115	*20.65*	*24.4*
Manuf. labourer	1000	900	1325	2000	1000	*18.51*	*50.0*
Domestic helpers	975	800	1250	1100	950	*17.59*	*88.6*
Mining labourer	900	800	1520	2600	900	*16.67*	*34.6*
Agric. Labourer	400	464	257	1346	420	*7.78*	*29.7*
Domestic worker	380	360	750	750	380	*7.03*	*50.7*
Unspecified	1150	1900	1500	4057	1399	*25.91*	*28.3*
Total	1082	1083	2310	4000	1400	*25.93*	*27.1*

The race data for the individual occupations do though reveal some interesting trends. Taking the unskilled categories first, there is a strong differentiation in wages by occupation[17]. For example, even though both African and White individuals may be coded as Manufacturing labourers, the median wage of the former is only half that of the latter. In fact, for all the labourer categories, it is clear that African workers are paid significantly less than their White counterparts. While this may be raised as serious evidence of continued discrimination in the labour market, closer inspection of the data reveals that for all these unskilled categories, White workers constitute less than 2% of the employment shares. We are in essence then, talking of a very small share of workers, and it is likely that the discrepancy in wages will be a function of continued discrimination, differing levels of experience, higher number of schooling years and so on. Ultimately though, the apparently stark contrast in median wages at the bottom-end can be ignored, given the insignificant number of white employees being considered.

[17] Unskilled occupations refers to Transport, Manufacturing, Mining and Agricultural labourers, together with domestic workers and domestic helpers.

For the semi-skilled and skilled occupations, the median wage differential between Africans and Whites remains[18]. In this case, the share of African employees is significant, ranging from 35% of professionals to 76% of machine operators in the economy. Hence, the differential that persists within these semi-skilled and skilled occupations does not pertain to an insignificant share of African workers. The data then delivers an intriguing puzzle: Why is it that while formally coded together as skilled or semi-skilled, African workers earn consistently less than their White counterparts? For example, an African professional will earn a median monthly wage of R2646, while a White professional will earn over twice as much at R7500 per month[19]. We know from work done on earnings functions that 'observable' variables such as education, experience and location may account for these differences within the occupations. Descriptive statistics however, cannot be used to effectively account for the contribution of each of these variables in explaining the differentials by occupations. We therefore utilise regression analysis, as contained in the earnings function literature, to explain the precise causes of the wage differentials by occupations.

Modelling Occupation-Level Wage Differences by Race

The approach taken here is to determine in a multivariate framework, what factors may help explain the differing wages of African and White employees within the same occupations. While we know of course that factors such as education and experience are important determinants, the optimal way of measuring the relative simultaneous strengths and contributions of these variables, is to estimate different earnings functions. We estimate two earnings functions for each of these two race groups. The first is a skilled worker earnings equation for Africans and Whites, and the second a semi-skilled equation for the same two race groups. Skilled workers here, based on Table 4, refer to workers categorised as managers, professionals and technicians. Semi-skilled workers cover clerks, service & sale workers, machine operators and craft workers. In total then, four regressions are run, two within each skills band.

[18] Semi-skilled occupations refers to machine operators, service and sales employees, craft workers, clerks, armed forces, technicians and skilled agricultural workers. Skilled workers are those classified as managers and professionals.

[19] It is also important to remember that the total wage differential between races reflects a combination of differentials within the broad occupational categories as well as the particular occupational mix.

Following the standard methodology, we estimate the 'observable' determinants of log wages, by estimating using Ordinary Least Squares (OLS) the following generic equation:

$$y_i = X'_i\beta + \varepsilon_i \quad (1)$$

Where y_i is the dependent variable, log of wages by individual *i*, and X'_i is a vector of independent variables that are modelled to be determinants of the individual's earnings and measured in the regression through a vector of coefficients, ß. The term, ε_i is the residual, where it is predicted that $E[e_iX'_i] = 0$, or that the residual will be uncorrelated with the regressors.

Specifically, our explanatory variables are made up of the following:

- Gender (where male is the referent variable)
- Location (where rural is the referent variable)
- Province (where the Western Cape is the referent province)
- Sector (where Agriculture is the referent sector)
- Education
- Union Status (where being a non-unionised worker is the referent)
- Experience
- Hours worked

The education variable is divided into three categories, namely those with Std. 5 or less (Primary); those with some secondary schooling, including a matric (Secondary); and finally individuals with tertiary education. Given that we convert these education categories into splines, there is no need for a referent education level. Experience is calculated as the age of the individual minus the number of years of education, less 6. This assumes that a worker begins working immediately after completing her education, and that the age of school completion will be schooling years plus 6. In essence it is a proxy for experience, rather than reflecting actual years of experience, given that data on actual experience is very hard to collect, and almost always absent in household survey questionnaires. The hours of work variable is important as it acts as an additional controller for using

monthly earnings rather than hourly equivalents. In this respect the variable will represent the impact of an additional hour worked on wages earned.

Regression Results for Skilled Workers

The table below presents the results from the earnings equation estimation on skilled workers. The Heckman selection bias correction was not utilised here or in the semi-skilled regressions, given that the probability of sample selection bias for very specific segments of labour market individuals as these, was unlikely. Indeed, regressions run for each of the occupations individually by race, using the Heckman correction technique, yielded an insignificant lambda term throughout, suggesting that no selection bias was present. Standard OLS regressions were therefore run for the four sub-samples above.

Table 5: Earnings Function Results for Skilled Workers

Dependent Variable: Log of Monthly Wages		
Variable	**African**	**White**
Female	-0.151**	-0.491**
Urban	0.055	0.050
Primary	0.037*	0.010
Secondary	0.122**	-0.004
Tertiary	0.159**	0.256**
Eastern Cape	-0.040	-0.084
Northern Cape	-0.39	-0.150
Free State	-0.238*	-0.126
Kwazulu-Natal	-0.099	0.080
North-West	0.026	0.081
Gauteng	0.130	0.200**
Mpumalanga	-0.104	-0.138
Northern Province	0.181	0.015
Mining	-0.176	0.225
Manufacturing	-0.061	0.436**
Utilities	0.163**	0.348**
Construction	-0.052	0.204
Wholesale & Retail Trade	-0.044	0.288**
Transport	0.219**	0.374**
Finance	0.331**	0.232**
Community Services	0.101	0.343**
Union member	0.036	-0.086*
Experience	0.035**	0.076**
Experience ^{2}	-0.001**	-0.001**
Log of Hours p.m.	0.286**	0.494**
Constant	5.086**	4.777**
No of Observations	2663	2536
R-Squared	0.221	0.345
F Statistic	29.72	58.23

**: Significant at the 1% Level.

*: Significant at the 5% Level.

Examining the skilled occupation results, it is clear that the important variables are education, experience and hours of work. The education splines for skilled Africans are all significant, with the latter two splines significant at the 1% level. In addition, higher levels of education are associated with higher internal rates of return. Hence a skilled African worker will earn 16% more from an additional year of tertiary education, compared to a return of 4% for those with primary education or less. The difference with White skilled workers is immediately evident though, given that it is only the tertiary education spline here that is significant (at the 1% level) and that the coefficients for lower levels are negligible. In other words, for White skilled workers, the rate of return to education is only affected, once they attain tertiary levels of education. The rate of return to tertiary education is 26%.

In the first instance then, the significance of the two sets of coefficients may result from the fact that the educational distributions of African and White skilled workers are different. White skilled workers appear to be concentrated at the top-end of the education spectrum, while African skilled workers are distributed more evenly across the education levels. While 36% of all white skilled workers have at least a matric, the figure for skilled Africans is only 21%. These results suggest that the first key reason for the wage differentiation between African and White skilled workers, is the higher absolute levels of education amongst White skilled workers, compared to skilled African employees.

A second important deduction from the results, is that the rates of return on the tertiary education variable are higher for Whites than Africans. Hence, while Whites can expect a 26% return on each additional year of tertiary education, for Africans the figure is only 16%. This is surprising given that previous regression results have noted a higher return for Africans instead (Schultz & Mwabu,1998). This higher return for Africans was argued as being due to the lower supply of African high-education workers, resulting in a wage premium on these rationed workers (Schultz & Mwabu,1998). However, these results did not divide the workforce into skills categories, and furthermore did not include any sector or provincial dummies. These two factors may explain, in terms of model specification, the different results obtained. How, though, do we explain the higher return on education for skilled White employees in the particular specification used here?

It is possible that there is a quality differential that is actual and also perceived by prospective employers. Hence, the quality of a tertiary degree obtained by African workers may be lower than that obtained by White graduates. The differential in quality would be a function primarily of the contrasting resource allocation between historically white universities (HWUs) on the one hand and historically black universities (HBUs) on the other. With the latter attracting a disproportionate share of the state's annual allocation, the quality of the degrees produced would be higher. These quality differences in turn, translate into a higher return for White workers who are the majority of students at HWUs. The differential may be reinforced at the point of job entry, where employers perceive

a HWU degree to be of higher quality than a HBU degree, so perpetuating the skilled wage gap through providing higher returns to White employees.

A further reasoning for the different rates of return, revolves around the notion that the tertiary degree is a heterogenous product. In other words, not all human capital accumulation at the tertiary level will result in the same labour demand responses from firms. Simply put, labour demand trends may indicate a demand for say computer-related or engineering-related degrees above all others. There is a probability that African skilled employees are disproportionately accumulating human capital in areas where labour demand is lower. Such human capital will therefore be rewarded at different rates - as based on firms' labour demand specifications. The table below presents important evidence in this regard. Using the skilled occupations, and breaking them down beyond the categories provided in Table 4 above, the table below illustrates that there has clearly been contrasting patterns of human capital accumulation amongst skilled African and White workers.

Table 6: African and White Skilled Employment: Selected Occupations

African	% of Total Skilled Share	White	% of Total Skilled Share
Primary education teaching professionals	17.55	**General Managers**	16.53
Other teaching associates	14.37	**Finance & Sales Associate Professionals**	10.23
Nursing & midwifery	10.09	**Physical & engineering science technicians**	8.95
Total	100.00	**Total**	100.00

The table presents the three largest skilled occupation shares for Africans and Whites. It is clear that African employees are represented primarily in teaching and nursing occupations. In contrast, white employees are represented in managerial, service professional and scientific professional occupations [20]. This matches with the labour demand trends observed in Chapters 1 and 2, which indicated that there was a significant rise in the share of the service sectors in national employment. It is in these sectors primarily, that the three largest white skilled occupations will be located. In contrast, while there is no doubt a need for

20 The managerial staff refers to general managers in all nine main sectors of the economy. The Finance and Sales Associate Professionals refer to individuals such as securities and finance dealers and brokers; insurance representatives; estate agents and so on.

skilled individuals in the education and health industries, labour demand trends did not suggest a larger relative increase in the need for these labour types.

The above has made it clear that the educational coefficients for African and White skilled workers underpin some important labour market information. These are firstly, that skilled African workers are on average less educated than skilled White workers. Secondly, that the higher returns to tertiary education reveal a perceived and actual quality differential in African and White educational qualifications. Finally, more detailed divisions of the skilled band indicates that White workers are found predominantly in occupations which yield much higher wages (and therefore higher rates of return on education), given that these skill types are in high relative demand in the labour market.

The sector dummies support the above education coefficient results. For African skilled workers, it is only individuals in the Transport and Finance sectors who are likely to earn more than those in Agriculture. Hence, being in the other sectors for skilled Africans, is not in and of itself a significant contributor to earnings. For skilled White workers on the other hand, all sector dummies, barring that of Utilities, Construction and Mining are significant and relatively large.

The experience coefficients are significant at the 1% level for both race groups. This suggests that for each additional year of experience, both skilled groups will see their earnings rise. However, the return on an additional year of experience is greater for White workers than African workers. The log of hours worked coefficient is also significant at the 1% level for both race groups. Again though, the wage return to an increase in the percentage of hours worked is far greater for Whites (49.4%) than Africans (28.6%), with the return to the former being almost twice as large.

A final interesting result from the skilled regression is the gender dummy. For both race groups, being a female skilled worker reduces the wage earned. However, it is interesting that while being an African female reduces earnings by about 15.1%, the figure for Whites is over three times as large - at 49%. At the margin then, the lower return for White skilled females in fact serves to reduce the overall differential between African and White skilled workers.

Regression Results for Semi-Skilled Workers

When examining the regressions results for semi-skilled workers, it is clear that the same variables are important determinants of the differential wages paid to each of the race groups. In the equations below, the occupation 'skilled agricultural worker' was excluded, given that its categorisation is an odd one, and difficult to define and attach to specific work activities. A detailed look at the category shows for example, that hunters and trappers are combined with dairy and livestock producers.

Table 5: Earnings Function Results for Semi-Skilled Workers

Dependent Variable: Log of Monthly Wages		
Variable	**African**	**White**
Female	-0.309**	-0.373**
Urban	0.128**	0.002
Primary	0.039**	-0.074
Secondary	0.128**	0.137**
Tertiary	0.017	-0.031
Eastern Cape	-0.011	-0.064
Northern Cape	-0.074	-0.138
Free State	-0.165**	0.010
Kwazulu- Natal	0.128**	0.050
North-West	0.144**	0.037
Gauteng	0.205**	0.163**
Mpumalanga	0.139**	0.089
Northern Province	0.205**	-0.004
Mining	-0.835**	-0.047
Manufacturing	-0.129**	0.249**
Utilities	-0.168**	0.091**
Construction	0.166**	0.106
Wholesale & Retail Trade	-0.261**	0.144**
Transport	-0.252**	-0.125**
Finance	0.070*	0.088*
Community Services	-0.063	-0.033
Union member	0.180**	0.147**
Experience	0.034**	0.056**
Experience ^{2}	-0.000**	-0.001**
Log of Hours p.m.	0.042*	0.516**
Constant	5.896**	4.629**
No of Observations	7396	3179
R-Squared	0.362	0.221
F Statistic	157.59	72.74

**: Significant at the 1% Level.

*: Significant at the 5% Level.

The results show, in the first instance, that the urban variable is significant at the 1% level for semi-skilled African workers, but not for Whites. In other words, being

in an urban area will cause the earnings of African semi-skilled employees to rise (by about 12.8%), while for Whites the coefficient of the location variable is small and insignificant. The data reveals that amongst the semi-skilled, while 63% of Africans are in urban areas, 93% of Whites work in urban labour markets. This suggests that due to the large proportion of rural semi-skilled African workers, location is a significant determinant of earnings for these workers.

The education variables are different from the skilled earnings equations, in that the tertiary spline is insignificant. Given that we are examining semi-skilled workers, with lower mean levels of education, this is not a surprising result as few semi-skilled workers have a tertiary qualification. Low returns to primary education and the fact that the data shows that while 23% of semi-skilled Africans have only primary schooling, while fewer than 1% of Whites are in this category, explains the differential semi-skilled median wages reported in Table 4 above.

In terms of secondary education, both coefficients are significant, with African workers reporting a slightly lower rate of return[21]. Hence for each added year of secondary education, African semi-skilled wages increase by 12.8%, while for Whites, the figure is 13.7%. Differential rates of return on education are therefore an important reason again for the higher median wages of White semi-skilled workers, although the differential is not as great as the skilled coefficients. The descriptive statistics indicate that of semi-skilled Africans, 21.2% have a matric, while 54% of White semi-skilled workers have this qualification. Put differently, the relatively higher qualifications amongst secondary school Whites, partly accounts for the education variable's contribution to the overall differential. In addition though, the quality of schooling is relevant in explaining the different returns. As with the discussion for skilled workers, there may be actual and perceived quality differences that contribute to the higher White rates of return.

The union variable is significant at the 1% level for both races. The union wage effect is larger for unionised Africans than Whites, increasing wages by 18% for the former, and for the latter by about 15%. The experience coefficient also shows different rates of return. For African semi-skilled workers, every year of experience provides a 3.4% return, while for Whites it is 5.6%. Again, however, the

21 It is important to note that for Africans there is an increase in the returns to education when moving from primary to secondary schooling, to the value of about 9 percentage points.

differences are not dramatic. The hours of work coefficients, however are very different. The results show that for a percentage increase in the hours worked, African semi-skilled earnings increase by about 0.04%, while for Whites, the figure is 0.52%. This is an extremely large differential, and one that is, at first glance, difficult to explain. The major employment distributions within the semi-skilled band may provide possible clues. The employment distributions indicate that the largest share of White workers are secretarial staff and keyboard operators. It is possible that this cohort of workers work more on an hourly rate basis, so hiking the returns to hours worked. Hence, the predominance of part-time work amongst this group may be dominating the log of hours coefficient, so explaining the large discrepancy[22].

Finally, as with the skilled regressions, the gender dummy is significant and negative at the 1% level for both races. Again though, the wage reduction for being female is larger for Whites than Africans. White semi-skilled individuals will see their wages drop by 37% if they are female, while for Africans, the figure is 31%.

Ultimately, the wage differentials for semi-skilled workers would seem to be a function of both differential rates of return to education and lower levels of human capital amongst African workers. In addition, the larger share of African workers in rural areas also serves to decrease the median semi-skilled wage. The union variable contributes a little to narrowing the semi-skilled wage gap, while the experience variable is important, yet not highly significant, in widening the differential. In turn, the log of hours worked seems to be key in explaining the wage gap between the semi-skilled cohorts[23]. The gender and union variables however, combine to reduce the wage gap between the two race groups, although of course the reduction is ultimately marginal.

The above has tried to interrogate the possible causes of wage differentials between Africans and Whites within what are ostensibly the same skill bands and

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22 Interestingly, the employment distributions for African and White semi-skilled workers are very similar, with the two of the three largest occupations being the same, namely protective service workers and shop salespersons & demonstrators.

23 As is no doubt apparent, the sector dummies are negative in many cases. With Agriculture as the referent sector, this is of course very puzzling particularly in the case of Africans, where most of the coefficients are negative. The only plausible explanation is that outliers in the sample are coded as being in Agriculture, and are earning very high wages.

categories[24]. The results show that for both skilled and semi-skilled categories, education is the key explanatory variable for the wage differential - either in the form of internal rates of return or absolute levels of human capital. In addition, both the levels of experience of White workers and the hourly return rates contribute to the overall White-African differential. Although less robust, results show that the gender dummy and the union status variable, in certain cases, may affect the overall wage gap between the races.

Wage Distribution Patterns

While the above is very useful as a discussion of median wages and wage differentials, we still exclude a picture of the entire wage distribution. The purpose then of this section, is to try and disentangle the wage distribution, at the percentile level, to try and gain a more naunced picture of wage premia and wage differentials in the South African labour market.

We utilise in the first instance the log of hourly wages as our unit of analysis, and then proceed with calculating from the OHS95 sample, the 10^{th}, 50^{th} and 90^{th} percentiles for each specified wage distribution. We then determine the differences in these logged hourly wages at different points in the distribution. Specifically, the results presented here are for levels of wage inequality between the median worker (50^{th} percentile) and the 10^{th} percentile worker, expressed as the log (50^{th} - 10^{th}); the 90^{th} and 50^{th} percentile wage earner, log(90^{th}-50^{th}); and finally the 90^{th} percentile earner as opposed to the 10^{th} percentile earner - log(90^{th} - 10^{th}). Internal consistency is ensured through the relationship: log (90^{th} - 10^{th})= log(90^{th} - 50^{th}) + log(50^{th} - 10^{th}).

Table 6 below thus calculates a set of log wage percentile differentials by race group. Looking across the race groups, and the total column, clearly the largest wage gap is for the 90-10 differential, as it represents workers at the top-end and bottom-end of the labour market. There are however interesting aspects relating to the remaining two percentile differences, specifically the 90-50 and 50-10 differentials. The former would represent those workers at the top-end of the

[24] This is important given that firstly, we do not have a large enough sample size to disaggregate the semi-skilled categories to a more detailed level. This may yield particularly different distributions of employment for the two race groups, similar for example to the skilled worker differentiation. Secondly, there will always be a distinction between these specific occupational categories and their application as a 'job category' within a firm that may very well render the title 'semi-skilled' as inaccurate.

distribution relative to those at the median of the distribution, while the latter compares the median to the bottom-end wage earner. Given that these are wage gaps around the median, equal values for these differentials would indicate an even (log-normal) distribution of earnings across the distribution - specifically between workers in the top-half of the distribution and the bottom-half. Deviations from this result, would be suggestive of imperfections of some form in the labour market.

The aggregate column suggests firstly, that inequality in the bottom-half of the distribution is in fact greater than in the top-half. Put differently, the 50-10 differential is greater than the 90-50 differential. Within race groups, the results contrast. For Africans and Coloureds the 50-10 differentials are greater than the 90-50 gap, while for Asians and Whites, the opposite is true. For example, for Africans the 90-50 figure is 1.18 and the 50-10, 1.39. The figures for Whites are 1.01 and 0.96 respectively. There seem to be two different processes at work here, when comparing African and Coloured, relative to Asian and White, workers. In the former case, there is evidence of very low earnings at the bottom-end of the distribution, which results in higher levels of inequality below the median relative to above the median. The extremely low earnings of African and Coloured workers, explored in greater detail in the following two Chapters, serves to widen the gap between these 10^{th} percentile workers and those earning at the median. In particular, it also points to which segment of the wage distribution is driving overall inequality amongst African and Coloured wage earners. The White and Asian results in all probability indicate the existence of a wage premium for those workers in the 90^{th} percentile, given their scarce supply - a premium that is not operative to the same degree for those at the median, when compared with the 10^{th} percentile earners. Put differently, the scarce supply of skilled Asian and White workers leads to a significant wage premium on their labour, so resulting in a greater degree of inequality in the top-half of the wage distribution[25]. Whilst the data is not presented here, these contrasting differentials also extend to the figures for the 75^{th} - 50^{th} and 50^{th} - 25^{th} percentiles, where the former outweighs the latter across the two race groups.

[25] Evidence for the US labour market for example, show that the 90-50 differential is 0.66, while the 50-10 is 0.80 for 1988 (Juhn, Murphy& Pierce, 1993), indicating a reversal of the Asian and White results but a concurrence with the African and Coloured figures. We deal with these international comparisons in more detail below.

Table 6: Percentile Differentials for Log of Hourly Wages, by Race

Percentile Differentials	Africans	Coloureds	Asian	White	Total
90 – 50	1.18	1.16	1.07	1.01	1.31
50 – 10	1.39	1.18	0.92	0.96	1.46
90 – 10	2.56	2.34	1.98	1.97	2.78
Std. Dev.	*1.0139*	*0.9063*	*0.8718*	*0.8530*	*1.1161*
Sample	*18529*	*5346*	*1550*	*6269*	*31694*

Note: Standard Deviations assume frequency weights, and sample size reported is unweighted.

The comparisons of percentiles across race groups also yield very interesting results. Across all the percentiles, it is clear that the degree of inequality is greatest amongst African workers, followed by Coloured workers. The inequality ranking amongst Asian and White earners varies across the percentiles, but in essence remains smaller than those of Africans and Coloureds. In terms of wage inequality levels then, there would appear to be greater wage compression amongst Asian and White workers than African and Coloured employees. Previous work has alluded to the existence of a segmented labour market, where the characteristics of Coloureds and Africans, were argued to be distinct from those of Asians and Whites (Bhorat & Leibbrandt,1999). This data adds a further supply characteristic that corroborates this evidence. The 90-10 differentials most aptly captures the higher level of wage inequality amongst Africans and Coloureds. Comparative evidence on households indicates the importance of the wage as a marker of overall inequality and secondly, that within-group inequality is driving overall inequality (Leibbrandt, Woolard & Woolard, 1996). The evidence garnered here would appear to support both these claims.

The table below disaggregates the percentile measures by gender. In addition, the 90-50 differential for both males and females is smaller than the 50-10 differential. Interestingly though, the level of wage inequality at the 90-50 differential is greater amongst males than females, suggesting that the premium for male wage earners at the top-end is larger than that for female employees. Conversely, there is greater wage compression at the 50-10 differential amongst male employees. However, within each of the genders, the 50-10 differential remains larger than the 90-50 log wage inequality.

Table 7: Percentile Differentials for Log of Hourly Wages, by Gender

Percentile Differentials	Female	Male	Total
90 – 50	1.20	1.36	1.31
50 – 10	1.61	1.43	1.46
90 – 10	2.81	2.79	2.78
Std. Dev.	*1.1034*	*1.1061*	*1.1161*
Sample	*12862*	*18832*	*31694*

Note: Standard Deviations assume frequency weights, and sample size reported is unweighted.

Combining the results of Tables 6 and 7, overall inequality in the wage distribution is driven more by the differences between the 50th and 10th percentile worker than between those in the top-half of the distribution, for Africans, Coloureds and for both genders. Put differently, the significant share of very poorly paid workers within these cohorts, results in higher wage inequality in the bottom-half of the distribution. Ultimately then, the wage gap in this portion of the distribution helps explains a disproportionate share of aggregate wage inequality in the South African labour market. The differences across genders indicates that there is greater overall inequality amongst females than males. Specifically, the 90-10 differential for females is higher than that for males.

Table 8 below attempts to determine the combined contribution of race and gender to the inequality observed separately above. The table makes it plain the highest degree of inequality amongst the employed, as measured by the 90-10 differentials, emanates from African and Coloured workers of both genders - a corroboration with the race figures in Table 6. The data shows that the highest level of wage inequality are for African female workers (2.79) followed by Coloured females (2.42). The next highest level of inequality is found amongst African and Coloured males respectively. This reinforces the results from Table 7, suggesting that the higher female inequality levels observed at the 90-10 level, is being driven primarily by within-group African and Coloured female wage inequality.

Table 8: Percentile Differentials for Log of Hourly Wages, by Race & Gender

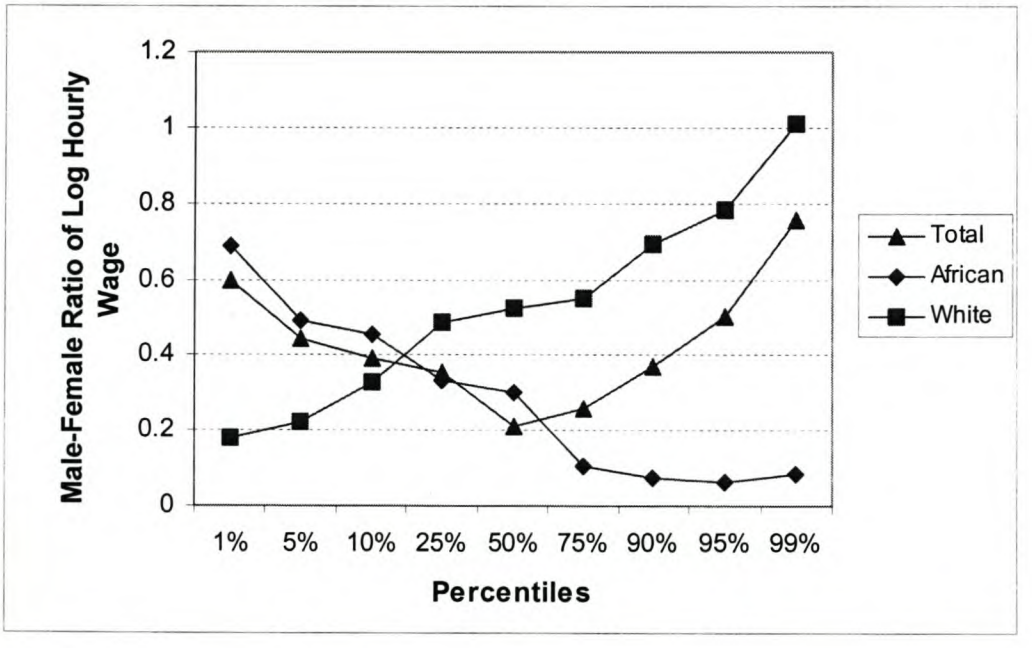
Percentile	Africans		Coloureds		Asian		White	
Differentials	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*
90 - 50	1.32	1.10	1.10	1.11	1.08	1.11	0.81	0.98
50 – 10	1.47	1.31	1.31	1.17	0.85	0.94	0.80	1.00
90 – 10	2.79	2.41	2.42	2.28	1.93	2.05	1.61	1.97
Std. Dev.	*1.0928*	*0.9491*	*0.8923*	*0.9057*	*0.7694*	*0.8864*	*0.7217*	*0.8651*
Sample	*7551*	*10978*	*2334*	*3012*	*508*	*1042*	*2469*	*3800*

Note: Standard Deviations assume frequency weights, and sample size reported is unweighted.

The remaining results confirm the race-based figures of Table 6. Hence we see that for Africans and Coloureds of both genders, the 90-50 differential is lower than the 50-10 differential, indicative of the high share of low earners in all these wage distributions. In contrast, Asian and White workers yield a higher 90-50 differential relative to the 50-10 differential. This confirms the evidence that for these race groups, the shortage of high skilled workers at the top-end engenders a premium for the 90th percentile worker, so driving greater wage inequality in the top-half of the distribution.

All the above figures of course are intra-gender measures of inequality, and thus do not explicitly present evidence on the level of gender inequality in the wage distribution. A more concrete way of assessing male-female differentials therefore is to look at the wage gap between the genders, at the same percentile levels. In other words, examining the 90-90, 50-50 and 10-10 percentile differentials for males versus females will provide detail on the extent of gender wage differences. The figure below provides clear evidence on these gender differences. What the figure measures is the male-female log wage differential at each percentile. This is in turn measured for the national sample (Total), African and White workers.

Figure 1: Male-Female Logged Hourly Wage Differentials, by Percentile of Wage Distribution (Total, African and White)



The three figures all contrast sharply. The White wage distribution reveals that at every percentile level, the male wage outstrips the female with the inequality measures ranging from 0.18 to 1.01. Put differently, what this suggests is that for White workers at higher percentile levels, the degree of inequality between males and females is greater. In other words, inequality levels for the 90-90 percentile differential is higher than that observed for the 50-50 percentile differential, which in turn exceeds the 10-10 gender differential. What the data for the sample of White workers suggests then is that not only is there a higher wage paid to men over women at every point in the distribution, but that this differential is greater at higher levels in the wage distribution.

The African wage distribution however, is almost the inverse of the White sample. It is clear, graphically, that for the African cohort, gender wage inequality is highest at the lowest end of the distribution, and lowest at the highest end of the distribution. In terms of the data, the 10-10 differential for African males versus females is 0.45, while the differential at 90-90 is 0.09. Clearly then, gender inequality amongst the African workforce is heavily influenced by the differences that exist between the genders at the bottom-end of the distribution, rather than the top-end. Indeed, gender inequality amongst high earning African workers appears to be almost non-existent.

The national measure for gender inequality for all races illustrates that there remain high levels of wage inequality at the bottom and top-end of the distribution, with however marginally higher levels remaining at the 10th (0.39) relative to the 90th percentile (0.36). The data though is a reminder that for the national employed population, high-end gender wage inequality remains an important contributor to overall gender wage inequality.

Table 9 below provides the percentile differentials by education categories. Looking at the 90-10 differences, it is evident that the level of wage inequality is monotonically related to the level of education. Hence, the highest level of wage inequality is found amongst the employed with no education, and the lowest amongst tertiary educated workers.

Table 9: Percentile Differentials for Log of Hourly Wages, by Education Level

Education	90--50	50--10	90-10	Std. Dev	Obs.
No education	1.22	1.12	2.34	0.9818	3019
Primary	1.08	1.14	2.22	0.9191	7795
Incomplete Secondary	1.07	1.14	2.21	0.8868	9419
Matric	0.98	1.00	1.97	0.8582	6480
Tertiary	1.01	0.92	1.92	0.8486	4981
Total	1.31	1.46	2.78	1.1161	31694

Note: Standard Deviations assume frequency weights, and sample size reported is unweighted.

The percentile differentials within the extremes of the distribution, reveal interesting contrasts. Hence, the figures show that the 90-50 differential is greater for the employed with no education and a tertiary qualification. The national result, namely that the upper-half differential is lower than the bottom-half, is replicated for the remaining differentials. The tertiary results in particular suggest that while individuals may formally have degrees or diplomas, the type of qualification it is, the field of study, the institution from which the qualification was obtained, and discrimination from employers, may perhaps all serve to segment the returns to this same level of education. The heterogeneity of the cohort with no schooling may be picking up the importance of experience that results in a premium offered to those workers at the top-end of this specific distribution.

An interesting addition to this differential analysis, is to examine the degree and extent of inequality at the sectoral level. We thus present the three sets of wage differentials at the main sector level in Table 10 below. The 90-10 differentials indicate that the highest levels of wage inequality are found in the Community Services sector (2.79), followed by Construction (2.53). The lowest levels of inequality, as measured by the 90-10 differential, are in Transport, Electricity and Agriculture. The most surprising result at first glance is that of Community Services, where the dominance of the public sector should have resulted in low levels of wage inequality. The sector in these results though, captures most of the economy's domestic workers, who are of course very low earners. Hence, the high 90-10 differential is picking up these domestics in the sector. To test for this, we have included the 90-10 differential for Community Services, excluding domestic workers. It is clear that the level of inequality falls significantly from 2.79 to 2.18, with the sector then placed as one of the more equal main sectors in the economy.

Table 10: Percentile Differentials for Log of Hourly Wages, by Main Sector

Sector	90--50	50--10	90-10	Std. Dev	Obs.
Agriculture	1.25	0.88	2.13	1.0426	5000
Mining	1.32	0.87	2.19	0.8378	1369
Manufacturing	1.20	1.01	2.21	0.9094	4211
Electricity	1.07	1.04	2.11	0.8254	303
Construction	1.47	1.06	2.53	0.9977	1486
Wholesale	1.35	1.14	2.49	1.0403	5465
Transport	0.98	0.95	1.93	0.8480	1396
Financial Services	1.26	1.03	2.29	0.9189	1699
Community services	1.10	1.69	2.79	1.1241	10765
Comm. Services (excl. domestic workers)	0.95	1.24	2.18	0.8839	8144
Total	1.31	1.46	2.78	1.1161	31694
Total (excl. Community Services)	1.38	1.38	2.76	1.1121	20929

Note: Standard Deviations assume frequency weights, and sample size reported is unweighted.

The 90-50 and 50-10 results are extremely interesting. The data reveals that for all of the main sectors, with the exception of Community Services, the 90-50 differential is greater than the 50-10 differences. The percentile differentials indicate that sectors with high-skill factor proportions, such as Financial Services and Electricity, are rewarding top-end employees far more than in other sectors. This reflects the extreme shortages in the labour market for these skill types, which manifest then in significant wage premia. In addition the differences in the 90-50 differentials across the main sectors suggests that the suite of skilled workers demanded sectorally, do not represent supply shortages of the same magnitude. Ultimately, one of the lessons from this analysis is that different sectors demand skilled workers not only in different quantities, but also of different characteristics. This means that sectors will not only reward skilled workers differently, but also reward them according to their shortage in the market.

But perhaps the more pressing concern from the figures is that contrary to the race, gender and to some extent, education results above, the 90-50 inequality measures in most cases outweigh the 50-10 inequality measures - so reflecting on a significant shortage at the top-end of these sectoral labour markets. The outlier is the Community Services sector, which reports a higher differential in the bottom-half of the wage distribution, reflecting, as we alluded to above, the large number of low (mainly domestic worker) earners in this sector. However, even when domestic workers are excluded from the distribution, the results show that the 50-

10 differential remains greater than the 90-50, although the differential is narrower. Indeed, as a result of this, when Community Services are excluded from the national distribution we see that wage inequality, at 1.38, is exactly equal around the median.

The above result is critical in that it suggests that most of the higher differential in the 50-10 percentiles across race and gender, are being driven through the Community Services sector, with the key drivers here being the public sector and domestic workers. It is the extremely low earnings amongst domestic workers, together with a large cohort of low earners in the public sector, that appear to be driving the overall level of bottom-half wage inequality in the South African labour market.

How Large are South African Wage Differentials?: A Tentative International Comparison

International comparisons of wage differentials are a difficult exercise. They of course assume that the country-specific conditions across the sample are all the same with regard to a range of variables. In addition, and perhaps more importantly, they assume that the labour market conditions in each of the economies are similar and therefore comparable. This is the background information then, that has to be considered when accounting for wage differentials across countries. In most cases, it has to be stated, such comparisons belie the significant differences that are present across economies. The differences are particularly magnified when, as is the case below, a developing country such as South Africa is contrasted with larger industrialised economies.

Despite the above caveats, Table 17 below attempts this tentative international comparison, while noting at the outset the assumptions made in doing such an analysis. In order to reduce the statistical noise induced when taking all workers in the sample, only male worker differentials are used in the international estimates. This is to avoid picking up the gender bias present in the distribution. In the South African context, race also acts as an important discriminator, and therefore the racial male differentials are also reported here. The developed country figures are all based on data from the mid to late-1980s, and while this is somewhat outdated, there was no comparable later data that could be found, using the percentile

differential approach. In addition though, it was felt that the core results would not be affected by the use of more recent wage data.

Table 17: International Comparison of Wage Differentials: Log Hourly Male Wages

	Percentile Differentials		
Country	**90-10**	**90-50**	**50-10**
United States	1.592	0.552	1.040
Non-US average	1.003	0.545	0.458
Britain	1.277	0.683	0.594
Switzerland	1.241	0.777	0.464
Australia	1.194	0.439	0.755
Hungary	1.123	0.661	0.462
Germany	0.995	0.539	0.456
Italy	0.964	0.486	0.478
Austria	0.899	0.508	0.391
Sweden	0.854	0.452	0.382
Norway (1982)	0.754	0.382	0.372
Norway (1989)	0.749	0.525	0.224
South Africa			
Total	**2.79**	**1.36**	**1.43**
African	**2.41**	**1.10**	**1.31**
Coloured	**2.28**	**1.11**	**1.17**
Asian	**2.05**	**1.11**	**0.94**
White	**1.97**	**0.98**	**1.00**

Source: Blau & Kahn,1996 and own calculations

The data shows firstly that in the developed country sample, the USA yields the highest level of wage inequality when measured by the 90-10 differential. The hourly log wage inequality amongst males in the US labour market stands at 1.592, while in Norway for example, it was 0.749 in 1989. If we include the total male wage inequality for South Africa, it is amply evident how high South African wage inequality is, in this limited international comparison. Indeed, by this measure of wage inequality, the national 90-10 for South Africa is about 75% larger than the US figure. Note that even when considering the intra-racial wage gap statistics, South African wage inequality remains comparatively very high, suggesting that South Africa's high income inequality is not only driven by race.

What is also useful from the data, are the inequality measures at the 90-50 and 50-10 differentials. For all the developed countries in the sample, with the exception of the USA and Australia, the 90-50 differentials are in fact larger than the 50-10

differentials. In other words, there is evidence of very low earnings in these two developed country labour markets, that serves to increase inequality in the bottom-half of the wage distribution. Interestingly, this concurs with the national South African results, as well as those for African and Coloured workers. Indeed, there would seem to provisional evidence that high wage inequality distributions in a country are marked by greater levels of inequality below the median than above it.

Ultimately then, irrespective of whether examining the racial male cut or the aggregate figure, the South African labour market, by these comparisons does manifest extreme levels of wage inequality. In turn, it is an inequality that is only approached by that of the US labour market, with most of the European labour markets revealing significantly lower levels of wage inequality. While the above comparison is fraught with difficulties and constraints, there does appear to be provisional evidence that South Africa has high levels of wage inequality, in international comparison.

Conclusion

The above chapter has attempted to parallel the coverage in Chapters 1 and 2 of employment trends and patterns in the labour market, with an intensive examination of the wage patterns that underlay or inform these quantity changes. The results suggest, in the first instance, that when looking at median wages the regular race, gender and education differentials arise. The results show that the racial wage gap is far more severe than the gender wage gap, while the racial wage cleavage is again between Africans and Coloureds on the one hand and Asians and Whites on the other. The education median wage data illustrated the importance of matric or tertiary education in raising workers' earnings.

While the median wage analysis showed that one of the highest paid sectors was Financial Services and the lowest Agriculture, it was the occupational wage data that was most revealing. The discrepancy in wages of Africans and Whites in the same skilled and semi-skilled occupations resulted in a more detailed regression analysis. This analysis suggested that one of the key reasons for the wage differential within each of the skill bands, was the higher rates of return on education for White as opposed to African workers. The higher rates reflected White workers accumulating human capital in areas that are in greater demand by

firms, as well as the possibility of firms perceiving the a degree from an Historically White University (HWU) was of a higher quality than that from an Historically Black University (HBU). In addition, unofficial discrimination from firms may also be operative, so reducing the relative wage of African skilled and semi-skilled workers. For both skill bands and both race groups, being a women reduced one's wage while for semi-skilled employees, belonging to a union increased the wage earned.

The remainder of the chapter focused on examining wage inequality across the wage distribution, splining it at various intervals in the distribution. The results suggested firstly that the levels of wage inequality amongst African and Coloured workers of both genders was decidedly higher than the inequality found amongst Asians and Whites of both genders. In addition, there was strong evidence for significant wage premia operating for skilled Asian and White workers, as the 90-50 differentials often outweighed the 50-10 differences. This result parallels labour demand trends showing high and increasing demand for skilled workers, in a labour market with severe skills shortages. In contrast, the African and Coloured results are suggestive of very low earnings at the bottom of the distribution, so raising the level of inequality below the median. The education wage differentials suggested that as one moved into higher education cohorts, the level of wage inequality decreased. Hence when examining individuals with a tertiary degree for example, the level of inequality within that group was lower than the inequality amongst primary school workers. This fact displayed once again the heterogeneity in higher educational qualifications, and the differential returns that this translated into for workers.

The sectoral wage data suggested that it was primarily the Community Services sector that was driving the higher levels of wage inequality in the bottom-half of the distribution. That was prescribed partially to the high share of domestic workers captured within this sector. Indeed, the non-Community Services inequality measures for the national sample, revealed the same wage differential measures around the median. Finally, the tentative international comparison revealed that relative to all other developed countries in the sample, South Africa yields very high levels of wage inequality, as measured by the 90-10 percentile differentials, and that this applies even to intra-race inequality.

Chapter 4: Measuring Vulnerability in the South African Labour Market

Introduction

The above chapter has revealed not only that South Africa yields high levels of wage inequality, but furthermore that low levels of earnings remain for those with employment. In addition, Chapters 1 and 2, and the trends outlined therein, imply that skilled workers have gained, and will continue to gain, at the expense of unskilled workers. The implication of these first three chapters then is that a high degree of vulnerability continues to pervade the South African labour market. This chapter seeks to analyse in more detail what the correlates of this vulnerability are. The intention therefore is, through the use of an established methodology, to measure the nature and extent of low earnings and vulnerability amongst participants in the labour market. The chapter again uses the October Household Survey for 1995, and here as with the previous chapter, reliance on the OHS99 was not possible given the problem with their income data. The chapter concentrates on illustrating and measuring the extent and distribution of low-earnings in the labour market, by drawing on existing poverty methodologies, which have thus far been applied predominantly to the analysis of poverty at the household level rather than to individuals in the labour market.

An Application of a Class of Poverty Measures to the Labour Market

While Chapter 3 was suggestive of the nature and extent of low earnings in the labour market, this section of the thesis tries to provide a richer description of the distribution of earnings in the labour market, while paying particular attention to identifying the working poor within the labour market. To do so we apply the tools and framework of poverty dominance analysis to individuals in the labour market. These tools are usually applied at the household level, but given the specific focus of our work here, it is wholly appropriate to use these tools to focus on individuals in the formal and self-employed sectors as well as the unemployed, where applicable.

A major strength of the methodology is the fact that it is capable of integrating the unemployed into the analysis. The aim of this chapter, in the first instance, is to derive cumulative distribution functions by pre-defined labour market categories, in order to understand earnings, segmentation and the nature of job allocation

decisions in the labour market. By specifying a low-earnings line, we are also able to highlight the incidence of working poor in different sub-groups within the labour market and to derive the shares of working poor within these sub-groups. The design of later multivariate modelling of labour market earnings will flow from the picture of the labour market that we distil in this section.

The FGT Poverty Approach

The most widely used approach that captures both the depth and severity of poverty is the generic class of measures, found in Foster, Greer and Thorbecke (1984). This FGT class of poverty measures can be written in the general form as:

$$P_\alpha(z) = \int_0^z (1 - \frac{Y}{z})^\alpha \, f(Y)\, dY \qquad (1)$$

where α is a non-negative parameter. It is clear from (1) that when α=0, a headcount index (H or P_0) is calculated. The depth of poverty, measured as the poverty gap index (PG), is calculated when α=1[26]. The severity of poverty, a measure that is sensitive to the distribution of income among the poor, is found when α=2.

The choice of a poverty line is open to much debate, and is probably the most contentious issue surrounding the measurement of poverty. In recent literature, considerable progress has been made in overcoming the restrictions implicit in basing a poverty analysis on one poverty line. The FGT methodology has been extended to a graphical consideration of the widest possible range of poverty lines, from 0 to z^{max} (Ravallion,1994:126). The values taken by this cumulative distribution function over the defined interval, will yield the Poverty Incidence Curve. Given the distribution function, F(Y), the poverty deficit curve can be traced by the following:

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[26] The Poverty Gap (PG) is therefore calculated as $P_1 = \int_0^z \left(\frac{1-y}{z} \right) f(y) dy$

$$D(z) = \int_0^{z^{max}} F(Y)\,dY \qquad (2)$$

Hence the area under the Poverty Incidence Curve, represents the poverty deficit function. The former traces the values of the headcount index (P_0) for all poverty lines (z) from 0 to z^{max}, while the latter traces the measure for the poverty gap (P_1) for all z from 0 to z^{max}. The poverty severity curve is derived in turn, from the deficit function as:

$$S(z) = \int_0^{z^{max}} D(Y)\,dY \qquad (3)$$

and points on S(z) represent the results for P_2, at any poverty line between 0 and z^{max}.

Given the fact that these three functions are nested within each other, the interlinkages elicit important poverty comparisons (Ravallion,1994:129). Should $F_A(z)$ lie above $F_B(z)$ for all z, where $F_A(z)$ and $F_B(z)$ represent distributions A and B, then this is true for both distributions on D(z) and S(z). The opposite though is not true. Hence should $S_A(z)$ lie above $S_B(z)$ for all z, it would not necessarily be true that $D_A(z) > D_B(z)$ for all z. These are the axioms of dominance testing which make it possible to do useful poverty comparisons and rankings, based on the magnitude, depth and severity of poverty, for different distributions and sub-groups in the population.

The extension of the graphical representations of dominance testing to the description of individual earnings in the labour market is especially useful and illuminating. Using pre-determined labour market categories, for example, for all formal sector workers defined by their sector, it is possible to construct a set of curves which would fully describe the distribution of individual earnings within any given sector of the economy. Dominance testing therefore becomes a crucial tool in understanding the difference in earnings status amongst individuals in the labour market. It allows us to provide powerful and very useful information about the

magnitude, depth and severity of low earnings amongst individuals in the labour force. In providing such an analysis we extend our analysis of earnings - beyond the somewhat crude median incomes provided in the previous chapter.

Cumulative Distribution Functions for the South African Labour Market

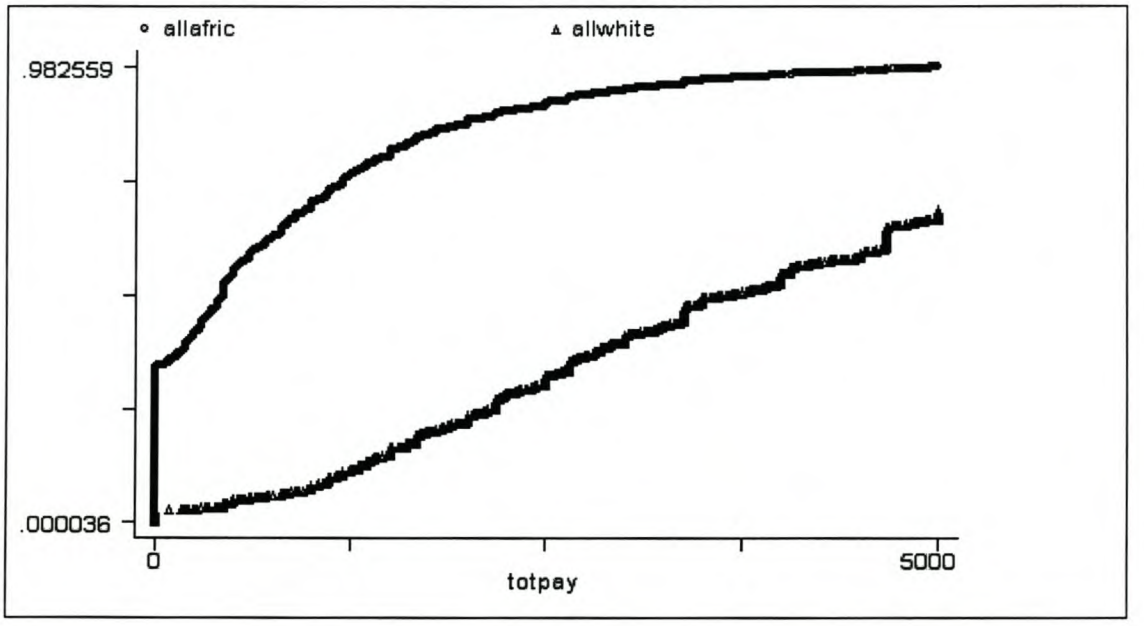
The cumulative distribution functions (c.d.fs) that follow are derived for all three major labour market segments, namely the formally employed, unregistered self-employed and the unemployed. The intention is to derive different cumulative distributions by a set of relevant markers of low earnings in the labour market. These include race, gender, location and education. In addition, certain other markers were included, namely union status, sector and occupation. It should be clear from the above analysis that some of these variables will be relevant predictors of the earnings profile of workers. Therefore, the distribution functions will be important, not only in providing graphical representations of poverty in the labour market, but also in informing any earnings equation estimation. Hence, a crucial input of the functions is to inform how individuals are selected into different segments in the labour market, and what the important set of determinants of participation and earnings are. Dealing correctly and exhaustively with this selection process will go a long way toward increasing the robustness of any earnings equation results.

The challenge in constructing the distribution functions lay in the choice of cuts to make on the data. The one clear trend is that strong first-order dominance holds almost across all of our selected cuts. Almost no second-order dominance testing was required The functions that follow are an overview of the most important results found for labour market participants.

Figures 1 and 2 below present the labour force as a whole, i.e. it includes all employees, the registered and unregistered self-employed and the unemployed. The vertical axis cumulates individuals in the sample and varies from 0 to 1 as the sample increases. To avoid graphical interference from outliers in the sample, income is only shown to a maximum of R5000 per month for all the c.d.f.s presented here. The values on the vertical axis will confirm the percentage of the sample captured in each case. The positive value of the intercepts in Figures 1 and 2, represents the share of

unemployed individuals in the selected sub-samples. Hence, the higher value intercept for the African workforce simply indicates a larger pool of unemployed compared to White workers. The figures below illustrate that for any chosen poverty line between 0 and R5000 per month, the fraction of all African workers in poverty is significantly greater than the fraction of African employed in poverty (Figure 2), and the share of this sample in poverty is in turn, larger than that of the White employed or White workers (Figure 1)[27].

Figure 1: Earnings Distribution of African and White Workers

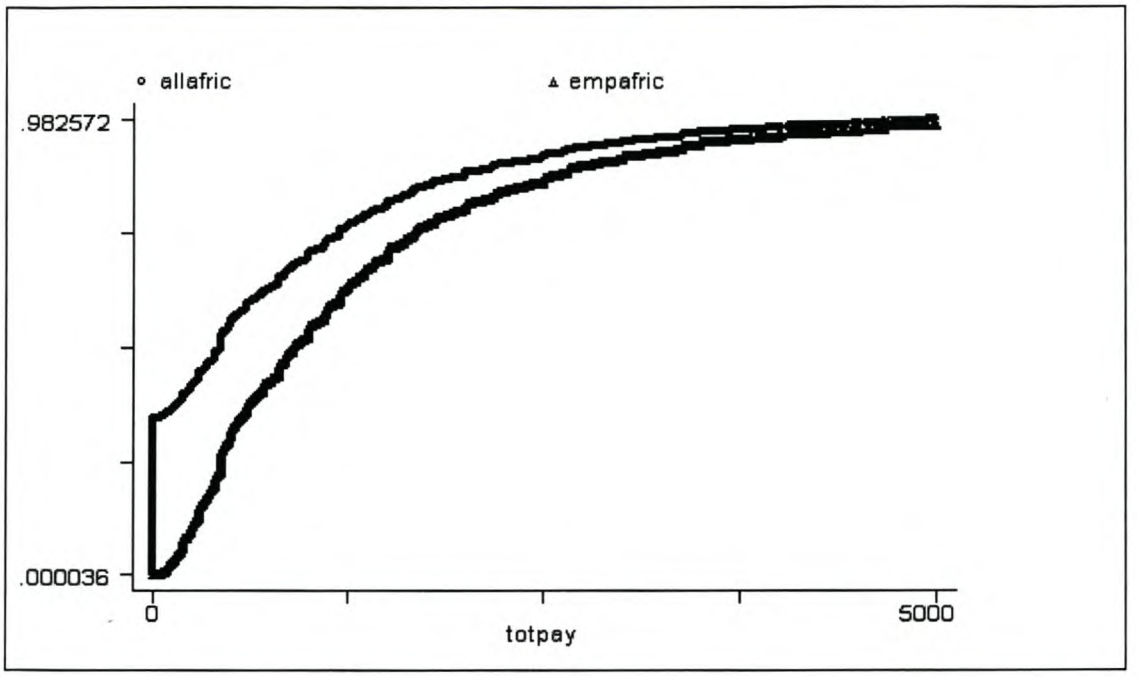


The inclusion of zero earners therefore generates a greater fraction of individuals living in poverty than when compared with the sample of employed only. It is clear though that race is a crucial predictor of zero and low labour market earnings, with the dominance of Africans over Whites being quite stark[28].

[27] The term 'in poverty' when applied here to any labour market category should be understood to refer to vulnerable individuals as yielded by zero or low earnings.

[28] Note also that, visually, the steepness of the c.d.f is informative. Hence, a flatter c.d.f indicates lower levels of vulnerability across any range of low earnings lines, while a steep c.d.f will be matched by higher levels of vulnerability across the different low earnings lines.

Figure 2: Earnings Distribution of African Employed and African Workers



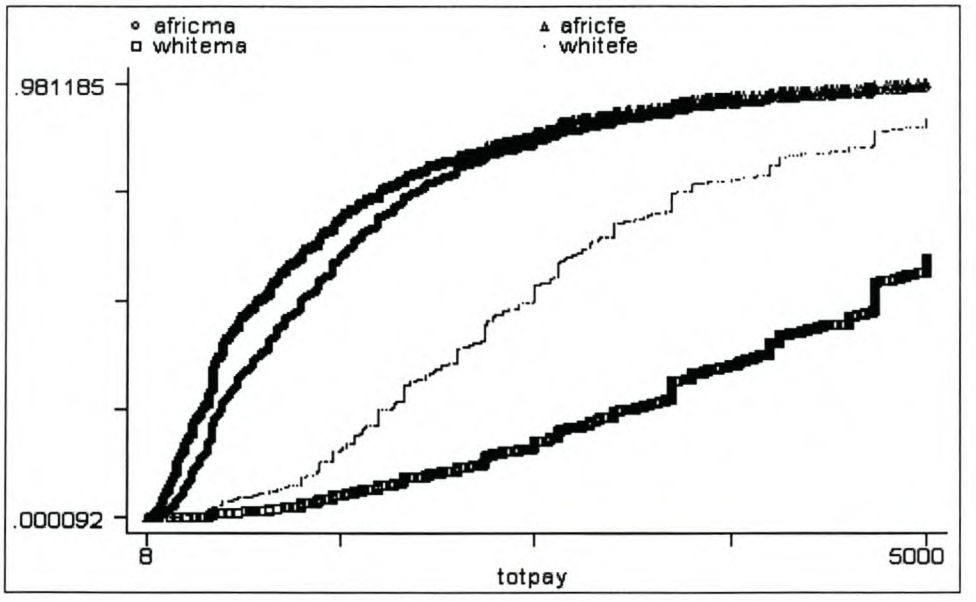
Another, and equally important, manner in which to interrogate the data here is of course to determine a poverty line and then estimate the share of individuals falling below the poverty line - the headcount index (H). The individual poverty line calculated is R293 per month.[29] Hence Figure 1, for example, shows that at the poverty line the proportion of the White labour force in poverty is only 4.2%, while the headcount for the African labour force stands at 41.6%, almost thirteen times greater. This is a vivid illustration of the differing poverty status amongst African and White labour market participants. When the unemployed are excluded, the P_0,or headount index, values drop considerably for Africans to 10.1%, while the decline for White workers is to 0.2%. Labour market poverty in the aggregate then is very different for the White workforce, compared to that experienced by African workers - in large part a function of the very high unemployment numbers amongst African workers.

Having examined the labour market as a whole, it is interesting to analyse the gender and race distribution of earnings for the employed only, thus excluding unemployed individuals. Figure 3 below attempts to do this. Note that because the unemployed

[29] The choice of this low-earnings line is discussed below. All the headcount results that are discussed here are taken from Table 1 below.

have been excluded, the intercepts are zero for all the functions, i.e. no individuals have zero earnings. There is clearly both a race and a gender effect in terms of earnings.

Figure 3: Earnings Distribution of African and White, Male & Female Employed



The figure above illustrates that the lowest proportion of earners living in poverty, at any chosen poverty line, are employed White males followed by employed white females[30]. There is robust first order earnings dominance between Whites and Africans, and this dominance also holds for all low-earnings lines when comparing male and female African workers. The higher degree of poverty amongst African females is illustrated also in the headcount index, where the value is 16.6% while for African males it is only 6.2%. What is interesting is that while the male and female cumulative distribution functions are closer together for Africans, the vertical differences for White workers are, on average, much greater between the genders.

The education-related earnings distributions for all the employed are shown in Figure 4 below. Again, the strong level of first-order dominance is evident. The employed

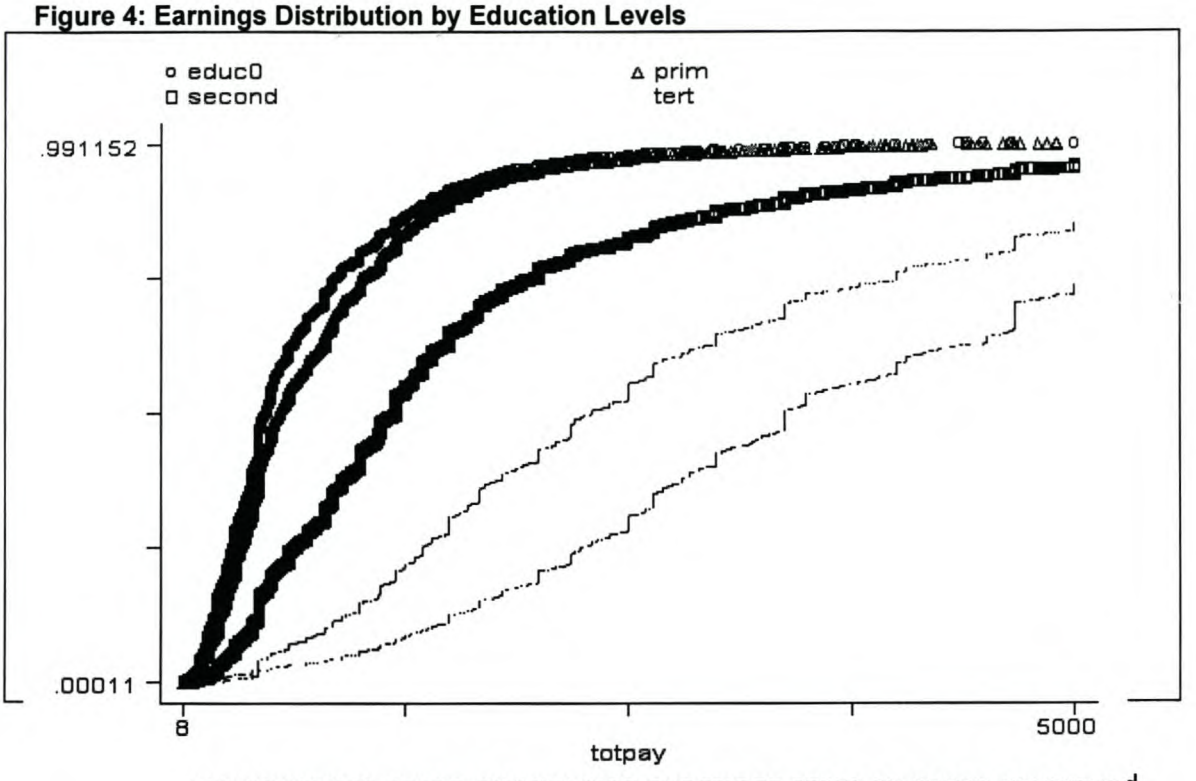
[30] The employed here capture two types of employment, namely formal sector employees and self-employed informal sector workers.

with the lowest fraction of individuals in poverty are those with tertiary-level schooling, while those with no education or primary schooling have the largest proportion of poverty earners. Figure 4 also makes it clear that secondary education has a positive impact on the economic status of the employed. The attainment of primary education for an employed person is unlikely to reduce the probability of earning more than the low-earnings line, relative to an employed individual with no schooling. This can be seen from the fact that there is no first-order dominance and the lines overlap in places. At the low earnings line though, the value for the headcount index is 23.1% for individuals with no education, and 16.7% for those with primary schooling. A second-order dominance test would determine whether this poverty information is robust for all income levels, and it would also provide additional information on the comparative depths of poverty between these two groups. The value of the headcount index for the employed with no education is about 35 percentage points higher than for those with tertiary education, whose headcount value is 0.7%. This reinforces the notion that education is a key variable in predicting earnings, relative to poverty, of employed individuals in the labour market.

Another very robust result of first-order dominance is for the employed by region type. Again, as with the full labour force, the proportion of individuals in poverty is lower for those in urban areas relative to those in semi-urban and rural areas, irrespective of the low-earnings line that is specified[31]. Given that the demand for labour is strongly correlated with location and wage levels, this result is not surprising. It is evident that in terms of the earnings of labour market individuals, the five education categories chosen together with the three location variables are very clear predictors of the earnings status of employed individuals in the labour market.

[31] Given that three discrete distribution functions were generated, it was decided, *ex post*, to maintain the three locational definitions of the CSS, rather than opting for only a rural - urban split.

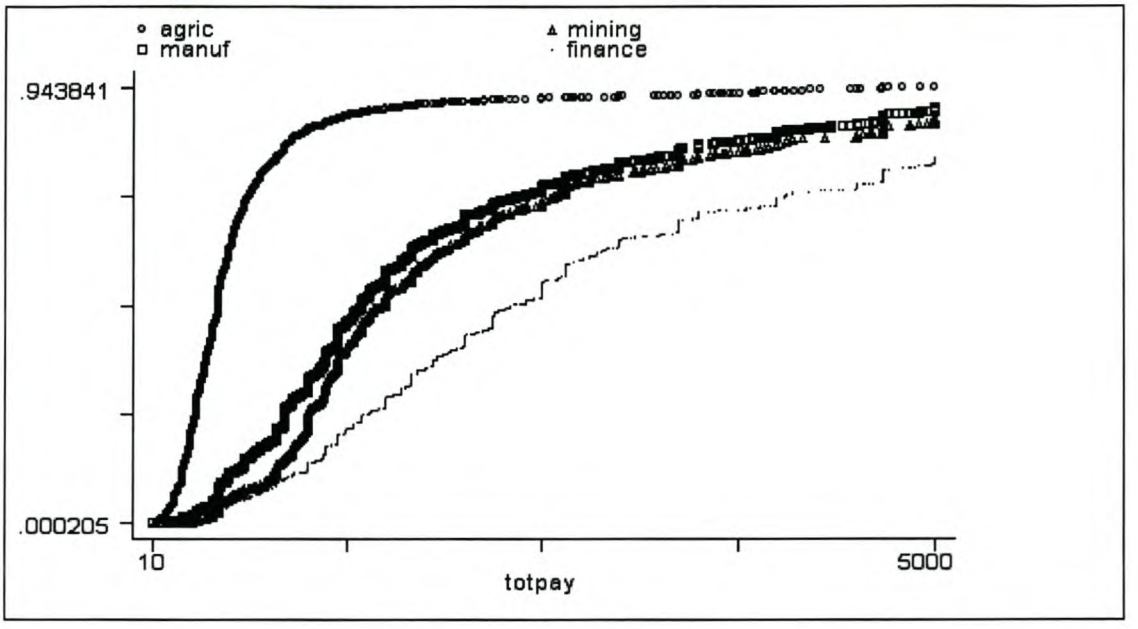
Figure 4: Earnings Distribution by Education Levels



The following three distribution functions refer to those employed individuals by a pre-selected sub-set of sectors and occupations. The OHS95 survey contains a far larger number of sectors and occupations, and it is convenient to aggregate these into categories, that may yield interesting comparative information about labour market poverty. Figure 5 therefore examines those individuals in four sectors, namely Mining, Manufacturing, Agriculture and Finance.

Mining was chosen, given its obvious historical importance in output and employment terms to the economy, while Manufacturing remains the largest contributor to GDP. Agriculture, like Mining represents an industry in decline with relatively high labour-capital ratios, while the Finance sector, in being the core of the new services industry, is the fastest growing in the economy. The first two chapters detailed the specific labour demand trends for these sectors, and hence the distributions here are an important addition to the employment trends that were observed above, for these sectors. It is evident therefore from the distribution functions that individuals in these sectors have contrasting earnings profiles. Hence the largest and smallest fraction of individuals below any chosen low-earnings line are those in Agriculture and Finance respectively. The latter is indicative of a high-skill sector, while individuals in farming are disproportionately labourers with low skill levels.

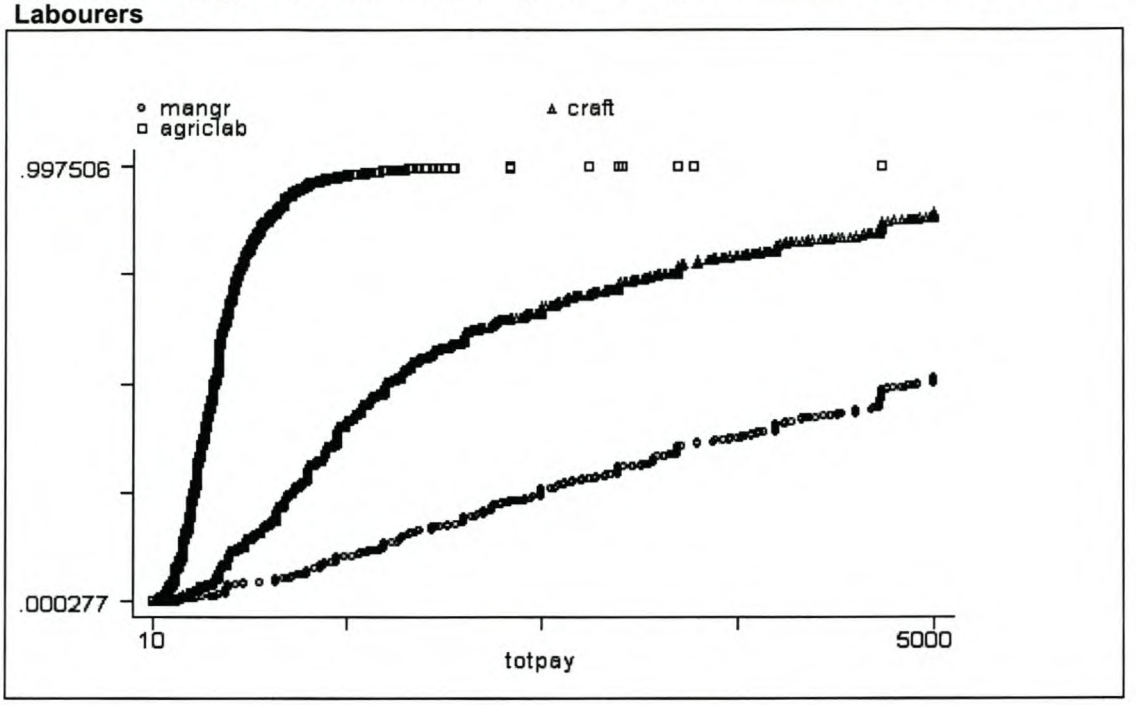
Figure 5: Earnings Distribution By Selected Main Sectors



Applying our low-earnings line reveals a headcount index for workers in Agriculture in poverty of about 23%, while for Finance it is 0.4%. The close association between the employed in Manufacturing and Mining may be a result of the high level of unionisation in these two sectors, combined with similar mean skill levels. It would appear though, that the share of Manufacturing workers in poverty is higher (H=1.46%) than the fraction of Mining workers (H=0.45%), for any poverty line. The percentage of unionised Manufacturing workers (42.1%) is lower than the share of Mining workers who are union members (67.7%), and this may be, in part, an explanation for the first-order dominance. The distributions for union and non-union members, not shown here, yields first-order dominance of non-union workers over union workers, robust for any poverty line.

Figures 6 and 7 derive earnings distributions by selected occupations. Figure 6 compares three broad occupations that span the entire job ladder, from managers to those in elementary occupations. We have chosen Managers, Craft and Trade workers and Labourers in Agriculture to represent this distribution across the job ladder.

Figure 6: Earnings Distribution of Managers, Craft & Trade Workers and Agricultural Labourers



It is evident that first-order dominance holds, irrespective of the poverty line. Given the relative wages found in most societies, this distribution is not unexpected. It is clear though that the level of individual poverty amongst labourers in Agriculture is extremely high. For example, a poverty line of R650, would place over 72% of these workers in poverty, while the comparative figure for Craft and Trade workers and Managers would be 13.6% and 4.5% respectively[32]. Using the study's individual poverty line, the figures for craft workers and managers are close to zero, while the H value for all agriculture labourers is 26.8%.

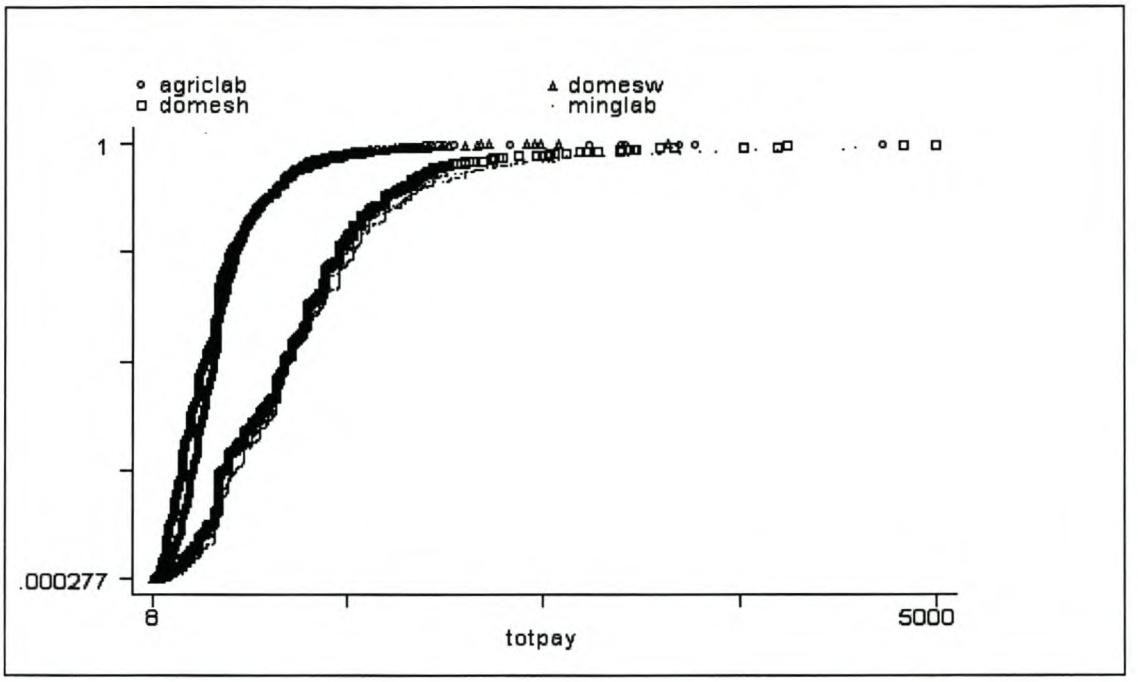
While Figure 6 shows the expected poverty information - that Labourers are low earners compared to other occupations in the labour market - Figure 7 attempts to provide more detail on the earnings status of those individuals captured broadly as Labourers. The survey was very helpful in identifying workers by their occupation and sector together. Hence, it was possible to look at labourers in say Mining and Agriculture compared to Domestic Services.

[32] We generate unusually large numbers low-earning managers in the distribution function, given that we would include employed persons who are unregistered self-employed and, therefore, would not conform to the classic conception of managers employed in the formal sector. Across all race groups, this class of managers numbers about 101 000 individuals.

Figure 7 then, shows that the two occupations with the lowest earnings, and those with the highest fraction of individuals in poverty, are self-employed domestic workers and agricultural labourers, a result alluded to in Table 4 of the previous chapter. Labourers in main sectors such as Mining and Manufacturing have a lower incidence of poverty. Note that domestic helpers also have a distribution closer to Mining and Manufacturing labourers than Agriculture labourers and domestic workers.

This earnings distribution picks up the cohort of cleaning staff in the formal sector. Using the individual poverty line, the H value for Domestics is 38.03%, compared to 26.78% for farm workers. However, first-order dominance does not hold for all possible income levels as a cross-over seems to occur at approximately R1000. Hence, it will be necessary to undertake a second-order dominance test for differences in the depth of poverty between the two groups. There is clearly though a strong first order dominance between Labourers in Agriculture and self-employed Domestic Services on the one hand and labourers in the traditionally formal sectors such as Mining and Manufacturing. For example, while about 70% of all these individuals earn below R1250 per month, the figure for farm and domestic employees is close to 100%. The H value for those in Manufacturing is 1.54%, while for mine workers, it is less than 1%.

Figure 7: Earnings Distribution by Labourer Categories



In sum, it is clear from the above that Agriculture and household Domestic workers present the highest levels of earnings vulnerability in the South African labour market, irrespective of the choice of individual poverty line. The constellation of covariates identified in the previous distribution functions, namely race, gender, education, union status and location, are all informative in seeking to locate and explain employment that is both unskilled and very poorly paid. While mean skill levels, as identified by broad occupational classification, may be similar in other sectors, different endowments serve to generate lower individual poverty rates. More specific results on the contributions of these covariates to earnings and poverty status, will be generated through the earnings function analysis in the next chapter.

Shares of the Working Poor in the South African Labour Market

The above section has presented a diagrammatic understanding of poverty in the labour market, as embedded in the c.d.f.s. These diagrams are very useful and user-friendly and are a powerful way in which to present earnings dominance over the entire income range. Of course, the c.d.f.s are able to impart information about the actual values for the Headcount Index for a given poverty line, and these were also illustrated. We used the headcount index, to derive the percentage of labour force participants and/or

employed workers in different sub-groups of the labour market who earn less than a poverty line of R293 per month.

As discussed in our earlier review of the FGT measures, the headcount is only one of the three poverty measures. We restricted the discussion to the headcount as it offered the most intuitive picture of the incidence of working poor within any sub-group. However, it may be illuminating to derive specific values for all three poverty measures: P_0 (equivalent to the headcount index, H), P_1 and P_2. This is to utilise one of the key advantages of the FGT measures; i.e. in each instance total measured poverty can be fully and consistently distributed between the chosen sub-groups. In short, total poverty can be decomposed into poverty shares.[33]

More precisely, we split the labour market population into a relevant set of *m* sub-groups with each sub-population of n_i so that the total population is simply:

$$n = \sum_{i=1}^{m} n_i \tag{4}$$

We then derive intra-group FGT measures for different sub-groups in the population. The intra-group FGT measure is best captured as follows:

$$P_{\alpha i} = \frac{1}{n_i} \sum_{j=1}^{q_i} \left(1 - \frac{Y_{ij}}{z}\right)^{\alpha} \tag{5}$$

where Y_{ij} is the income of the *j*th household or individual in sub-group *i*. Finally, we derive the formula for calculating weighted shares of sub-group poverty as:

[33] In all these calculations, national frequency weights were assumed and missing values for monthly income were all omitted. The original intra-group measures are available from the author, as are the actual weighted measures.

$$P_\alpha = \frac{\sum_{i=1}^{m} P_{\alpha i} n_i}{n} \qquad (6)$$

where the *i* individuals are summed by the *m* sub-groups in the sample and then weighted by the total sample, *n*, to derive the composite P_α value. Thus, the decomposable properties of the FGT class of measures allow us to measure the share of all low-earners across key sub-groups in the labour market. Tables 1 and 2 below present the results of this share decomposition across race, gender, education, location, sector, occupation and union status. In all but the last three of these cases, the poverty shares are computed for the full labour force and also for the employed. In calculating these shares it is worthwhile to do the calculation for all three poverty measures. The changes in the shares as one moves from P_0 to P_1 and then P_2 provide us with a sense of how the poverty shares change as one uses measures that give greater weight to the depth of poverty and the poorest of the working poor.

Before discussing the results, there is one final sensitivity issue that we need to address. This is the choice of low-earnings line. Up until this point, we have made use of a R293 per month low-earnings line. The strong first-order dominance illustrated by the c.d.f.s above imply that the poverty rankings will not change as we change the low-earnings line. However, although the c.d.f.s do not cross, their slopes and relative positions do change and the actual poverty shares will change based on the actual low-earnings line that is selected.

As stated at the beginning of this chapter, the justification for the R293 line is that this is the monthly adult equivalent income that undergirds our household poverty line. However, there is no doubt that this is an extremely low labour market income. For one thing, an adult earning such an income would be poverty-neutral in the household in the sense that they pay their own way but make no additional contribution to lifting that household out of poverty.

At the end of the day, there is really no rigorous way to choose a low-earnings line. The best that can be done is to be transparent and to explore sensitivity to the chosen line. Box 1 below presents the annual and monthly values for a number of possibilities. We selected option 4 (R650 per month) for the sensitivity analysis and Table 2 repeats all the share decompositions at this wage. The amount would enable a household of average size with the average numbers of employed and unemployed to earn the relevant household poverty income. Thus, there is a positive household contribution built into this wage but it is still clearly a low income. For example, it is well below the R800 mark that is the 25th percentile of actual wages or the 40th percentile of wages if we include the unemployed as zero earners.

Box 1: Selecting a Low-Earnings Line: Defining the Working Poor

1. Per capita adult equivalent:
   R293 per month and R3 516 per year
2. Per capita expenditure level:
   R594 per month and R7 128 per year
3. The wage required to meet the household poverty line, given the mean number of employed workers in a household
   R814 per month and R9 768 per year
4. The wage required to meet the household poverty line, given the mean number of employed plus unemployed workers (assuming they were also to find employment) in a household of average size
   R650 per month and R7 800 per year
5. The 40th percentile of all wages of employed workers
   R1 200 per month and R14 400 per year
6. The 25th percentile of all wages of employed workers
   R800 per month and R9 600 per year
7. The 40th percentile of all workers, presuming a zero wage for the unemployed
   R800 per month and R9 600 per year
8. 50% of the mean wage of those employed
   R1 107 per month and R13 287 per year

The bolded total figures in Tables 1 and 2 offer a good starting point in discussing the results. Obviously, the total labour force (13.8 million workers) and the total number of employed workers (9.9 million workers) are the same in both tables. Of these, 45.6% of the labour force and 25% of the employed are poor when the low-earnings line is set at R650 per month. The respective figures fall to 32.56 % and 7.25 % when the line is set at R293 per month. Thus, at this lower line most of the poor are unemployed. In

terms of a straight headcount, 86.03 % are unemployed. This same number of unemployed participants only forms 61% of the working poor at the higher line. As these unemployed are, by definition, the poorest of all participants, it is no surprise that the poverty share of the unemployed rises sharply in both tables when P_1 and P_2 are used as bases for the shares calculation.

For the labour force as a whole (employed and unemployed), the decomposition in Table 1 shows that 88% of the low earners are African and about 9% are Coloured. When the analysis is restricted to the employed alone, these respective shares are 86% and 12% respectively[34]. This picture is robust across all poverty measures and across both tables. The dominant racial angle to labour market vulnerability could not have been more clearly revealed. Within the African group, 10% of earners lie below the R293 benchmark, compared to 7 % of Coloureds. Within this group of working poor, the Africans are clearly the lowest earners as their share of poverty rises to close to 100% when P_1 and P_2 shares are calculated. Table 2 shows that Coloureds increase their share at the higher line.

Thus, we now know that we are predominantly looking at within-African breakdowns as we move away from race to the determinants of vulnerability in the labour market. A comparison of the total male/female and African male/female breakdowns in Table 1 reveals a very stable picture across the measures. Females make up 57% of poor labour market participants and African females alone constitute half. This is not only because of the much higher incidence of unemployment. When we focus only on the employed, African females make up 53% of the working poor by straight head-count and 68% when the depth of poverty is considered. Given that African women make up 30.5% of the labour force and 23.3% of the employed, their poverty 'contributions' are seen to be far in excess of their representation. This is a stark illustration of the special vulnerability of this section of the labour force. However, Table 2 shows that amongst the employed, the African male poverty contribution rises sharply relative to African females at the higher low-earnings line. This signals the fact that there is a significant group of African males earning between R293 and R650 per month.Yet,

[34] The P_1 and P_2 share measures for non-Africans are zero because of rounding off in the figures.

even at this higher poverty line, African female earners constitute 40% of the vulnerable African employed and 46% of the vulnerable African labour force.

Table 1: FGT Measures for Individuals in the South African Labour Market, with low earnings line at R293 p.m.

		Intra-group	Poverty Shares		
Variable	**Number**	P_{0i}	P_0	P_1	P_2
Labour Force					
Total	**13817522**	**32.56**	**100.00**	**100.00**	**100.00**
African	69.12	41.58	88.27	88.73	88.19
Coloured	10.92	25.15	8.44	8.23	8.29
Asian	3.00	11.98	1.10	1.01	1.14
White	16.95	4.23	2.20	2.01	2.34
Unemployed	28.01	100.00	86.03	93.37	96.59
Male	56.72	24.62	42.89	42.59	42.60
Female	43.28	42.98	57.13	56.91	56.90
African Male	38.61	32.07	38.03	38.87	38.52
African Female	30.51	53.62	50.24	49.86	49.67
No Education	8.68	47.46	12.65	10.58	10.56
Primary Education	24.56	44.75	33.75	30.98	30.05
Secondary	32.50	34.75	34.68	36.56	36.99
Std. 10	21.50	24.08	15.90	17.98	18.44
Tertiary	12.77	7.71	3.02	3.48	3.48
Urban	61.73	24.63	46.69	51.80	52.41
Semi-urban	1.91	30.88	1.81	1.98	2.21
Rural	36.22	46.00	51.17	45.41	45.33
Employed					
Total	**9 947 208**	**7.25**	**100.00**	**100.00**	**100.00**
African	61.79	10.14	86.42	100.00	100.00
Coloured	11.97	7.07	11.59	0.00	0.00
Asian	3.67	0.53	0.25	0.00	0.00
White	22.57	0.56	1.74	0.00	0.00
Male	61.60	4.39	37.30	33.33	34.00
Female	38.40	11.85	62.77	66.67	66.00
African Male	38.53	6.22	33.06	31.84	31.85
African Female	23.26	16.62	53.32	68.16	68.15
No Education	8.15	23.10	25.98	24.46	24.56
Primary Education	22.31	16.72	51.46	52.07	52.08
Secondary	30.37	4.35	18.22	20.24	20.11
Std. 10	22.74	0.93	2.92	3.23	3.25
Tertiary	16.43	0.67	1.52	0.00	0.00
Urban	65.81	2.79	25.33	35.10	34.90
Semi-Urban	1.90	5.31	1.34	1.58	1.48
Rural	32.24	16.49	73.33	63.32	62.75
Agriculture	12.73	22.82	40.07	26.58	23.34
Manufacturing	15.05	1.46	3.03	3.09	3.80
Mining	4.66	0.45	0.29	0.00	0.00
Finance	6.47	0.39	0.35	0.00	0.00
Wholesale & Retail	17.40	3.93	9.43	10.47	10.63
Community	32.88	9.89	44.86	51.26	52.98
Other	10.81	1.32	1.97	8.60	9.25
Manager	5.74	1.27	1.01	1.91	2.87
Craft & Trade	12.18	2.15	3.61	4.06	5.09
Agric. Labourer	9.50	26.78	35.07	25.32	26.99
Domestic Worker	7.17	38.03	37.60	38.79	39.00
Union	29.02	0.58	2.32	1.96	1.00
Non-Union	72.48	9.79	97.87	98.33	99.00

Table 2: FGT Measures for Individuals in the South African Labour Market, with low earnings line at R650 p.m.

		Intra-group	Poverty Shares		
Variable	**Number**	P_{0i}	P_0	P_1	P_2
Labour Force					
Total	**13817522**	**45.65**	**100**	**100.00**	**100.00**
African	69.12	56.83	86.04	87.32	88.61
Coloured	10.92	44.19	10.58	9.37	8.50
Asian	3.00	16.68	1.10	1.01	0.76
White	16.95	6.13	2.28	2.30	2.13
Unemployed	28.01	100	61.36	76.00	85.45
Male	56.72	37.58	46.70	43.90	42.87
Female	43.28	56.22	53.30	54.89	55.82
African Male	38.61	47.73	40.37	39.32	38.70
African Female	30.51	68.36	45.69	47.36	48.64
No Education	8.68	72.52	13.79	11.99	11.17
Primary Education	24.56	67.82	36.48	33.53	32.21
Secondary	32.50	47.04	33.49	34.51	35.47
Std. 10	21.50	28.5	13.42	15.61	16.97
Tertiary	12.77	10.08	2.82	3.03	3.37
Urban	61.73	32.62	44.05	51.26	52.02
Semi-urban	1.91	49.8	2.89	2.01	2.01
Rural	36.22	67.48	53.06	46.73	45.97
Employed					
Total	**9 947 208**	**25.01**	**100.00**	**100.00**	**100.00**
African	61.79	33.36	82.42	83.55	84.48
Coloured	11.97	30.41	14.56	13.44	12.53
Asian	3.67	5.69	0.83	0.64	0.56
White	22.57	2.4	2.19	2.37	2.43
Male	61.60	20.64	50.85	46.34	46.17
Female	38.40	32.01	49.15	52.57	53.83
African Male	38.53	27.66	42.61	40.67	40.26
African Female	23.26	42.81	39.81	42.88	42.22
No Education	8.15	59.9	19.53	19.73	21.27
Primary Education	22.31	51.21	45.69	46.12	47.39
Secondary	30.37	22.12	26.86	25.75	23.90
Std. 10	22.74	6.39	5.81	5.63	4.94
Tertiary	16.43	3.2	2.10	2.05	2.07
Urban	65.81	12.79	33.66	33.15	33.50
Semi-Urban	1.90	31.01	2.36	2.30	2.35
Rural	32.24	49.58	63.91	62.77	64.15
Agriculture	12.73	72.27	36.78	31.58	31.62
Manufacturing	15.05	12.37	7.44	5.93	5.95
Mining	4.66	7.97	1.49	0.87	0.87
Finance	6.47	4.88	1.26	0.93	0.94
Wholesale & Retail	17.40	20.06	13.95	11.10	11.20
Community	32.88	25.81	33.94	38.05	38.15
Other	10.81	11.89	5.14	11.54	11.57
Manager	5.74	4.51	1.03	0.98	1.08
Craft & Trade	12.18	13.62	6.63	5.10	5.38
Agric. Labourer	9.50	81.33	30.88	27.50	27.03
Domestic Worker	7.17	81.25	23.29	25.69	29.71
Union	29.02	6.71	7.79	5.25	5.14
Non-Union	72.48	31.9	92.44	94.75	94.86

The tables highlight a number of important variables that cut across racial and gender divides. The importance of low levels of education in terms of the incidence of low earnings has already been flagged. The share analysis adds to this by showing that, amongst the employed, 75% of low earners have primary schooling or less. Since these individuals constitute only 31% of the employed, the burden of low levels of education is clearly revealed. When comparing the blocks for all participants versus the employed, it can be seen that secondary schooling and matric have a larger poverty share for all participants than the shares amongst the employed. This would seem to imply that these higher levels of education do not necessarily guarantee that a person will have a job, but do offer better earnings to those with employment. Underlying this rather anomalous finding is the fact that South Africa's unemployment problem has become far more severe in the last fifteen years and therefore has a strong youth dimension to it. At the same time, the exit levels of South Africans out of school have risen sharply. Thus, it is very important to keep the age cohort differences in mind when interpreting these education effects.

Individuals in rural areas constitute close to a third of the total labour force and the employed. Yet, half of the poverty in the labour market and 73% of the poverty amongst the employed is rural. Thus, rural areas are greatly over-represented. Despite this, there are two aspects to Tables 1 and 2 that caution against an exclusive focus on the rural dimensions of labour market vulnerability. First, the rural share (by headcount) falls when the poverty line increases to R650 per month. Second, even at the lower poverty line, the rural shares fall significantly as the basis is changed from P_0 to P_1 and then to P_2. This indicates that there are significant pockets of urban unemployed and low-earners.

The last three blocks of both tables offer further cross-sections on vulnerability among the employed. From preceding discussion we know that these blocks are predominantly intra-group insights about the determinants of vulnerability amongst poorly educated Africans. We also know that this analysis still spans both males and females and rural and urban areas. The sectoral and occupational analyses

complement each other. A full 85% of the low-earners work in the Agricultural and Community Services sectors. The occupational distribution shows that this result is largely due to the shares of low earners that are agricultural labourers and domestic workers (35% and 38% respectively)[35]. Since both of these occupations and sectors, as well as the third major vulnerable sector (Wholesale & Retail Trade) are non-unionised, it is hardly surprising to find that unions have a close to zero share of low earners at the low poverty line. This rises to an 8% headcount share at the higher line corresponding to the increasing share of manufacturing workers within the working poor.

Conclusion

This chapter has sought to show that important, useful and indeed graphically powerful information can be gleaned by using the tools of poverty analysis to describe individual earnings in the labour market. Rather than rely on median or mean income levels, this analysis has sought to understand more rigorously the distribution of earnings and the extent and incidence of low earnings in the labour market. While a choice of poverty line could have dictated this analysis from the outset, the preferred option was to begin by using the tools of dominance testing to understand the poverty-sensitive segmentations in the labour market. Thereafter we specified a poverty line in order to discuss the incidence of poverty in the labour market. We then used two poverty lines to calculate poverty shares across different groups within the labour market.

One of the key results here is that domestic workers and farm workers together, are the two most vulnerable groups in the labour market. It is the importance of these groups that correlates with the total dominance of African and Coloured race groups and the significance of women among the most vulnerable. The above picture has important implications for the modelling of earnings. The importance of education in turn, was powerfully displayed through the distribution functions. It appears though that education is more important in determining earnings than whether an individual gets a job or not. We have ensured that all labour market participants are

[35] Note that the sample by occupation is incomplete in both tables, excluding individuals in other job grades. An 'other' category however, in representing occupations not captured in the table, would have little meaning and was thus omitted.

extensively discussed in our analysis by exploiting a particular strength of the FGT poverty framework, namely, its ability to integrate the unemployed into the analysis of earnings vulnerability. This is fully reflected in our c.d.f. analysis and in the share decompositions. However, in conclusion, it is important to recognise that this framework has not been broad enough to incorporate those that are not participating in the labour market. There are two key drawbacks of the above analysis. Firstly, we can say very little about the determinants of non-participants in the labour market. Secondly, the c.d.fs, while useful tools in and of themselves, cannot cope with the simulataneous determinants of each of the above covariates in determining participation, employment and finally earnings in the labour market. In order to achieve this, it is necessary that we attempt to model these stages of labour supply decision-making in the South African labour market. It is to this, that the next chapter turns.

Chapter 5: Modelling Vulnerability and Low Earnings in the South African Labour Market[36]

Introduction

Chapter 4 above provided a descriptive overview of low and zero earners in the labour market, utilising the methodologies found primarily in household poverty studies. One of the key results of the chapter was that in terms of the race and gender covariates, Africans and females were particularly disadvantaged in the labour market. In addition the importance of rural versus urban labour markets in explaining access to employment and the quality of employment was highlighted. The importance of education was powerfully displayed through the use of cumulative distribution functions. It appeared though that education was more important in determining earnings than the probability of employment. Herein lies the limitation of this descriptive approach: that it is incapable of comprehensively and simultaneously highlighting the different determinants and factors impinging on labour market selection and earnings processes. The next step in such an analysis therefore is to combine these differing covariates, which we identify as important, into an econometric model. Such a model would determine the relative importance of these covariates in explaining each stage of the labour market process, namely participation, employment and earnings.

The modelling work in this paper therefore flows on directly from the descriptive discussion of Chapter 4 in the sense that this analysis is used to formulate and specify the modelling work below. Given the quantum of previous studies on modelling earnings in South Africa, however, it is also useful to anchor the approach here relative to this recent econometric work. Hence the intention of this chapter is two-fold. Firstly, a comparative analysis is undertaken of all the South African earnings function literature, with a focus on the specification of the models and their differing treatments of sample selection issues. Secondly, a unique model is proposed, which attempts to highlight the full dimensions of vulnerability in the South African labour market.

[36] As noted in the introduction to the thesis, this chapter is drawn from collaborative work with Murray Leibbrandt, and the fruits of this joint work are contained in Bhorat *et al* (2001).

Past Earnings Function Models in South Africa

The 1990s have seen the production of a wealth of earnings function work (Moll (1998), Mwabu and Schultz (1996a, 1996b and 1997), Fallon and Lucas (1998), Winter (1998), Hofmeyr (1998)). This new literature has been spawned largely as a result of the fact that a number of reliable national sample surveys have been conducted in the 1990s. The availability of these data sets has encouraged the application of rigorous and econometrically sophisticated analysis of South African labour market issues for the first time.

Four of the studies from this literature are selected for further discussion as this is adequate to illustrate the type of choices that need to be made when modelling the South African labour market. It also allows for an illustration of how the approach in the model proposed here, compares to the existing literature. The methodology and the results of these studies in Box 1 are summarised below.

[table temporarily deleted!!]

To the uninitiated, it is hard to read across this literature and make comparisons. The major reason for this is the bewildering array of differences in specification, conceptualisation, estimation techniques and data. These differences are rarely discussed or justified. The four previous studies in Box 1 all use ordinary least squares estimation techniques in estimating the earnings function and all but one use the 1993 SALDRU-World Bank PSLSD data set, referred to in the introduction. Thus, to a large measure the differences due to data and techniques are controlled for. This allows for a focus on issues relating to specification and conceptualisation.

In terms of specification issues, each study makes different choices about whether to deal with race, gender and location via dummy variables or via separate equations. Then there are differences in how education, age and experience effects are captured. Some studies use a set of dummy variables and interactive dummy variables for all of these explanatory variables. On the other hand education effects are often assessed through the use of splines.

These choices, for the purposes here, are largely defined by the descriptive analysis in Chapter 4, as alluded to above. This picture revealed that the vulnerable are almost exclusively found within the African and Coloured racial groups, with the African group accounting for close to 90 per cent of all low earners and no-earners. In the modelling presented here the focus is therefore exclusively to African individuals. We also know that, within the African group, females carry a larger than proportionate burden of low participation, high unemployment and low earnings. In addition, low-earning African females tend to be found in different sections of the labour market to males. Given these factors, there is a strong likelihood that estimates based on aggregate African models are likely to throw up average parameters that are not useful representations of either male or female groups. In addition, we explicitly want to compare African female and male models. Thus, in all instances, separate estimations for African males and females are run.

Thus, on the basis of the descriptive support formulated in Chapter 4, these restrictions are imposed. Such restrictions are also in line with the careful econometric work represented in Box 1. One can be confident, therefore, that they will improve the quality and usefulness of the resultant estimates.

Besides these racial and gender dimensions of vulnerability, the analysis in Chapter 4 also revealed strong rural and urban differences within both African male and female groups. This is accounted for by estimating models for all African women and all African men in which a rural and urban dummy variable was included. We then go on to estimate separate models for rural and urban areas so that the coefficients can be compared and statistically test for significance between these coefficients. Thus, in assessing rural and urban differences, separate specifications from the outset are not imposed. Rather we assess the specifications as part of the estimation process.

These are the major choices that are made regarding the earnings equations. As explained later, a labour participation and employment equations alone with the earnings equation is estimated. Each of these three equations include certain explanatory variables that clearly pertain to that equation and not to the others. However, the results in Chapter 4 make it clear that there are age, education and provincial aspects to labour market vulnerability at each of these three levels. All three equations will include a set of dummy variables capturing age and provincial effects and a set of three educational splines that capture the returns to schooling at primary, secondary and tertiary level.

At the conceptual level, hardly any of the South African work spells out even a rudimentary model of the South African labour market as the context for estimation. Earnings function work only makes sense against such a context and part of the difference between the models must lie in the fact that the earnings functions are set up, often only implicitly, in differently defined labour market contexts. This point is teased out below by a close examination of the sample selection equations that are used in each of the studies. Each researcher chooses a sample selection equation based on a demarcation of the relevant sample (labour market) of the study as well as the relationship between the sub-sample of earners and this broader sample. Thus, inspection of the interface between the earnings equation and the sample selection equation reveals much about the overall labour market context within which the earnings function work is located.

This is illustrated with reference to the four studies presented in Box 1. The key columns are the two columns reflecting the coverage of the earnings function and labour market sample selection.

The Mwabu and Schultz (1996) study is the most careful of all four studies in terms of testing for the adequacy of different specifications for the earnings function. However, the focus of the earnings function, formal sector earnings, is assumed from the outset and not derived. The selection equation begins with all potential labour market participants. It includes an extensive array of agricultural asset variables that are the hallmarks of a participation equation in a conventional developing country. However, the resultant selection term is insignificant in all but one of the earnings functions and it is therefore omitted for the final set of earnings function estimations. Indeed, as Mwabu and Schultz point out, these variables are jointly insignificant even in the participation equation, thus raising some problems for the identification of the two-equation model.

This insignificance is hardly surprising for two reasons. First, one of the apartheid legacies in South Africa is the decimation of any small-holder and subsistence farming classes (Lipton *et al*, 1996). Thus, it is hard to conceptualise any clear relationship between these agricultural assets and labour market participation. Second, the earnings equation is narrowly focussed on formal sector earnings. This leaves participation in the labour market, selection into employment and participation in the informal sector to be dealt with by the participation equation. We would expect such a diversity of forms of participation and selections to be inadequately captured by a single participation equation. Even assuming that all unemployment in South Africa is voluntary, and indistinguishable from the decision regarding whether or not to participate in the labour market, the participation equation also has to deal with the awkward issue of participation in the informal sector versus the formal sector.

The Fallon and Lucas (1998) study covers a far broader section of the labour market in the earnings function itself. Formal sector employees, the self-employed and part-time workers are all included as earners. The selection equation then selects from the chosen sample of all labour market participants into this sample of earners. The selection equation therefore covers the selection from the pool of participants into earnings; i.e., an employment-unemployment equation. Of

course this makes the selection equation coherent and interesting in its own right. However, this coherence is achieved at the cost of ignoring the issue of participation in the labour market and therefore using a narrower sample than the other studies. The employment probit includes a set of variables defining "other household income". These variables would usually be thought of as factors influencing participation rather than factors influencing employment. The exception would be if unemployment were viewed as voluntary. Fallon and Lucas clearly do not believe this to be the case. However, this then leaves the participation-unemployment nexus hanging in the air in this study.

Winter (1997) offers a full analysis of participation in the South African labour market. Indeed it was her clear documentation of the importance of South Africa's very low participation rates and the gender and racial biases in these participation rates that informed the view here that participation is one of the aspects of labour market vulnerability in South Africa. Having provided this exhaustive analysis of participation, Winter uses her earnings function work to document the importance of earnings discrimination by gender in the South African labour market. The focus of this earnings analysis is on formal sector workers. In estimating earnings functions by gender she does not include a sample selection term. Indeed she could not as she has provided extensive coverage of participation but no coverage of unemployment. She has left the selection into employment unexplored and therefore has a missing sub-sample in her labour market.

Like Fallon and Lucas, Hofmeyr (1999) attempts to capture all earners within the ambit of the earnings function estimations. Hofmeyr uses the same earnings categories as Fallon and Lucas but goes further by splitting formal sector workers into unionised and non-unionised sections. However, Hofmeyr differs from all previous studies in his approach to selection. He sets up a full sample of potential labour market participants and presumes that they are allocated into one of his four categories of earners or into unpaid household help (helping another household member who is self-employed) or into no employment. This selection is done simultaneously in a multinomial logit allocation equation in which "no employment" is defined as the default category. It is interesting to see how the characteristics of those allocated into the earnings segments differ from those without employment. However, it needs to be stressed that "no employment"

covers non-participants and unemployed. Thus, the model cannot provide useful information on either participation or on unemployment.

The original rationale for such a multinomial logit model is an occupational choice model (Roy, 1951). Hofmeyr is well aware of the fact that the South African labour market offers an uncomfortable context for such a choice-theoretic view of the allocation process and wants the model to cover both supply and demand elements and therefore choice and constraints from the individual point of view. It is not clear that the model is up to such a task as is evidenced by the fact that the model allocates many individuals to incorrect segments of the labour market.

This review of four recent econometric studies is a relevant and useful context for the presentation of the modelling approach taken here. Our special focus is on the vulnerable in the labour market. The preceding chapter has made it quite clear that vulnerability needs to be defined in such a way that it encompasses labour market participation, selection into employment as well as the determinants of earnings. The biggest conceptual issue with regard to the formulation of the modelling is to give detailed attention to all three of these stages in the labour market.

Econometric Estimation Approach

The equations estimated for participation and employment status below necessitate the use of limited dependent variable models (Maddala, 1984 and Greene, 1991) These models all derive coefficient estimates for the explanatory variables by maximising the probability of correctly predicting whether or not each person is a participant (the participation equation) or employed (the employment equation). We utilise here the Basic Probit (Cumulative Normal) specification - probably the most widely used approach in the class of binary choice models - in order to derive the likelihood function that best predicts the participation and employment status of the individuals in the samples. In this limited dependent variable model (as in all others) an individual's characteristics jointly determine the probability of an individual falling into the defining category (e.g. employment or participation). Generically the model takes the following form:

$$y^{*} = X\beta + \varepsilon, \qquad (1)$$

$$y = 1 \text{ if } y^* \geq 0 \text{ , } y = 0 \text{ if } y^* < 0 \tag{2}$$

$$\varepsilon \sim N(0,1) \tag{3}$$

where **X** is a row vector consisting of the list of explanatory variables, with the column vector coefficient β, simultaneously determining the probability that $y^* \geq 0$. The error term, ε, is assumed to be normally distributed. The model implies that:

$$\text{Prob } (y=1 \mid \mathbf{X}) = E(y \mid \mathbf{X}) = F(\mathbf{X}\beta) \tag{4}$$

where F is the cumulative normal distribution function. As a consequence of the above, individual coefficients cannot be interpreted as the separate contribution of that variable to the probability. For this reason, the focus of attention will be on the sign and statistical significance of the individual coefficients rather than the actual values of the coefficients. The earnings function approach of course relies on the more familiar OLS techniques, and has been described in Chapter 3 above.

The Model Set-up

The model structure deals with these stages participation, employment and earnings sequentially. First, we begin with a full sample of potential labour market participants and estimate a participation probability model. Then, for the reduced sample of labour market participants an employment probability model is estimated. Finally, an earnings function is estimated using the sample of employed Africans. Such a sequential model can be loosely justified by the assumption that labour market participation and employment are first choice activities of all potential labour market participants and therefore a rationing process is being modelled. The participation equation attempts to throw light on the key factors selecting participants. Once the participants are determined, the second stage models the employment allocation process. The final stage models earnings of those who succeed in obtaining employment.

This is certainly a plausible South African scenario; particularly for the employment-unemployment step between participation and earnings. As argued above, other econometric studies of the South African labour market have tended to blur the distinction between participation and unemployment in their selection equation. While this is not particularly important if the purpose of the exercise is to cleanse the earnings equation of sample selection problems, it is of no use if the purpose of the analysis is to examine the determinants of participation and employment.

Such analysis is particularly important in the South African context because of the debates that exist over usage of the narrow versus the expanded definition of unemployment (ILO, 1996 and Nattrass and Seekings, 1998). In discussions over the two unemployment definitions, insufficient attention has been given to the fact that a movement from a broad to a narrow definition of unemployment involves an assertion that discouraged workers are not participating in the labour force.[37] Thus, the sub-sample of unemployed shrinks to the narrow definition and the sub-sample of participants expands to take in the discouraged work-seekers. By distinguishing between participation and unemployment one can assess the difference that the change in definition makes to *both* participation and unemployment.

Related to the narrow versus broad unemployment issue is the question of voluntary versus involuntary unemployment. All analysts recognise that unemployment is predominantly involuntary in South Africa[38]. Even more important is the fact that the unemployment questions in all recent surveys are designed to select out those who want jobs but do not have them from the sample of potential labour market participants. Thus, the surveys themselves are structured to capture the involuntarily unemployed. Yet, as pointed out earlier, the earnings function literature in South Africa has tended to present a messy interface between

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[37] The ILO (1996) argues that there are so many discouraged workers that they must be doing something. In other words, the discouraged worker category is an artifact of inaccurate survey work. This is a plausible argument for some surveys data sets. However, as argued in Bhorat (1999b), the OHS 95 gives serious attention to these issues and we would therefore argue that the patterns are robust enough to accept. In OHS 1995 the discouraged worker category is notably smaller than previous estimates but the narrow unemployment category is larger. This suggests that part of the inaccuracy of earlier survey work may have involved an inaccurate capturing of search activity.

[38] There has been, historically, an ongoing debate in South Africa on voluntary as opposed to involuntary unemployment, with the claim of high reservation wages amongst the unemployed serving to buttress the view that the economy's unemployment has a significant voluntary component.

participation and unemployment in their selection equations. Indeed, given that most selection equations are starkly framed in terms of participation versus non-participation in the labour market, it is only by assuming that unemployment is voluntary that the specified selection equations can be made tenable. By including both participation and employment equations here, we are clearly defining unemployment as a state that occurs despite a decision to participate in the labour market. It is therefore clearly involuntary.

The estimation starts out with a full sample of potential labour market participants. It then shrinks the sample to cover actual labour market participants and then shrinks the sample further to cover earners. It is now well established in the labour economics literature that the estimates derived in the employment model and in the earnings model may be biased because of the fact that they are both based on non-random, reduced versions of the original sample of potentially employable Africans (Heckman, 1979). Thus in all versions of the modelling, and as undertaken in Chapter 3, the possibility of sample selection problems is controlled for. A probit model is used to estimate the participation equation. Then another probit model is utilised to derive employment probability estimates conditional on the characteristics of all labour market participants and *conditional on the fact that these are the actual participants taken from a full sample of all potential participants.* Then an estimated earnings coefficients is derived, conditional on the individual characteristics of the earners and *conditional on the fact that these earners are a sub-sample of all labour market participants and an even smaller sub-sample of potential participants.*

In each instance, the Heckman two-step approach is used, to cope with the sample selection issue (Greene, 1993 and Breen, 1996). Having estimated the participation probit, these estimates are used to derive the estimate for the inverse Mills ratio (lambda) for inclusion in the employment probit. It is the inclusion of this lambda that allows one to make the employment probit conditional on positive participation. The estimates from the employment probit are used to derive a new estimated Mills ratio, reflecting selection into earnings. The inclusion of this second lambda in the earnings equation makes the earning equation conditional on participation and selection into employment. It seems plausible to argue the selection into employment and the determination of earnings for those employed are simultaneous processes rather than sequential.

This possibility is allowed for by deriving another set of estimates for the employment probability model and the earnings function based on a single, integrated maximum-likelihood model.

One of the strengths of a clear delimitation of participation, employment and earnings stages in the labour market is that it facilitates the selection of a coherent set of variables for each equation. For example, as mentioned in the discussion around Fallon and Lucas (1998) above, it is fairly common to see household variables in an employment-unemployment probit. However, such variables would normally relate to a participation process rather than an employment process. Thus, the participation equation includes a full set of household composition variables by age as well as variable reflecting income from other household members (and the square of this variable to allow for non-linearities). In terms of the two-stage selection model, these household variables identify the lambda that is included in the employment probit.

The employment equation therefore only contains information about the personal characteristic of each job seeker (age, education and location). As these variables are all also plausible explanatory factors in the earnings function, this raises a tricky identification issue in terms of the selection lambda that is derived from the employment probit for inclusion in the earnings equation. There are two factors that lead one to suspect that this is not a problem in the estimations. First, age (one of the common variables) would seem to be important in the employment/unemployment equation whereas potential experience (and potential experience squared) would appear to be the more relevant age-related variable for the earnings function. Thus, age effects are specified differently in the two equations. Second, the lambda carried through into the earnings equation incorporates the first lambda from the participation equation as an identifying explanatory variable. This lambda is an additional variable in the employment equation.

Data Issues

Thus, there seems to be a comforting degree of agreement between tidy econometric practice and the type of labour market that we estimate in order to capture the key aspects of labour market vulnerability in South Africa. However, it is necessary to conclude this section by clearly spelling out the constraints that the

data have imposed on the modelling. One key limitation is the inability to use the survey to clearly demarcate an informal and a formal sector. Models of segmentation in developing countries give explicit attention to these earnings segmentations (Glick and Sahn, 1997, Heckman and Hotz, 1986 and Andersson, undated). We cannot do this.[39]

Yet, descriptive analysis highlights the fact that, for Africans, self-employment clearly offered inferior earnings. However, further analysis showed that it was African female domestic workers who dominated this self-employment category (Bhorat,1999b). As there are estimating separate earnings equations by gender with full sets of sectoral and occupational dummy variables and an explanatory variable for hours worked, this self-employment effect will be adequately captured in the female earnings equations.

The participation equation is also far from perfect. It is common to define potential labour market participants by age (16-65). However, if one follows through with this definition here, then the non-participant sub-sample is dominated by young adults who are still in education. It might be the case that some young adults are staying in school because of poor employment prospects in the labour market. However, given high repetition rates and educational backlogs in South Africa, the routine school-leaving age is also well above 16 years. Such people are not potential labour market participants. However, not all young adults are in school and this pattern is overlayed with a high youth unemployment problem. Therefore, it would be distortionary to deal with this issue by raising the age of labour market participants. Rather all people who are in education from the sample are removed from the estimations.

This significantly reduces the sub-sample of non-participants. As the table below illustrates, the number of individuals in the population of working age enrolled in education is just over 4 million, accounting for close to one-quarter of all African individuals between 16 and 65 years. In the derivation of labour market participants then, those in the last category, being either retired, permanently

[39] Our review of Fallon and Lucas (1997) and Hofmeyr (1998) showed that the LSMS data is similarly flawed when it comes to an analysis of the informal sector. It would appear therefore that there is no data set in South Africa that can be used to explore formal sector/informal sector interactions in South Africa. The problem of uncovering the informal sector in the OHS95 data set is taken up in Bhorat (1999b).

disabled or unclassified are excluded. The exclusion of those in education omits the largest number of individuals.

Table 1: African Working Age Population, by Type of Activity

Activities	Male	Female	Total
Working Full-time	3597992	2009485	5607477
%	42.71	22.29	32.15
Working Part-time	245596	294602	540198
%	2.92	3.27	3.10
With a job, but absent from work	39512	30360	69872
%	0.47	0.34	0.40
Going to school/university/college	2061942	2039084	4101026
%	24.48	22.62	23.51
Unemployed (looking for work)	1677274	1981823	3659097
%	19.91	21.98	20.98
Not working, not looking for work	293627	678380	972007
%	3.49	7.52	5.57
Home Production	21096	1337700	1358796
%	0.25	14.84	7.79
Retired (pensioner)	253188	431601	684789
%	3.01	4.79	3.93
Permanently unable to work	233189	211216	444405
%	2.77	2.34	2.55
Other	1060	2224	3284
%	0.01	0.02	0.02
Total	8424476	9016475	17440951
%	100	100	100

For African females there remain a large number of non-participants who are engaged in home production, but very few males are in this category. The structure of the survey is such as to classify all male non-labour market activity as self-employment, to impute earnings to these activities and include such males as unregistered self-employed earners. With the removal of African individuals in education, the sub-sample of non-participants as a whole drops to 12 207 447, 70% the size of the original sample. Of this narrower sample then, 11% of the activities undertaken involve home production. Of this 11%, the overwhelming majority (98%) are female.

The import of the above decisions taken in dividing the sample of African participants for the modelling is as follows:

- When the broad definition of unemployment is adopted, there is a very small sub-sample of male non-participants and the female sub-sample are exclusively those engaged in home production.

- When one adopts the narrow definition of unemployment, male non-participants are dominated by discouraged workers and female non-participants are a mix of discouraged workers and women engaged in home production.

There is one final data difficulty in the participation equation. It is not possible to attribute children to specific parents. A variable capturing the number of children in the household is included, but this is certainly only a loose proxy for the influence of own children on participation.

Model Results

Tables 2 to 5 below present the influence of the different covariates on the probability of participation and employment as well as on the level of earnings of the employed. For the covariates which are dummies, the following are the referent variables:

- Location: Rural
- Age: 16-24
- Province: Western Cape
- Sector: Agriculture
- Occupation: Farm worker
- Union Status: Non-Unionised worker

As explained above, the equations are all run for African individuals only. In addition, separate male and female equations are estimated for both the expanded and strict definitions of unemployment. The key results for participation, employment and earnings, respectively, are presented in tables 2, 3 and 4 below. Tables 5 through 9 in Appendix 3 represent the output when all of these models are re-estimated separately for rural and urban areas[40].

[40] In the employment and participation probit regressions, the coefficients reflect the impact of an infinitesimal change in each of the continuous variables on the dependent variable, while for dummy variables the discrete change in the probability is reported. These coefficients are referred to as 'marginal effects' in the tables. The underlying distribution remains the same, but reporting the results in this way, allows for easier interpretation and explanation. Included in the outputs are the mean values for each of the variables, 'x-bar'.

Participation Equation

Table 2 presents the results from the participation decision in the labour market. The urban dummy variable is significant for females but not for males, across both the narrow and expanded definitions of unemployment. Hence, for females, living in an urban area increases the probability of participating in the labour market, while for males location has no statistically significant bearing on their participation decision. Further evidence in this regard comes from Tables 5 and 8 in Appendix 2 which present results for male and female participation equations in urban and rural areas. The marginal effects in the male equations in both urban and rural areas are very similar to each other and to the marginal effects in the aggregate model. It would seem that there are no noteworthy differences in male participation in urban and rural areas. However, this is not always the case with African females and we will flag these differences in our discussion below.

The education splines suggest that schooling is an important variable in determining whether individuals participate or not in the labour market. For African males, according to the expanded definition both primary schooling and secondary schooling have a positive bearing on the participation decision. Surprisingly, having tertiary education does not appear to influence the decision to participate or not. However, with a switch to the narrow definition of unemployment and the consequent re-classification of the discouraged workers as non-participants, all three splines become significant. The significant tertiary variable here implies that tertiary education increases the probability of being employed or of being an active job seeker relative to being one of the discouraged work-seekers who now dominate the non-participants.

For females, the education splines are slightly different. Only secondary education is significant for the expanded definition, while for the narrow definition, secondary and tertiary schooling are significant. As with males, a small percentageof females have tertiary education. Remembering that the non-participants here include discouraged work-seekers, the data shows that of the female non-participants by the narrow definition, only 1% have tertiary education compared to 11% for participants.

Table 2 : African Male and Female Probability of Labour Participation Equations for Expanded and Narrow Definitions of Unemployment

	Male				Female			
	Expanded		Narrow		Expanded		Narrow	
	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar
Urban	.0099	.504329	.0072	.504329	.1418**	.390973	.1321**	.390973
Education								
None-Std5	.0029**	4.43131	.004*	4.43131	.0027	4.20941	.0030	4.20941
Std 6-10	.0052**	1.44132	.0159**	1.44132	.0517**	1.27643	.0568**	1.27643
Tertiary	.00241	.105839	.0161**	.105839	-.0231	.103659	.0115*	.103659
Age								
26-35	.05796**	.349291	.13893**	.349291	.09665**	.342574	.1309**	.342574
36-45	.07255**	.248674	.18949**	.248674	.07898**	.252344	.1831**	.252344
46-55	.05132**	.143162	.1616**	.143162	-.0115	.149113	.1371**	.149113
56-65	.01766**	.053417	.1440**	.053417	-.12882**	.050201	.0781**	.050201
Household Variables								
No. of Kids <7	.00166	.785774	.0060	.785774	-.02125**	1.11372	-.0258**	1.11372
No. of Kids 8-15	-.00156	.878397	-.0095**	.878397	-.00989**	1.14248	-.0168**	1.14248
No of males 16-59	-.009189**	1.96432	-.0317**	1.96432	-.00988**	1.33687	-.0164**	1.33687
No of fems 16-59	-.00937**	1.51446	-.0259**	1.51446	.02978**	2.15132	.0116**	2.15132
No of Adults >60	-.03313**	.319228	-.0958**	.319228	-.00307	.34587	-.0381**	.34587
Other hhld. income	-6.12e-07**	17352	-9.90e-07**	17352	-2.24e-06**	20880.8	-9.73e-07**	20880.8
Other hhld. income squared	2.75e-12**	1.1e+09	7.16e-12**	1.1e+09	2.44e-12**	2.0e+09	4.83e-13**	2.0e+09
Obs. Prob	**.91173**		**.7753**		**.6584**		**.4865**	
Pred. Prob (at x-bar)	**.9348**		**.80972**		**.6773**		**.4878**	
No Obs	**15658**		**15658**		**19548**		**19548**	
Chi(2)	**1084****		**2450**		**2190**		**2144****	
Pseudo R2	**0.1120**		**0.1426**		**0.0870**		**0.0792**	

** Significant at the 1% level

* Significant at the 5% level

What the above suggests is that education is important in determining whether an individual participates or not. However, its significance seems to increase when using the narrow definition of unemployed. This is manifest in much better educational qualifications amongst participants, relative to non-participants. For both females and males, non-participants by the narrow definition are dominated by discouraged work-seekers. This educational wedge between the two groups, drives the results in the narrow definition equations.

The age dummy variables are all significant barring the case of females 46-55 under the expanded definition. In addition, all significant coefficients have the same positive sign, barring the case of females 56-65 under the expanded definition. In other words, the age dummies suggest that the probability of participation increases for all age cohorts, relative to the youngest cohort, namely 16-25 years. This is not a surprising result, as those adults who are older are more likely to have a job or to be seeking a job, irrespective of the definition of unemployment used. However, the fact that this age effect strengthens with a move to the narrow definition of unemployment is alarming as it suggests that there are a significant proportion of the youth cohort that are discouraged worker seekers.

While not presented in Table 2 above, the equation also included a full set of provincial dummy variables. These dummies generally had similar results across the genders and definitions. Provinces with significant results were the Northern Cape, Kwazulu-Natal, North-West, Mpumulanga and the Northern Province. The referent province was the Western Cape. In each of these cases, being in the respective province decreased the probability of participating in the labour market relative to those in the Western Cape. All of these provinces have a higher percentage of rural economically active than the Western Cape. For the narrow definition, these results also pick up the much larger number of discouraged work-seekers in these provinces relative to the Western Cape.

The household block of variables includes two 'number of children' variables, three 'number of adults' variables and two household income covariates. Here the gender biases of child rearing become immediately evident. For males, the number of children of any age in a home is insignificant in determining their participation decision. For females, however, it is clearly established that the greater the number

of children under the age of 7 or between the ages of 8 and 15, the less the probability of their participation in the labour market.

With the exception of adults older than 60 in the female expanded equation, the 'number of adults' variables are all significant. What is interesting though is that in most cases, the coefficients are negative. This indicates that the presence of a greater number of adults in the household acts as a deterrent to participation in the labour market. For females though, the signs are positive when considering the number of female adults aged 16-59 in the home. In other words, females are more likely to participate in the labour market, the larger the number of working age women in the home by both definitions of unemployment. This fact may be picking up those women involved in home production, who because they will not be participating cause other females to participate in the labour market. The more working age males in the home though, the less likely are women to participate.

While the larger the number of aged in the home causes the probability of participation to fall for males by both definitions, this is not true for females. For females, the expanded definition estimate is insignificant, while the narrow definition is significant. These results in general suggest that for males and females, the presence of an aged person (and in all likelihood a pensioner) acts as a deterrent to participation in the labour market.

Finally, the other household income variables are both significant across genders and definitions, with the same negative sign. It is evident that the greater the value of other household income available to an individual, male or female, in a household, the more it reduces the probability of their participation in the labour market. In other words, access to income within a household is an important determinant in an individual's decision to participate. However, the small but positive values on the household income squared coefficients suggest that its effect is dampened as income increases.

Tables 5 and 8 in Appendix 3 show that, in a few key areas, the aggregate female participation patterns that we have discussed above have blurred important rural-urban differences. Two cases are highlighted. First, the education results for urban females are stronger than for the whole sample of females. Thus, for urban women under the expanded definition, only primary schooling is significant in increasing the

probability of participation. For the narrow definition, all three educational splines are significant. This would suggest that for urban women, educational qualifications are a more important determinant of their decision to participate, when compared with the sample of all females. Second, for urban women, the presence of children between the ages of 8 and 15 is not significant in determining participation, across either definitions of unemployment. This would suggest that in urban labour markets, women are less likely to give up a job or stop searching for a job due to older children being in the home. It may also reflect a work life-cycle phenomenon, where women after rearing the children at home, then re-enter the labour market. Noticeably this is a purely urban characteristic, as this variable is negative and significant for rural females.

Employment Equation

Having considered the determinants of participation, we retain the sample of those individuals who decide to participate, and in turn estimate the probability these participants have of finding a job. The results from the employment probit are presented in Table 3 below. Maintaining consistency with the participation models, we also estimated separate employment equations for urban and rural areas. These estimations are reported in tables 6 and 9, respectively, of Appendix 3. Note that there were too few narrowly unemployed females in urban areas for the urban, female employment equation to generate a set of estimated coefficients.

Many of the variables in the employment equation are the same as those included in the participation equation. However, household structure or household income variables are not included in the employment equation. As discussed in an earlier section of this paper, the employment equation is set up to capture the rationing process through which jobs are allocated to some of those who are seeking work. The household variables are seen to influence the decision to seek work but not the process of finding employment.

Beginning with the last variable first: The coefficients for lambda are significant for males and females for the narrow definition, but, under the expanded definition, only for males. Lambda represents the inverse Mill's ratio and is a measure of the selectivity bias in the sample. The significant results suggest that sampling bias did exist in the sample and needed to be corrected for through this procedure. Labour market participants do not look like a random sample chosen from all of the

economically active population. This difference is particularly acute when participants are defined based on the narrow definition of unemployment.

The location results show that for African males across both definitions, living in an urban area reduces the probability of being employed. For females the result also holds for the narrow definition of unemployment. Given that employment opportunities present themselves overwhelmingly in urban areas, the negative coefficients are seemingly surprising. Tables 6 and 9 in Appendix 3 allow us to unpack this a little further. These tables contain figures for the actual and estimated probabilities of employment in urban and rural areas, respectively. It can be seen that both of these probabilities are very close for urban and rural areas. The predicted probabilities of employment are based on an average set of characteristics for urban or rural work-seekers, respectively. The mean values for all variables which are shown in tables 6 and 9 show that the average rural work-seeker is not as well educated or as well located as the average urban work seeker. The marginal effect of the urban-rural dummy variable in Table 3 is based on an average set of characteristics for the *combined* urban and rural sample. Thus, it assesses the probability of employment for an average worker who has characteristics that lie in between those reflected in the separate urban and rural estimations. This worker has less favourable attributes than the average urban worker and, *for such a person*, rural areas offer a higher probability of employment.

The case of female participants under the expanded definition appears to offer an important exception. Tables 6 and 9 show that the actual and predicted probabilities of being employed are close to ten percent higher in urban areas than rural areas and the urban/rural dummy variable in Table 3 is positive, reflecting a higher probability of employment in the urban areas. However, even here, the urban/rural dummy variable is not statistically significant. This reflects the fact that an African female with average aggregate characteristics would have better characteristics than the rural average and worse than the urban average. She would therefore have a higher than fifty percent chance of employment in rural areas and a lower than sixty percent chance of employment in urban areas.

Table 3 : African Male and Female Employment Equations for Expanded and Narrow Definitions of Unemployment

	Male				Female			
	Expanded		Narrow		Expanded		Narrow	
	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar
Urban	-.08119**	.518166	-.06044**	.536173	.01502	.470573	-.11547*	.512476
Education								
None-Std5	-.01214**	4.46674	-.00877**	4.49146	-.00381**	4.4932	-.00940*	4.58104
Std 6-10	.00911	1.46147	.00007	1.49287	.03556*	1.53057	-.02063*	1.66111
Tertiary	.04735**	.108512	.03623**	.116307	.14162*	.126277	.15301*	.153247
Age								
26-35	.00314	.356938	-.00214	.357391	.2068*	.378007	.08557*	.370626
36-45	.05499**	.261804	.01259	.27969	.35464*	.259706	.16435*	.278516
46-55	.11750**	.146699	.04410**	.156069	.38832*	.129088	.2040*	.143411
56-65	.25410**	.049023	.09665**	.053912	.41972*	.033449	.23622*	.039938
Province								
E.Cape	-.06235*	.12238	.04477*	.108051	-.12400*	.162958	.05221	.15373
N.Cape	.00402	.01065	-.02210	.01137	-.0151	.007157	.02185	.007811
Free Stat	-.00515	.087579	.07063**	.089931	.03244	.089192	.0729**	.091194
Kwaz/Natl	.03850	.192919	.02811	.192312	-.04242**	.221515	.05947	.225838
North-W	-.01404	.115938	.04595*	.115271	-.04376	.098021	.09928*	.093327
Gauteng	.05342**	.249739	.04712**	.268261	.00861	.193928	.03198	.219473
Mpumal	-.0207	.092567	.06406**	.090007	-.08506*	.0792	.07478**	.071484
N.Prov	.08420**	.08616	.08594**	.079052	-.17369*	.118059	.06257*	.10429
Lamda	-1.4131**	.156201	-.43850**	.329335	.0018	.502512	-.44005*	.740367
Obs. Prob	**.7173043**		**.8434**		**.5460**		**.73894**	
Pred. Probat x-bar)	**.7419969**		**.8740**		**.55423**		**.76711**	
No Obs	**14203**		**11931**		**12810**		**9426**	
Chi(2)	**2677****		**1585**		**1902**		**1245**	
Pseudo R2	**0.1483**		**0.1548**		**0.1078**		**0.1156**	

** ***Significant at the 1% level** * **Significant at the 5% level***

The education splines firstly show that across both genders and definitions, the possession of primary schooling or less reduces the probability of finding employment. Indeed, for females by the narrow definition, this negative coefficient holds for secondary schooling as well. In contrast the coefficient on tertiary education is positive across both genders and definitions. Collectively the education splines indicate that individuals with lower levels of education have less of a chance of getting a job than those with high-level, and specifically tertiary, education. This analysis confirms the time-series labour demand analysis undertaken in Chapters 1 and 2 above, which revealed a growing demand for higher skilled labour, and stagnant or declining demand for less skilled workers.

The age variables, as with the previous equation, are not surprising as they show an increased probability of employment in older age cohorts relative to those in the 16-25 group. This reflects the large number of youth who are unemployed. The insignificant results for all except one age cohort for males by the narrow definition, may be picking up the large number of discouraged work-seekers who are fairly evenly distributed across these age groups. The provincial results are mixed. Some of the provinces, such as the Northern Cape and Kwazulu-Natal, yield mostly insignificant results. For the rest, in some cases there is a lower probability of being employed in the province, relative to the Western Cape, and in others a higher probability. In Gauteng for example, African males have a greater probability of finding employment than their counterparts in the Western Cape. The parallel coefficients for females though, are insignificant. The Northern Province, one of the poorest provinces in the country, yields a positive coefficient except for females by the expanded definition.

The separate urban and rural employment estimations, presented in tables 6 and 9 of Appendix 3 have already been referred to. This section is concluded on, by noting further interesting results from these tables. For males for example, secondary education is seen to be important in predicting employment in urban labour markets. The insignificance of secondary education in the aggregate male employment equations therefore reflects the lack of significance of secondary education in rural areas. Contrary to these mixed results for secondary schooling, across all four equations in both urban and rural areas, tertiary education is crucial in predicting employment. Noticeably, the effect of primary schooling or less is weaker in rural areas. The location cuts also show more consistent results for the provincial dummies. Along with Gauteng, the Western Cape is seen to be the most favourable location for rural work-seekers. However, this is not as clear cut for urban work-

seekers, especially when discouraged unemployed are not included as labour market participants.

The Earnings Function

Table 4 below presents the earnings function for all those employed, by gender and again by the two definitions of unemployment. The move from narrow to expanded unemployment does not affect the classification of earners but only the sample selection variable (lambda) in the earnings function. Thus, the results of the estimations do not and would not be expected to differ much by the choice of narrow versus expanded unemployment. However, as employment and earnings were estimated together in one maximum-likelihood process, the two sets of earnings estimates are reported again. The disaggregated urban-rural equations are reported in table 7 and 10 of Appendix 3. In all estimations earnings are measured by the log of the monthly total wage earned by individuals, which is the manner in which the survey reported total pay.

Table 4: African Male and Female Earnings Equations for Expanded and Narrow Definitions of Unemployment

	Dependent Variable: Log of Monthly Wages			
	Male		Female	
	Expanded Unemployment	Narrow Unemployment	Expanded Unemployment	Narrow Unemployment
Urban	.1192892**	.1294798**	.1780**	.1912**
None-Std5	.034631**	.0357029**	.0488**	.0514**
Std 6-10	.1087725**	.1078169**	.0816**	.0927**
Tertiary	.0367241	.0312919	.0234	.0318
E.Cape	-.1070717**	-.1116288**	-.1117*	-.1465**
N.Cape	-.155832**	-.147461**	-.2329**	-.2267**
Free Stat	-.3030291**	-.3149274**	-.5577**	-.5694**
Kwaz/Natl	.0350547	.0377735	.0538	.0411
North-W	-.0153048	-.0194882	-.0891	-.1180*
Gauteng	.0536299	.052913	.1422*	.1357*
Mpumal	-.0353655	-.0467185	.1254*	.0945
N.Prov	.1192166**	.1087125**	.2051**	.1613**
Mining	.607814**	.6068056**	.2840*	.2831*
Manuf	.6394293**	.643446**	.2494**	.2535**
Electricity	.8829402**	.8850715**	.5171**	.5237**
Constr	.4777885**	.4826215**	.3753**	.3761**
Wholes	.5040102**	.5100534**	.1957*	.1995**
Transport	.7384904**	.7407738**	.5106**	.5179**
Finance	.6486269**	.6500433**	.4674**	.4708**
Comm Serv	.677428**	.6803405**	.3619**	.3653**
Other	-.2943609**	-.291168**	.2713**	.2735**
Armed Forces	.5296329**	.5256727**	.7866	.7881
Managers	.7602302**	.767167**	.9501**	.9552**
Profess	.7286019**	.7230151**	1.029**	1.031**
Technicians	.4671531**	.4656222**	.9203**	.9212**
Clerks	.2231234**	.2237144**	.5926**	.5953**
Serv&Sales	.1635076**	.163773**	.3514**	.3532**
Skilled Agric	.1874371**	.1916955**	.0711	.0797
Craft	.1862878**	.1865975**	.2341**	.2371**
Mach Operator	.1460807**	.1461151**	.3355**	.3383**
Unspecified	-.0151913	-.0098603	.1577	.1641
Domes Helper	-.0466067**	-.0482176	.2067**	.2073**
Mining lab	-.0668179*	-.0656155	.2000	.2033
Manuf. labourer	-.0591869**	-.0579945**	.2727**	.2732**
Transport labourer	-.0401749	-.0409864	-.2676	-.2347
Domes Worker	-.8043337**	-.7996188**	-.3591**	-.3596**
Union Member	.1997917**	.1941152**	.2131**	.2145**
Experience	.033548**	.0322203**	.0194**	.0220**
Experience sqrd.	-.000409**	-.0003958**	-.0002**	-.0002**
Log of Hours p.m.	.1089995**	.1036497**	.1246**	.1250**
Constant	5.543329**	5.601965**	4.838**	4.672**
Lambda	-.139954**	-.25413766**	-.2660**	-.2271**
No of Obs	**14 124**	**11 886**	**12 723**	**9 393**
Model Chi2	**2775****	**1687.44****	**1939.9****	**1284.5****

** Significant at the 1% level * Significant at the 5% level

Firstly, as with the employment equation, the Mill's ratio is shown to be significant and negative for all cases. There was therefore a sample selection bias, which was corrected for. The sample of earners is not a random selection of people drawn from the pool of participants. The significance of lambda once again vindicates the selection procedure utilised here.

From the remaining results it is clear that being in an urban area increases the earnings of the employed. It is an effect that holds true for males and females and for both definitions of unemployment. The education splines are particularly interesting. They show that for African males and females primary schooling as well secondary schooling are important in increasing earnings, but not tertiary education. Tables 7 and 10 show that the insignificant impact of tertiary education is true for the disaggregated urban and rural estimates as well. Hence, while tertiary education has been shown to be crucial in determining whether an African individual gains employment, it is not relevant in predicting the level of earnings. Notice that the rates of return to secondary schooling are in each case higher than the returns to primary schooling or less. Hence the return to earnings of one additional year of secondary schooling range from 8.1% to 10.9%, while in the primary schooling case, the figures are 3.5% and 5.1%. Furthermore, the returns to males on secondary education are higher than for females, but lower than for females in the case of primary education. Males also get higher returns to education in urban areas than in rural areas but the returns to females do not appear to differ in this way.

The provincial dummies show that African individuals in the Eastern Cape, Northern Cape and Free State, are likely to earn less than their counterparts in the Western Cape. The differential ranges from about 11% for males in the Eastern Cape to 56% for females in the Free State. The coefficients for both males and females appear to be relatively insensitive to the two unemployment definitions. The Northern Province is the only other province where the results are all significant. However, in this case, the coefficients are all positive. This seems contrary to poverty estimates of the province which place it far below the Western Cape. However, what this may suggest is that for the African employed, the Northern Province offers better earnings potential than the Western Cape. Indeed the mean wage in the Western Cape is only about half that of employees in the Northern Province. The urban-rural estimates add needed detail to this picture. It is not the Northern Province as a whole that offers better earnings, but urban employment in the Northern Province. Indeed for rural Northern Province and all other provinces, average male earnings are significantly lower than in the Western Cape.

The sectoral dummies show a strong and clear pattern: relative to Agriculture all the African employed earn more on average. This result holds true for both males and females and according to both definitions. For males, the ranking of the largest wage differentials does not alter by unemployment definition. The sector which pays the most relative to Agriculture is Electricity, where individuals are earning about 88% more than those in farming. This is followed by Transport, Community & Social Services and Finance. For females though, Finance does rank higher due to the low ranking of Community Services, where females only earn about 36% more than women in Agriculture. This can be explained by the large number of female basic service workers, particularly domestic workers, in this sector. Note that for the two large employers in the economy, Mining and Manufacturing, male workers will tend to earn 60% or more than those in farming, while for females the differential is much smaller at about 25%.

The results by occupation show that for the skilled occupations (Managers, Professionals and Technicians), these individuals are likely to earn between 47% and 76% more than farm labourers. As we move to the semi-skilled occupations (Clerks, Service & Sales, Skilled Agriculture, Craft workers and Machine Operators) the differentials are smaller. Hence for these occupations individuals earn between 15% and 22% more than farm workers. In the unskilled category though, the results are slightly different and in some cases, surprising. For females, household domestic workers earn about 36% less than farm workers. The coefficient for male labourers in manufacturing is surprising, as they are seen to earn about 6% less than male farm labourers. For females though, manufacturing labourers earn more. Hence, it would seem that the often perceived higher wage for unskilled workers in the manufacturing industry, is driven by the wage differential between women and not men, in these two sectors. One can see these same forces and a similar logic operating in the case of domestic helpers. The negative mining labourer coefficient for males (expanded definition) may be reflecting the fact that the mining industry's average skill levels have been increasing in the last decade. Hence those at the bottom have found their wages lagging in preference to those higher up in the internal labour market. Indeed many of the workers in the mining industry would be in the semi-skilled categories.

The union-wage effect is shown here to be about 20% for males and marginally higher at 21% for females. This is substantially lower than the cross-section estimate of Fallon & Lucas (1998), where the differential was over 50%. However their time-series analysis delivered an estimate in the range of 25 - 35%, which is more agreeable with the number here. It cannot be doubted though that union

membership is associated with significantly higher earnings for African workers. Tables 7 and 10 reveal that there is a particularly strong union effect in rural areas. The rural union premium is about 23% for males and 30% for females.

The experience variable indicates that an additional year of experience generates a return to earnings of about 3% for African males. For African females, the return is lower at about 2%. The log of hours worked is significant for both genders and definitions. The coefficients suggest that an increase of 1% in hours worked will raise earnings by between 0.1% and 0.12%. This is quite important as it indicates that an important determinant of earnings is the hours that the African employed are working. Table 7 suggests that in urban areas in particular, should males or females opt to work more, the returns could be quite high.

Conclusion

This chapter has tried to be as meticulous and transparent as possible in modelling participation, employment and earnings in the labour market. To this end, the short review of other models highlighted their strengths and drawbacks, while also offering the reasoning for the methodological approach taken here. Perhaps the strongest point to emerge from the methodological section was the insistence on a very carefully managed, three-phase labour market selection procedure, from participation to employment and then to earnings.

The participation equation showed that discouraged workers are statistically closer to the non-participants than to the narrowly unemployed. This strongly suggests that those searching for employment are more likely to get a job than those no longer searching, and therefore hints at the importance of structural unemployment in understanding the participation decision. What makes this so bleak is the fact that many of the youth are in this category rather than in the searching category. The employment analysis showed that the rural and urban unemployed have different characteristics but similar probabilities of getting employment. What is important about this is that it highlights an asymmetry. Urban work-seekers could take rural jobs but, on average, rural work seekers do not have the characteristics to compete in the urban job market. Rural work-seekers should thus be looking for work in rural areas. This suggests also that the spatial rigidities are essential to understanding employment creation in the domestic economy. The significance of the sample selection terms in the earnings functions also make it clear that those that get employment are different from those that try and do not. The key differences seem to be age and education.

Across the equations then, the age and education variables are important determinants. The age results for the participation and employment equation, in different ways, reflect the importance of youth unemployment. In the participation equation the older age cohorts all have a higher probability of participating than the youth. In turn, the stronger effect in the narrow definition case, points to the significant proportion of youth who are discouraged job-seekers - a fact which has important policy ramifications. The employment probit again suggested that the youth were the least likely to gain employment relative to those in the older age cohorts.

The education results showed very interesting variation across the three equations. Hence, while the non-tertiary education splines tend to be significant and positive in the participation equation, the non-tertiary splines are negative in the employment estimation. This suggests that while non-tertiary education levels tend to increase the probability of participation, these levels are not sufficient to ensure employment. This is a result that matches well with the economy's current, and in all likelihood, future labour demand patterns where firms' specifications are directed primarily toward highly skilled workers in the economy. However it is clear that for those who already have a job, the returns to schooling operate as expected, with secondary schooling yielding a higher rate of return than primary schooling. The heavy concentration on the vulnerable was shown by the insignificant tertiary coefficient. Essentially though, the results across the equations show that education levels operate differentially at each phase of the labour market process.

Chapter 6: Public Expenditure and Poverty Alleviation: Simulations for South Africa

Introduction

The analyses in Chapters 1 and 2 made it clear that employment in the medium-term will be provided in the main to those individuals at the top-end of the skills ladder. These employment shifts indicated massive job losses, particularly in the primary sectors, matched on the other hand by significant increases in the demand for labour in the services sectors, notably in financial and business services. In terms of skill levels, this sectoral change in employment revealed that the need for highly skilled workers (concentrated in the services sectors) has risen dramatically. In contrast, the demand for unskilled workers plummeted, with the restructuring of the public sector a significant post-apartheid contributor. Importantly, these employment trends are likely not only to continue, but in all probability to intensify over the medium term. Simplistically, the winners have been the highly skilled, while the losers have been almost without exception, unskilled workers.

In terms of the unemployed, this means that those individuals who are not skilled or have low levels of education will in all probability not get a job. Furthermore those who are older and not well-educated will most likely never obtain a job in their lifetime. Many of the unemployed are indeed, *unemployable*. Chapters 4 and 5, provided an in-depth overview of the correlates and determinants of vulnerability in the labour market. It was evident here that vulnerability in the labour market, while fairly discernible, was deep-rooted in the society. It is primarily within the context of these empirical co-ordinates then, that a policy debate has emerged around the notion of basic income grant to all individuals in the society. It is to this policy debate that the current chapter turns, while attempting at the same time to link the issues within the debate to the empirical work that has preceded this chapter.

The specific intention of undertaking these policy simulations is to determine, firstly in a hypothetical world, the cost to the state of alleviating poverty through an extensive income transfer scheme. This section of the chapter is deliberately general and somewhat grandiose, as its focus is to deliver baseline estimates of what the potential once-off costs of different income transfer schemes could be. Different permutations of such a hypothetical income transfer scheme are considered, through utilising an established methodology drawn from the approach of the FGT poverty analysis utilised in Chapter 4. The second component of the chapter utilises the same methodology, but differs on two counts: firstly a more recent, unofficial, data set is used and secondly simulations are undertaken on the basis of the specific

policy proclamations that have been made on a universal income grant for South Africa.

The Theoretical Approach

The most useful measure for simulating the effects on poverty of various policy interventions is the poverty gap measure. The poverty gap measure is derived from the general class of poverty measures developed by Foster, Greer and Thorbecke (1984). The FGT index of poverty measures, can be represented in general form as:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{z-y_i}{z}\right)^\alpha \Big|(y_i \le z) \qquad (1)$$

where n is the total sample size, z is the chosen poverty line, and y_i is the standard of living indicator of agent i. The parameter α measures how sensitive the index is to transfers between the poor units. Note that the index is conditional on the agent's income, y_i , being below the designated poverty line, z. The poverty gap measure (PG) is generated when α=1, and therefore for a given poverty line z[41] is presented as:

$$P_1 = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{z-y_i}{z}\right)\Big|(y_i \le z) \qquad (2)$$

As is clear, the PG represents a direct measure of agents' incomes relative to the poverty line. It is a money metric of poverty in the group under scrutiny. A first advantage of the FGT index, is its additive decomposability, which allows for sub-group poverty measures to be summed to form a society-wide measure without any loss of generality. More importantly here, the PG measure, in being linked to money values, can be utilised to run simulations on the poverty impacts of income transfers to the poor - for any given reference group in the society. Remembering that P_1 is a measure not simply of how many poor agents there are, but also of how poor the poor are, one arrives at a fairly nuanced analysis of the welfare outcomes of poverty alleviation strategies.

Utilising the poverty gap measure then, it is possible to calculate the minimum financial cost of poverty alleviation. This is done by assuming that the poverty

[41] If we assume an infinite number of poverty lines, we can then trace what is known as the Poverty

outcome in each sub-group is for P_1 to be zero. Put differently, it means that the income to each agent in the sub-group or society (y_i), would at least be equal to the value of the poverty line (z). This value can be determined from the equation (2) by calculating $\sum_{i=1}^{n}(z - y_i)\big|(y_i \le z)$. In other words, we sum the value of the resources required to place each agent in the society just above the poverty line.

A reformulation of this, and one that is easier for calculation purposes, is nzP_1, which is derived directly from equation (2) above. Using the latter as a basis, we can therefore present the minimum financial cost of alleviating poverty as measured by P_1, to the sub-group or society by the value associated with nzP_1 (Kanbur,1987:71). This figure represents the minimum commitment required of the state in that it assumes perfect targeting, with zero administrative and other costs generally associated with welfare transfer schemes. It is also assumed that the scheme would elicit no behavioural responses from any potential recipients. These responses are particularly important when individuals' returns to labour supply fall within the range of the transfer value. While these assumptions are of course extreme, and are discussed in greater detail below, the value of nzP_1 does provide a very useful first step in trying to gauge the importance and magnitude of the problem facing the society or the public sector.

The value of nzP_1 can be extended to include sub-divisions of the total sample. Hence, what can be determined is a matrix of the minimum financial commitment required to eradicate poverty amongst different groups at the household and individual level in the society.

A Generic Estimate for Poverty Alleviation

Utilising the above methodology, it is possible to estimate the once-off costs of eradicating poverty amongst different groups in the society. An important conceptual issue is to deal adequately with the unit of analysis in the different simulations. This relates to the problem of individuals and households in poverty analysis. In the language of the labour market, individuals earn or receive income, but from a strict poverty perspective it is households that should be examined when trying to understand income in relation to poverty - something alluded to but not adequately dealt with above. The analysis here will be diligent in trying to ensure that both individual and household level impacts of poverty alleviating expenditure

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Deficit Curve, which is represented as $P_1 = \int_0^z \left(\frac{z-y}{z}\right) f(y)dy$. This is the area under the Poverty Incidence Curve, which is associated with the headcount index.

are adequately dealt with. This is particularly important, as each approach offers separate conceptual advantages.

Expenditure for Zero Poverty

It was noted that the minimum expenditure required to yield zero poverty in the society is represented by nzP_1. The tables below provides these estimates for different sub-groups in the society. A few things need to be noted about the tables. Firstly, the analysis is based on the October Household Survey of 1995 (OHS95), which sampled about 30 000 households, drawn from 10 selected households in each of 3 000 clusters. For the household-specific data, the accompanying Income and Expenditure Survey (IES) was also utilised, and income rather than expenditure data manipulated to estimate household earnings. Secondly, for all the calculations that follow, the household poverty line chosen was R903 per month, a scale based on May *et al* (1995). The resultant individual poverty line drawn directly from this measure was R293 per month, used also in Chapter 4, based on the assumption, albeit simplistic, of an average of just over three individuals in a household. Given that the expenditure figures below will be presented as annual commitments, the equivalent household poverty line is R10 836 and the individual annual poverty line, R3 516. Finally, given the date of the survey, the money values presented are in 1995 prices.

Table 1 below provides baseline estimates of the minimum financial commitment required to eradicate poverty at the household level, and therefore is based implicitly on the assumption that each household's poverty gap is perfectly predicted. The different sub-groups of households, are those characterised by the race of the household head and the location of the household. The total number of households in the society is about 9.5 million, of which about 3 million are poor households. The national poverty gap measure for this group is about 0.13. As a consequence, the minimum financial commitment necessary to eradicate poverty at the household level in the economy using the 1995 data, is approximately R12.8 billion per annum. The state's total expenditure in 1995, at current prices was about R154.9 billion, and thus the cost of eradicating household poverty in the society constitutes 8.29% of this expenditure.

Table 1: Minimum Poverty Alleviation Expenditure for Households[42]

Sub-Group	No. of Households (n)	No. of Poor Households	Poverty Measure (P_1)	Expenditure per annum. (R. bill.)	% of Total National Budget Exp.
Total	*9 475 165*	*3 010 855*	0.1251	12.8	8.29
African	6 625 570	2 749 295	0.1180	12.1	7.82
Coloured	783 595	187 707	0.0060	0.6	0.40
Asian	249 906	11 356	0.0001	0.01	0.01
White	1 816 094	62 497	0.0010	0.1	0.07
Urban	5 122 047	831 863	0.0360	3.7	2.39
Semi-urban	177 302	52 081	0.0020	0.2	0.13
Rural	4 175 816	2 126 911	0.0871	8.9	5.77

In terms of the race-household distribution of public expenditure, a disproportionate share needs to be allocated to African households. While African households form about 70% of the total household population, they constitute 95% of poor households in the society. As a result R12.1 billion of the total expenditure needs to be allocated to households where the head is African. Coloured households are marginally under-represented amongst poor households relative to their share in the total household population. Coloured households thus form 8.3% of the population, and 4.8% of the required poverty eradication expenditure. The commitment needed from government for these households is less than 1% of total expenditure outlays. No significant financial commitment is required from the fiscus to eradicate poverty amongst Asian and White households. For White households, despite the fact that they form close to 20% of all households in the society, the required commitment from the state constitutes under 1% of the poverty eradication expenditure. The location results reveal the importance of rural household poverty in South Africa. To eradicate poverty amongst rural households, the state would need to commit at least an additional R8.9 billion per annum, constituting 5.8% of the state's total expenditure in 1995. Notwithstanding the expected predominance of rural household poverty, 30% of fiscal expenditure on poverty alleviation would still need to be allocated to urban households.

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[42] The decomposability properties of the FGT measure is particularly useful here, and the P_1 measures are calculated according to the formula, $P = \frac{\sum_{j=1}^{m} P_j n_j}{n}$ where the j individuals are summed by the m sub-groups in the sample and then weighted by the total sample, n, to derive the composite P_1 value. It should be noted that using this formula, the value for the minimum financial commitment by m sub-groups will be equal to $nz\sum_{j=1}^{m}\frac{n_j P_j}{n}$. In this table and all that follow, the poverty measure P_1 represents weighted shares of total poverty.

The household poverty alleviation figures may be complemented by a description of the magnitude of commitment required from the state, by the different labour market cohorts in the society. In a more general vein, this is an analysis of poverty and public expenditure at the individual rather than the household level. Table 2 below attempts to achieve this division of individual poverty alleviation expenditure, by calculating the value of nzP_1 for individuals identified by their labour market status, where z is now R293 per month, and the unemployed are of course zero earners.

The data illustrates, for example, that the state would need to spend approximately R15 billion per annum more, to keep all individuals in the labour force out of poverty. This static figure constitutes 9.7% of total government spending in 1995. Note that the individual expenditure value is greater than the household figure above, indicating that the cost to keeping a household out of poverty involves economies of scale not realised when dissecting the sample by individuals only. In particular, it reflects the fact that some individuals who are earning low or zero wages, belong to households that are not poor, particularly in urban areas. The racial division of the labour force again shows the dominance of African individuals. While the state would need to spend about R485 million per year on White workers in order to keep them out of poverty, the corresponding figure for Africans is 27 times greater. The racial disparities are also evident in that Africans form 69% of the labour force but 88% of all poor individuals in the labour force, while the corresponding figures for Whites are 17% and 2.2%.

The second set of figures for the labour market concentrate on employed individuals, by race, gender, location, sector and occupation. It is immediately apparent that the required resources from the fiscus decline sharply when only employed individuals are included. The expenditure required falls by over R14 billion, suggesting that the large numbers of unemployed would capture a substantial portion (93%) of the state's poverty eradication expenditure. Hence, a labour market focused poverty eradication programme would be overwhelmingly targeted at the unemployed. It is tempting then to describe the fault line of poverty in the labour market, as between the employed and the unemployed. However, as the discussion below will illuminate, pockets of poverty do exist amongst specific categories of the employed as well - that may require modification of this strict division.

Table 2: Minimum Poverty Alleviation Expenditure for Labour Market Individuals

Sub-Group	No. of Individuals (n)	No. of Poor Individuals (q)	Poverty Measure (P_1)	Expenditure per annum (R. bill.)	% of Total National Budget Exp.
Labour Force					
Total	*13 817 522*	4 499 617	*0.3100*	*15.1*	9.72
African	9 550 773	3 971 141	0.2700	13.1	8.47
Coloured	1 509 564	379 631	0.0300	1.5	0.94
Asian	414 511	49 675	0.0000	0.0	0.00
White	2 342 674	99 170	0.0100	0.5	0.31
Urban	8 528 908	2 100 535	0.1600	7.8	5.02
Semi-Urban	263 791	81 463	0.0200	1.0	0.63
Rural	5 004 374	2 301 880	0.1300	6.3	4.08
Employed					
Total	*9 947 208*	721 625	0.03	1.0	0.68
African	6 146 540	622 992	0.03	1.0	0.68
Coloured	1 191 020	84 206	0.00	0.0	0.00
Asian	364 780	1 932	0.00	0.0	0.00
White	2 244 868	12 495	0.00	0.0	0.00
Male	6 127 107	269 078	0.01	0.4	0.23
Female	3 820 101	452 547	0.02	0.6	0.45
Urban	6 546 947	182 856	0.01	0.3	0.23
Semi-urban	189 015	10 036	0.00	0.0	0.00
Rural	3 207 066	528 733	0.02	0.7	0.45
Agriculture	1 266 183	288 918	0.01	0.4	0.23
Mining	463 743	2 085	0.00	0.0	0.00
Manufacturing	1 497 292	21 833	0.00	0.0	0.00
Construction	92 470	10 386	0.00	0.0	0.00
Utilities	472 457	370	0.00	0.0	0.00
Wholesale	1 730 487	68 001	0.00	0.0	0.00
Transport	510 099	4 081	0.00	0.0	0.00
Finance	643 354	2 526	0.00	0.0	0.00
Comm. Services	3 271 123	323 425	0.02	0.6	0.37
Manager	570 923	7 201	0.001	0.03	0.02
Professional	351 518	347	0.000	0.0	0.00
Technicians	1 137 083	3 698	0.000	0.0	0.00
Clerks	1 205 348	10 194	0.001	0.03	0.02
Service	1 124 283	30 872	0.001	0.03	0.02
Skilled Agric.	129 267	9 143	0.000	0.0	0.00
Craft	1 211 344	25 556	0.002	0.07	0.05
Machine Operators	1 152 070	26 551	0.002	0.07	0.05
Domestic Helpers	379 684	22 973	0.001	0.03	0.02
Agric. Labourer	944 531	250 972	0.008	0.27	0.18
Mining Labourer	256 891	8 925	0.001	0.03	0.02
Manuf. Labourer	352 742	12 770	0.000	0.0	0.00
Transport Labourer	38 307	934	0.000	0.0	0.00
Domestic Workers	713 035	267 439	0.013	0.45	0.29

Expenditure on the employed by race, once again yields over-expenditure on Africans, relative to their share in the population. The financial resources required for the employed according to gender, shows greater spending is required for women than men. Despite the fact that women form only 38% of the workforce, the state needs to spend twice as much on poor employed females compared to males in order to end poverty in this cohort.

It is the sector and occupation cohorts though that provide for an interesting analysis of labour market poverty. At the sectoral level, the two poorest sets of individuals are those in Agriculture and Community & Social Services. These two sectors account for 85% of all the poverty amongst employed individuals in the labour market. Community & Social Services has marginally more poor individuals than Agriculture. These two sectors account for close to 90% of all the required expenditure on the employed poor. More specifically, the state would need to spend about R400 million in Agriculture and R600 million in Community & Social Services every year to eradicate poverty in these sectors. This sectoral picture of poverty is mirrored in the poverty results by occupation. The two poorest occupations are Domestic Services and Agricultural Labourers. These two occupations account for 72% of all the employed poor in the labour market. Note that there are more poor individuals that are domestic workers than farm labourers. As a result, the state would need to spend about R450 million per annum in domestic services versus R270 million amongst farm workers, to eliminate poverty amongst in these cohorts. These two occupations would have accounted for 0.47% of the government's total expenditure in 1995.

From the above table then, it can be argued that the majority of public expenditure would need to be committed to the unemployed. A strict separation in poverty terms between the employed and the unemployed does not, however, exist. This is particularly true in the case of farm workers and domestic workers who represent the core of the working poor in the labour market. These two groups of workers would require a substantial public expenditure commitment aimed at poverty reduction. This suggests that should public expenditure take the form of a labour market intervention, due consideration should be given to the fact that poverty exists not only amongst the unemployed, but also amongst sections of the employed. There would remain though, the real danger of disincentive effects on the labour supply decision of these two cohorts of workers, from this type of government support.

Perhaps a stronger mechanism for displaying this shared poverty amongst the unemployed and a segment of the employed is found in Table 3 below. The table presents household level data, but these are households categorised according to their labour market status. Hence each labour force individual - in this case domestic workers, farm workers and the unemployed - is linked back to their respective households. The sub-groups therefore, are of households characterised by a labour market status variable. The sample in each category is mutually exclusive. Hence, the households that domestic workers are found in, refers specifically to those households where domestic workers, *and no unemployed individuals or farm*

workers, reside. This is to avoid double-counting in our poverty measures, which would bias our poverty gap estimates. In addition, the households wherein combinations of these three labour force types are found, are included under the sub-group termed 'Combined'. Note that this category represents a minor share of these selected indigent household types. The data illustrates that while these four household types account for 54% of the total population, they represent 73% of all poor households in the society[43]. In terms of trying to gain a labour market view of household poverty then, it is evident that these four sub-groups of households are a fairly strong representation of how labour market earnings generate the observed household poverty levels in the society.

Table 3: Minimum Poverty Alleviation Expenditure for Selected Households

Sub-Group	No. of Households (n)	No. of Poor Households	Poverty Measure (P_1)	Expenditure per annum (R. bill)	% of Total National Budget Exp.
Total	9 475 165	3 010 855	0.1251	12.8	8.29
Domestics	407 247	185 841	0.008	0.8	0.52
Farm workers	662 888	424 002	0.018	1.8	1.16
Unemployed	3 386 180	1 371 302	0.058	5.9	3.82
'Combined'	698 632	230 745	0.014	1.4	0.92

In terms of public expenditure, the state would need to spend over 70% of its total poverty eradication budget on these households. Hence, over two-thirds of fiscal support for the poor would need to be targeted at only four types of labour market groupings in the society, accounting for 6.4% of the government's total expenditure. The largest share of the additional annual expenditure would accrue to households with unemployed individuals (R5.9 billion), followed by farm worker (R1.8 billion), combined worker households (R1.4 billion) and then domestic worker households (R800 million). Ultimately, if one were to use a general targeting rule of capturing the most disadvantaged labour market participants, together with ensuring that their households were the recipients of public support, this sub-group meets the requirement in a powerfully optimal manner.

With regard to farm workers and domestic workers, an interesting switch occurs when moving from the individual level data to household data. In the previous table domestic workers were poorer than farm workers, and hence required greater expenditure than the latter to place them out of poverty. However data on which Table 3 above is based make it clear that farm workers come from poorer households than domestic workers. Not only is the number of farm worker households in poverty

[43] The category for the unemployed refers to households where the unemployed reside. There may of course have other income earners co-resident in the household, as long as they are not, for our purposes here, earning an income through domestic or farm work.

larger than those of domestic workers, but the intra-group poverty measure, not shown in the table, is also higher for farm workers. The household Headcount measure for domestics is 45.63, while for farm workers it is 63.96. The respective P_1 measures are 0.18 for domestics and 0.25 for farm workers. A possible reason for this outcome is that farm worker households are by their very nature found in rural or semi-urban areas. This location effect is a strong predictor for greater household poverty, given the nature of rural labour markets and the returns provided to labour in these areas. Hence, the data shows that close to 92% of all farm worker households are in rural areas, while the corresponding figure for domestic workers is 49%. A second reason for this outcome was tested, namely that the probability of multiple earners is greater in domestic worker households, so increasing the total household income earned. The data illustrates however, that this is an unlikely source of the poverty differential, as the number of earners per household type is fairly equal. Farm worker households have on average 1.8 earners, while domestic worker households have about 2 earners each.

Another interesting facet of the individual and household differences, is comparing the unemployed as individuals to the households they live in. Hence, because the unemployed by definition earn no income, they are as individuals the poorest in the labour force. However, at the household level, the dynamic changes. Hence, while this sample of households clearly outnumber those of any other poor sub-group, the poverty measures tell a slightly different story. The poverty gap measure for households containing the unemployed is lower than that of domestics and farm workers. The household intra-group P_1 measure (again not shown in the above table), amongst the unemployed households is 0.16 while the headcount index is 40.50 - compared to 0.18 and 45.63 amongst domestics and amongst farm workers, 0.25 and 63.96. Put differently, while there are more unemployed households living in poverty, so generating the largest share of overall household poverty, the extent of poverty within this sample is lower than amongst domestic or farm worker households. It would appear then that farm workers come from the poorest households in the society, while the unemployed in fact live in households that are generally better off than the other two categories.

There are a few lessons in the above empirical experiments for policy prescriptions. Firstly, the data suggests that despite the very strict assumptions of zero transfer costs in the income transfer, the value of the financial commitment asked of the state for both individuals and households is fairly modest. This is supported by comparisons with the relatively large expenditure outlays on other functions of government. Secondly, the markers of household and individual poverty, such as

race, location and occupation, are important determinants of this expenditure. An extension here is that labour market poverty should not simply be expressed as a distinction between the employed and the unemployed, given that pockets of deep poverty do prevail amongst the employed. Thirdly, the choice of generic sub-groups in the form of individuals or households significantly alters the description of poverty, and therefore the magnitude of expenditure allocations. Finally it is evident that should the state opt to target those households with domestic workers, farm workers or the unemployed residing in them, a large proportion of poverty in the society will be captured. As such, a targeting of expenditure in this way involves a creative and effective manner in which to give credence to both the individual and household dimensions of poverty.

The above estimates however suffer from a number of constraints, in relation to the specific income grant proposals that COSATU, the Department of Welfare and others have tabled. Firstly, we modelled the cost of reducing poverty to zero in the society, whereas the thinking has been primarily around a universal income grant set at a specific value. Secondly, the above has tried to identify the most vulnerable household- and individual-types in the society, and sought then to estimate the cost of eradicating poverty amongst these groups. This exercise is extremely illuminating in providing for a poverty gap analysis of the indigent, but does remain at an arm's length to the specific proposals of the Basic Income Grant (BIG). Given these limitations, the intention of the following section is to try to run a set of simulations that more closely match the current Basic Income Grant proposals being debated.

Simulations for a Universal Income Grant

As stated above, the simulations in this section are more closely linked to the specific proposals on a BIG tabled variously by the union movement and the Department of Welfare. We try here to look in a fair degree of detail at the relevant covariates that identify the national sample of households, in the event of a universal income grant. This is followed by more specific estimates of the poverty-reduction effects that may arise with a grant set at different levels. The section concludes with a tentative attempt at costing the grant under different assumptions.

Preliminary Descriptive Statistics

Unlike the previous segment of the chapter, we utilise the Income and Expenditure Survey for 1999 (IES99) here. The IES99 is a simulated update of the Income and Expenditure Survey of 1995, which surveyed over 29,500 households that were randomly selected. The IES99 is thus based on the most comprehensive coverage of

income and expenditure information in South Africa. The IES99 is simulated in the sense that a data company, *Wefa Southern Africa*, unofficially updated the 1995 IES on the basis of a number of different criteria including:

1. Re-weighting the population to reflect mid-1999 population totals;
2. Benchmarking total income earned by households on the 1999 estimate of total income in the national accounts;
3. Benchmarking expenditure on Bureau of Market Research estimates of expenditure by product type (from report no. 261, "Household Expenditure in South Africa by Province, Population Group and Product", 1999).

We can therefore be fairly confident that we have, in the IES99, a robust representation of household data, albeit an update on the raw data collected from the 1995 IES. Given the nature of the data, and the fact that it has remained fairly under-utilised within the South African research community, it may be useful to present a few basic descriptive statistics from the data - particularly as they relate to the simulations that will follow.

Table 4 below therefore firstly presents the weighted sample of households within the data set. One of the advantages of this data set is that the 1996 Census weights are used, as opposed to the 1991 weights used in the IES95. This makes the universal income grant simulations here far more relevant, given that updated demographic figures are being used. In comparison with the 1991 Census-weighted figures provided in Table 3 above, it is clear that the number of households in the society is larger, at approximately 11.4 million - clearly given that the 1996 Census weights were used. It needs to be remembered that the race and gender figures refer to the household head. The figures suggest as is well-known that 81% of all households in the society are African, followed by 15.1% for White-headed households.

Table 4: Selected Descriptive Statistics of Sample

Race/Gender of HH head	African	Coloured	Asian	White	Male	Female	Total
Sample	19290	3764	1040	5485	20418	9161	29579
Weighted	*9224276*	*364799*	*118750*	*1726424*	*7680274*	*3753975*	*11434249*
Share	*80.67*	*3.19*	*1.04*	*15.1*	*67.17*	*32.83*	
HH Size (Mean)	4.78	4.53	4.18	2.88	4.39	4.68	4.49
Household Income							
Mean	31062	41626	91777	130976	56729	27447	47116
Median	17318	27488	60452	96233	25779	15165	21442
10^{th} perc.	6355	8634	20842	24930	7259	6200	6484
90^{th} perc.	67478	88405	173320	245385	134322	60194	110829

Interestingly, the data suggests that very close to a third of all households in the society are female-headed. While the concept of the household head is a problematic one in and of itself, this result does suggest a fair degree of feminisation of household headship.

One of the important constraints in the data is that we have information at the household level, but limited individual-level information. The survey provides for the race, gender and age of each individual in the household only. So, drawing very detailed individual profiles at the household level to gain a better understanding of intra-household dynamics is not possible with the data. In addition, the weights used in the survey are *household* weights and not individual-level weights. As a result, we cannot work with a national sample of *individuals* in the society in an attempt at, for example, deriving an estimate of the total cost of a universal income grant scheme set at a particular level. Put simply, if we instituted a grant of R100 per individual, the survey cannot tell us the total cost, because the weights are at the household and not the individual level.

While not being able to cost the scheme accurately, the data does allow for the construction of a household size variable[44]. The household size variable of course then means that a hypothetical income grant can then be accurately applied to each household. Hence, a household with 4 members will get a grant twice as large as a household with 2 inhabitants. What this means of course is that we have information on the total income entering each household as a result of the income transfer. Based on this, as the next section will illustrate, fairly good household poverty-

[44] If one knows the race, age and gender of each individual in the household, then a simple re-coding of one of these variables allows for the construction of a household size variable.

reduction indicators as a result of a grant can be simulated. Ultimately then, while the total cost of the scheme is not possible to derive from the data, we can derive household poverty reduction effects - something that no other available data set can in fact deliver as accurately as the one in use here.

Given the above introduction to the constraints of the data though, the household size variable becomes pivotal in gleaning interesting results from the data. Table 4 therefore also presents the mean household size, by race and gender of household head. In the first instance, the national mean household size is 4.49, while the median (not reported) is 4. It is evident, firstly, that the African mean household size, at 4.78, is above the national mean and indeed higher than other racial groups. While African, Asian and Coloured household size is clustered around the over-4 size range, the mean size for White-headed households is dramatically less at 2.88. In addition, in terms of the gender of the household head, note that the mean size for female-headed households is above the national mean, higher than the male-headed figure, but below the African household number. An important point about these figures, and one that needs to be kept in mind when thinking about a universal income grant, is that larger households are likely to yield lower monthly income. Indeed, a close look at the data reveals that while the average total annual income of a household with 4 individuals is about R63 000, the figure for a household with 10 members is about R35 000 per annum. Put differently, a 10 member household will be earning on average about 1.8 times less than their counterparts with a smaller number of members[45]. Appendix 4 below provides a more detailed, graphical description of the relationship between household income and household size. In terms of a national income grant, it means that a fixed grant value delivered to each household in the society will go disproportionately to larger households, and by extension more will enter poorer households.

In addition to household size though, the initial household income levels determine the possible impact of a grant on the poverty status of the household. The data provided above, suggests that the mean annual household income for South Africa stands at approximately R47 000, translating into a monthly income of R3 926. The more distributionally sensitive median measure suggests a lower income, of about R1 787 per month. The 10th and 90th percentile figures provide initial information on

[45] In terms of per capita household income, a dwelling with 3 individuals in it has a mean annual per capita income of R19127.4,while the corresponding figure for a 10-member household is R3510.23. This represents a differential of 5.4: 1, reinforcing the strong correlation being household size and poverty and the implicit pro-poor emphasis of the universal income grant.

the skewness in the distribution of household income. For example, the 10th percentile household nationally is earning a mere R6484 per annum.

The race-based figures reinforce this picture of inequality, as the 10th percentile households for African- and Coloured-headed households are earning between R530 and R719 per month. A very similar 10th versus 90th percentile figures are evident for female-headed households. The upshot from the data is firstly that high levels of income inequality mean a significant number of households are stacked up at the bottom-end of the distribution. More importantly though, a glance at the 10th percentile figures in particular, suggest that a monthly universal income grant of say R100 could conceivably increase household income quite substantially. For example, a R100 transfer to the 10th percentile African household would, in the unlikely event that one individual only was resident in it, increase household income by about 20%.

There are two missing pieces of information in the above analysis in that we have no benchmark by which to measure the impact of a universal income grant. The most appropriate under the circumstances would of course be a measure of poverty at the household level. The income levels above therefore would need to be understood within the context of absolute and relative poverty levels, something we turn to in the next table. Secondly, though, it would be relevant to examine the impact of the grant on income inequality, and thus the requisite benchmarks are also presented in Table 5 below.

Table 5 below therefore calculates a set of poverty and inequality measures for households in the society, which serves for our purposes here, as the pre-transfer poverty and inequality measures for the society. The data shows that in 1999, just under a third of South African households were poor. Specifically, of the estimated 11.4 million households in the society, approximately 3.7 million were below the poverty line. The poverty line used here was an annual household income of R12982.50. This was based on the 1995 household poverty line of R903 per month, drawn from May *et al* (1995), and updated using the core inflation figures for the period 1995 to 1999. The racial breakdowns reveal the maldistribution of this poverty incidence.

Table 5: Measures of Poverty and Inequality by Race and Gender of Household Head

Household Head	Headcount	Poverty Gap Ratio (%)	Gini	Coeff. Of Variation
African	38.22 (0.021)	14.2 (0.142)	0.53	1.80
Coloured	21.51 (0.022)	6.6 (0.066)	0.48	1.13
Asian	3.73 (0.006)	0.9 (0.009)	0.47	1.23
White	3.03 (0.030)	0.8 (0.008)	0.46	1.25
Male	26.39 (0.029)	9.2 (0.011)	0.60	1.81
Female	43.52 (0.027)	17.0 (0.012)	0.53	1.81
Total	32.02 (0.029)	11.8 (0.011)	0.60	1.91

Note: Standard Errors are in parenthesis, and are corrected for according to frequency weights, the primary sampling unit and sampling stratification.

Hence, in terms of the data above we find that while about 38% and 22% of African and Coloured households respectively are poor, only 3% of White households and 4% of Asian households are earning below the poverty line. Given that access to income is derived primarily through the labour market, the differing opportunities and options available to Africans and Coloureds in the labour market, remain key to understanding this differential poverty status (see Bhorat & Leibbrandt,2001). Apart from the concentration of poverty amongst Coloured and African households, it is evident that female-headed households in addition bear the brunt of indigence. Hence, the highest intra-group poverty incidence result is for female-headed households, where close to 44% are in poverty.

The poverty gap measures suggest that the mean (z-proportionate) distance of poor households from the poverty line is again differentiated by race and gender of household head. While poor African-headed households have an income that is on average 14.2% below the poverty line, the corresponding figure for White-headed households is 0.8%. Note though that the highest level of relative intra-group poverty is amongst female-headed households, who on average they 17% below the designated poverty line.

Finally, we have included two standard measures of inequality, the Gini coefficient and the coefficient of variation, to serve as our inequality benchmarks for the simulations that are to follow. The results confirm the exceedingly high levels of

inequality in South Africa, with a national Gini measure of 0.60 and a coefficient of variation of 1.91. The highest levels of income inequality are found amongst female-headed households. This maldistribution of income remains high for African-headed and male-headed households.

Universal Income Grant Simulation Results

The descriptive statistics have played an important part in laying out the various sub-components of the simulation exercise. Hence, from the above we know firstly that we *cannot* cost the scheme using the IES99 data. Given that household and not individual weights are available with the data, we are not able to determine according to a nationally weighted sample, how much such a scheme would cost. Secondly, the data does however allow for the creation of a size variable. This then becomes a perfect numerical axis around which the impact of a grant can be calculated. Simply put, if we have total household income and the size of the household, we can then simulate the transfer of the grant to each individual in the household by the requisite factor, to arrive at a post-grant household income. In comparing the pre-grant income with the post-grant income (derived from an annual pre-grant household income), we easily estimate the household poverty reduction effects of a grant. Thirdly and finally, what we have gained here in terms of the poverty effect, we would have lost had we used for example the Census 1996 figures, where all households are present in the sample, but actual income data is not.

Table 6 below presents the first attempt at simulating the poverty effect of a universal income grant set at different levels. Firstly, the table measures the impact on poverty according to the Headcount Index: simply the impact the grant has on the number of people below the designated poverty line. We have expressed the headcount as a percentage here. The grant is set at 4 different values, namely R50, R100, R200 and R300 per month per individual. It is in turn applied according to the race and gender covariates used in the above tables. Hence, in the simulation, every individual in the sample is provided with an annualised grant value. The grant values are arbitrary, except for the R100 value which is based on the original Basic Income Grant proposal from the Congress Of South African Trade Unions (COSATU), which suggested a R100 per month universal grant.

Table 6: Estimated Headcount Reduction Effects from Different Grant Values

Race/Gender of HH head	African	Coloured	Asian	White	Male	Female	Total
Pre-Transfer Headcount	**38.22**	**21.51**	**3.73**	**3.03**	**26.39**	**43.52**	**32.02**
Post-Transfer Headcount Ratio and Reduction							
R50 grant	28.00 (0.016)	14.43 (0.018)	2.12 (0.005)	2.19 (0.004)	18.77 (0.022)	32.86 (0.022)	23.34 (0.022)
% Change	*-26.74*	*-32.91*	*-43.16*	*-27.72*	*-28.87*	*-24.49*	*-27.11*
R100 grant	18.66 (0.010)	10.10 (0.012)	1.71 (0.005)	2.00 (0.004)	12.46 (0.014)	22.32 (0.013)	15.70 (0.014)
% Change	*-51.18*	*-53.05*	*-54.16*	*-33.99*	*-52.79*	*-48.71*	*-50.97*
R200 grant	8.59 (0.005)	5.62 (0.008)	1.17 (0.004)	1.50 (0.003)	6.15 (0.008)	9.80 (0.005)	7.35 (0.060)
% Change	*-77.52*	*-73.87*	*-68.63*	*-50.50*	*-76.70*	*-77.48*	*-77.05*
R300 grant	5.32 (0.004)	3.68 (0.004)	0.59 (0.003)	1.12 (0.002)	4.10 (0.005)	5.58 (0.003)	4.59 (0.004)
% Change	*-86.08*	*-82.89*	*-84.18*	*-63.04*	*-84.46*	*-87.18*	*-85.67*

Note: Standard Errors are in parenthesis, and are corrected for according to frequency weights, the primary sampling unit and sampling stratification.

Table 6 thus measures the contrasting poverty outcomes from the different grants on selected segments of the populace. Nationally therefore, a R50 income grant per month to each individual in the society would result in the headcount index falling from 32.02% to 23.34%, translating into a 27% reduction in the number of households below the poverty line. With a R100 grant the headcount index falls from 32.02% to 15.7% - which results in halving the number of poor households in the society. With the R200 and R300 grant, the headcount reaches into single-digits, with the R300 grant for example reducing the share of households in poverty to about 5%.

Interesting results emerge from the race-based data. Hence, we see that for African household poverty with a R50 grant would fall from 38.22% to 28%, while the African headcount would be about 5% with a R300 grant. In sum then, for African households, the poverty reduction effect on the basis of the headcount index falls by between 27 and 86%, depending on the value of the grant. On the specific grant proposal of R100, the results here suggest that half of the sample of poor households, would be placed above the poverty line after the grant is received. For female-headed households the headcount falls from 42.32% to about 22% with a R100 grant to every individual in these households, and 6% after a R300 grant. Hence, after the state has disbursed R100 to every individual in these households, close to a third remain in poverty.

The problem with the above figures however, is that they only measure whether a household moves from below the poverty line to above it. This is problematic of

course, given that the depth of poverty of a household would have changed through such a transfer. Hence, a household with one individual in it earning for example R5 000 per annum, with a R100 grant would be earning R6 200 annually: the household may still be below the poverty line, but is clearly less poor than it was. As the analysis of the previous section illustrated, the FGT index makes allowance for calculating the poverty gap index. The formal derivation of this index has been provided above. Suffice to say that for our purposes here we examine the *intra-group* changes in relative poverty, thus not presenting the shares-analysis that would for example be useful in a costing exercise.

Table 7 therefore attempts a simulation of the relative poverty, or poverty gap changes that will result from the grant set at the same 4 levels as Table 6. The P_1 measures provided in the table are representative of the average poverty gap for the designated group, and are expressed as a percentage. For example, amongst African households, the pre-transfer poverty gap expressed as a percentage measure is 14.2. This means that for the sample of all African households, the average poor African household earns about 14% below the poverty line, z. Note that the relative poverty positions of the different households are thus also informative. Hence, the average poor White household is much better off than the average African household, as it earns only about 1% less than the z.

Table 7: Changes in Poverty Gap with Universal Income Grant Transfers[46]

Race/Gender of HH head	African	Coloured	Asian	White	Male	Female	Total
Pre-Transfer Poverty Gap (%)	**14.2**	**6.6**	**0.9**	**0.8**	**9.2**	**17.0**	**11.8**
Post-Transfer Poverty Gap Measures							
R50 grant	8.2 (0.005)	4.0 (0.005)	0.6 (0.002)	0.7 (0.001)	5.4	9.8	6.8 (0.006)
% Change	*-42.25*	*-39.39*	*-33.33*	*-12.50*	*-41.30*	*-42.35*	*-42.37*
R100 grant	4.7 (0.003)	2.5 (0.003)	0.4 (0.001)	0.6 (0.001)	3.2 (0.004)	5.4 (0.003)	3.9 (0.004)
% Change	*-66.90*	*-62.12*	*-55.56*	*-25.00*	*-65.22*	*-68.24*	*-66.95*
R200 grant	2.1 (0.001)	1.3 (0.002)	0.2 (0.00)	0.4 (0.00)	1.6 (0.002)	2.2 (0.001)	1.8 (0.002)
% Change	*-85.21*	*-80.30*	*-77.78*	*-50.00*	*-82.61*	*-87.06*	*-84.75*
R300 grant	1.2 (0.001)	0.7 (0.001)	0.1 (0.001)	0.2 (0.001)	1.0 (0.001)	1.2 (0.001)	1.0 (0.001)
% Change	*-91.55*	*-89.39*	*-88.89*	*-75.00*	*-89.13*	*-92.94*	*-91.53*

Note: Standard Errors are in parenthesis, and are corrected for according to frequency weights, the primary sampling unit and sampling stratification.

[46] The poverty gap measure is reported according to at least five decimal points. As a result, the percentage figures often are not directly deduced from the P_1 measures in the table, which are only according to two decimal points.

In terms of the impact of the grant then, the relative poverty effects are quite powerfully displayed. In terms of the national sample, a R100 grant to each individual will result in the mean poor household earning 4% below the poverty line, as opposed to 12% - translating into a 67% reduction in the average poverty gap for the society as a whole[47]. When compared with the headcount measures in the previous table, the percentage change effect is larger here, given that we are measuring relative as opposed to absolute changes in indigence. With a R300 grant, the national results show that the average household will be earning 1% below the poverty line, as opposed to 12% - translating into a 92% reduction in the relative poverty gap for all households in the sample.

The race data, when compared with the previous table, suggest similar trends. Hence, we see that the average African-headed household, from earning 14% below the poverty line, with a R100 grant will then earn on average 5% below the poverty line. Clearly, in the case of the poverty gap, the effect of the grant is magnified, particularly so in the case of African- and female-headed households. Hence, we see that with a R50 grant, the poverty gap for these household types is close to halved. Indeed, through a R300 grant, the poverty gap across all household types would be almost reduced to zero.

As stated above though, what is perhaps more relevant about the poverty gap simulations in Table 7 is that we do not simply measure whether households have moved above the poverty line as a result of the grant. Rather the data is able to impart information regarding how much closer poor households have moved to the poverty line as a result of the grant.

The final simulation is a not a direct universal income grant intervention, but rather an estimation of the poverty reduction effects that may occur in the event of the age for qualification of the state pension being reduced. This simulation is undertaken purely for comparative purposes, and indeed in the national debate on the income grant, this particular variant has not been seriously considered. The labour demand patterns described in Chapters 1 and 2 arguably means that a significant cohort of the older unemployed are in fact highly unlikely to find employment in their lifetime. In recognising that there is this cohort of 'unemployable' individuals, the simulation undertaken examines the impact on poverty as a result of reducing the qualifying

[47] The report of the Taylor Committee of Inquiry into a Comprehensive System of Social Security for South Africa, reported that the poverty gap would decline by 74% with a basic income grant of R100 per individual in the society (RSA,2002:63)

pensionable age from 60 to 40 (for women) and 65 to 45 (for men). We did not make the pension means-tested, and hence every individual within the new age boundaries received the old pension of R540 per month. The idea of running this simulation is simply to examine what the potential poverty alleviation effects would be if a some reduced version of an universal income grant was instituted. The table therefore provides the poverty reduction effects as measured by both the headcount index and the poverty gap for a purely hypothetical policy intervention.

Table 8: Reducing the Pensionable Age for Men and Women and assuming all get R540 p.m.

Race/gender	*Pre-transfer H*	Post-Transfer H	% Change	*Pre-transfer* P_1	Post-Transfer P_1	% Change
African	*38.22*	23.51 (0.013)	*-38.49*	*14.20*	7.65 (0.004)	*-46.13*
Coloured	*21.51*	12.49 (0.013)	*-41.93*	*6.60*	3.44 (0.004)	*-47.88*
Asian	*3.73*	1.58 (0.004)	*-57.64*	*0.90*	0.42 (0.002)	*-53.33*
White	*3.03*	2.41 (0.005)	*-20.46*	*0.80*	0.65 (0.001)	*-18.75*
Male	*26.39*	14.30 (0.016)	*-45.81*	*9.20*	4.41 (0.005)	*-52.07*
Female	*43.52*	30.88 (0.019)	*-29.04*	*17.00*	10.42 (0.007)	*-38.71*
Total	*32.02*	19.74 (0.018)	*-38.35*	*11.80*	6.39 (0.006)	*-45.85*

Note: Standard Errors in parenthesis are corrected for according to frequency weights, the primary sampling unit and sampling stratification.

Table 8 suggests that a reduction in the pensionable age for African-headed households, would witness a 38% decline in the headcount and a 46% drop in the poverty gap measure. In addition for female-headed households, the figures are 29% and 39% respectively. Interestingly, after White-headed households, this reduction in poverty is the smallest amongst the household categories. This would suggest that female-headed households (along with White-headed households) have a relatively low representivity of adults over the age of 40 for men and 45 for women. Put differently, this means that the age profile of adults in female-headed households is not particularly favourable to an age-based income grant intervention such as the one tested here. Apart from the outlier results of female-headed households, the remaining results suggest broadly that a reduction in the pensionable age as modelled here, would have an impact that lies somewhere between the poverty reduction effects of a R50 versus R100 income grant.

The above section then has attempted a formal modelling of the possible poverty effects that may result from the institution of a national income grant. As we have seen, the last simulation examined the poverty effects from a reduction in the

pensionable age - purely as a hypothetical comparator to the national income grant scheme currently being debated. An important value-added in the above simulations, is that we have modelled the impact on absolute and relative household poverty - a factor that is crucial for policy evaluation purposes. One important caveat is necessary here, namely that the implicit notion of an income grant has not been assessed here. Criticisms of income transfer schemes abound, with issues such as targeting, labour supply incentive effects and ancillary costs looming large. The chapter has deliberately steered clear of these issues, but the above simulations cannot and should not be seen in isolation from the arguments that are often raised against such schemes.

Simple Cost Estimates of a Universal Income Grant

A very preliminary attempt is made here to estimate the possible cost of instituting a basic income grant, set at the proposed value of R100 per month. The exercise below is important in the sense that the official Taylor Commission Report does not allude to the total relative costs of such a grant scheme, and indeed makes little reference to the possible financing options in the official report (RSA,2002). Hence, Table 9 below examines the potential cost of the R1200 per annum universal grant, and applies it to the 1996-2001 period, anchored around the official population estimates for the period. We assume that in the multi-year period, that the R1200 per annum is provided in 1999, and the remaining years are inflated or deflated accordingly by the consumer price index. In addition, we assume that each grant would entail a 19% administrative fee attached to it, a figure that is currently applicable to other forms of social assistance provided by the provincial authorities[48]. We then tabulate the total cost of the grant (direct plus administrative costs) as a proportion firstly of total government expenditure and secondly as a percentage of total welfare expenditure.

[48] This figure has been provided by a senior official of the National Treasury, through a personal communication.

Table 9: Basic Cost Estimates of Instituting a R100 Income Grant

Year	Population (millions)[a]	Grant value (Rands p.a.)[b]	Total cost (R billions)[c]	% of Total Expenditure[d]	% of Total Welfare Expenditure[d]
1996	40342	984	47 239	30.26	224.95
1997	41227	1068	52 396	29.52	221.64
1998	42131	1140	57 155	30.13	223.36
1999	43054	1200	61 481	30.13	226.12
2000	43686	1260	65 503	30.27	221.69
2001	44561	1332	70 633	30.22	207.25

[a]: Population figures are estimates based on registry of births and deaths, with the Census 1996 estimate as a base.

[b]: Grant value of R100 per annum assumed for 1999, and in(de)flated for years after (before) 1999.

[c]: Total Cost assumes a R19 per capita administrative cost

[d]: Based on Budget Review Estimates (National Treasury) for various years.

It is clear from the above estimates that the scheme would be expensive. For 1999 for example, the scheme would have cost about R61 billion, amounting to 39% of government's total expenditure commitments in that year, and more than double the Department of Social Development's budget in that year. Given the overview above of the state's social assistance commitments, within the context of other social service outlays, the Medium Term Expenditure Framework and indeed the debt burden, this is clearly a notion with highly significant fiscal implications. The size of the scheme is quite powerfully indicated through the fact that the operational cost only constitutes about 4% of total government expenditure and over the period an average of about 35% of total welfare expenditure. Indeed, in 1999 this operational outlay amounts to about R9.8 billion per annum. Note also though that these administrative costs do not include the additional staff costs that would be required to manage and run the scheme (van der Berg, 2002).

The revenue options that have been unofficially mooted for the universal income grant include utilising the VAT system to fund the scheme, increasing personal income tax at the upper-end of the distribution, a tax on company profits and finally simply increasing the budget deficit (van der Berg, 2002). Whilst we do not intend to consider each of these financing options at length, it is clear that each of them pose significant problems. For example, financing through the VAT system would mean, using the 1999 figures, that the VAT system would need to generate an additional R61 billion in revenue, which ultimately requires increasing the VAT rate from its

current 14% to 32%[49]. If the deficit-financing route was taken, the budget deficit for 1999 would balloon from its current 2% of GDP to about 9% of GDP - an increase from about R17 billion to R78 billion per annum. The suggestions for using the personal income tax or company tax system are equally onerous on the national revenue system. In 1999, total personal income tax revenue stood at about R86 billion, while the cost of the grant stands at over two-thirds of this personal income tax receipts in 1999. Finally, company tax receipts (including secondary tax on companies) constituted some R24 billion in 1999. The proposed grant cost in 1999 would be three times this revenue intake from companies[50].

Conclusion

This chapter offers a number of important lessons about poverty and public policy. As a first approximation the analysis has yielded detailed baseline estimates of what, free of all additional costs, is required of the state to reduce poverty in the society. While these estimates do abstract from the real obstacles faced in such schemes, it is a first step in outlining the expenditure parameters of the poverty problem. In addition, the results show that a creative combination of individual and household level data can be very informative in the formulation of appropriate policy interventions. Relatedly, the centrality of the labour market and individual earnings in understanding poverty is displayed, and comes closer to providing some tools for policy-making that lean on the empirical work of the previous chapters. In combining these two units of analysis, we see that poverty in South Africa is readily condensed into three, labour market defined, household types.

The chapter then proceeded to analyse the possible poverty effects that could be discerned through the institution of a national income grant system. It was made amply clear that while the poverty effects were possible to derive one had to be clear about differentiating between the headcount and poverty gap measures. Hence, the results indicated that while absolute poverty shifts were witnessed through a grant scheme, shifts in the poverty gap were probably more important as an evaluation tool. Results indicate that according to the headcount index and depending on the value of the grant, household poverty would decline by between 27 and 80% nationally. When using the poverty gap measure, the figures are 42 and

[49] More realistically, if we assume that the scheme could be partly funded through reclaiming on VAT-related expenditure then even at the maximum reclaim value (which assumes an MPC of 1 for all individuals as well as no consumption of zero-rated commodities), then the contribution from VAT receipts still results in the grant costing some 26% of government's total expenditure and over 190% of total welfare expenditure.

[50] All these revenue estimates are derived from the 2002 Budget Review estimates (RSA,2002a)

92%. On the back of labour market reasoning, the simulation of the poverty effects when the pensionable age was reduced, reveals that the poverty effects are similar to the institution of a universal grant set between R50 and R100 per month. We closed off the discussion with a brief consideration of the potential costs of such a scheme, together with an extremely tentative review of the potential financing options of the scheme. On both these counts, it is evident that the pressures on the fiscus, either through the expenditure or revenue system, would be enormous. It is precisely these type of hard costing exercises that cannot be seen in isolation from the obvious welfare enhancing effects of a universal income grant.

Chapter 7: Are Wage Adjustments an Effective Mechanism for Poverty Alleviation? Some Simulations for Domestic and Farm Workers

Introduction

The previous chapters have in different ways raised and analysed the issue of vulnerability in the South African labour market. It was clear from this work, that domestic and farm workers, along with the unemployed, remain the two most indigent groups in the society. Hence the last chapter tried to estimate the cost of introducing an income grant scheme to exactly these individuals, and indeed the households they live in. In recognising the particular status of these labour market cohorts though, the South African Department of Labour responded by stating its intention to promulgate minimum wages for domestic and farm workers. This chapter will attempt to provide empirical thought experiments, that will hopefully display some of the stringent trade-offs that the Department of Labour may have taken into consideration when it ultimately did, early in 2002, promulgate a wage determination for domestic and farm workers.

This chapter therefore attempts a very basic simulation exercise to test some of these hypotheses concerning the functioning and response behaviour of the labour market, with regard to domestic and farm workers.

Employment and Wage Descriptors

The analysis in this chapter is again based on the October Household Survey of 1995. Before undertaking the two simulation exercises, it is necessary to provide a brief overview of the labour market for the three occupations to be analysed, namely drivers, domestic workers and farm workers. The driver[51] occupation was chosen because while they also represented labourers, their employment, wages and conditions of service can be said to be more secure and of a higher quality than that for domestic and farm workers. In this respect, the category offers an important contrast in terms of the nature of employment and poverty responses to wage adjustments amongst unskilled workers.

It is clear from Table 1, that the largest of the three occupations is farm workers, with close to 1 million workers. Note that this is over 50% down from the 1970 employment figure, when the agriculture sector had a workforce of about 2.5 million, a figure reflected on in Chapter 1. It is interesting that the two most

marginalised occupations amongst the employed constitute about 17% of all employment in the economy. The racial distributions indicate a disproportionate share of African workers in all three occupations. Note that while African workers constitute only 62% of total employment, they are clearly over-represented in these low skilled jobs and occupations. This is mirrored for example, in the case of white workers who, while representing 22% of national employment, form a negligible portion of all three occupations. In short, the employment figures by race reflect the strong race-skills cleavage in the South African labour market.

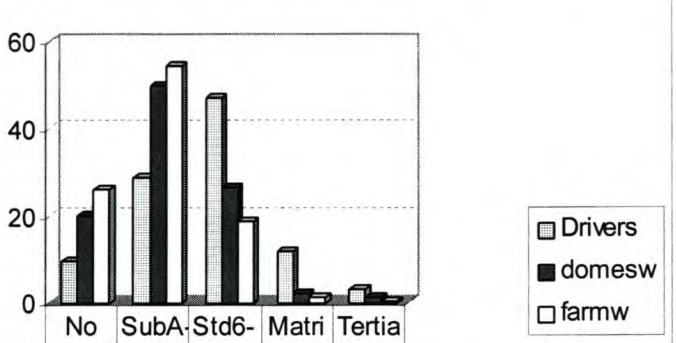
The gender data powerfully illustrate the strong gender-specific roles attached to certain forms of employment. Hence, while drivers are overwhelmingly male, domestic workers are predominantly female. In the case of farm labourers, the number of women is larger, yet it still remains a male occupation. In terms of national trends, 38% of all the employed are women. This would suggest that there is an over-representation of women in domestic services, and an under-representation of female workers amongst farm labourers and drivers.

Table 1: Basic Employment Statistics: Drivers, Farm and Domestic Workers (OHS,1995)

Category	Drivers	Domestic Workers	Farm Workers
Race			
African	361 105	619 150	754 813
Share (%)	*82.83*	*88.03*	*79.86*
Coloured	31 958	81 674	186 654
Share (%)	*7.33*	*11.61*	*19.75*
Asian	14 128	450	98
Share (%)	*3.24*	*0.06*	*0.01*
White	28 782	2049	3608
Share (%)	*6.60*	*0.29*	*0.38*
Total	**435 973**	**703 323**	**945 173**
Share (%)	***100.00***	***100.00***	***100.00***
Gender			
Male	424 229	22 363	734 374
Share (%)	*97.31*	*3.18*	*77.70*
Female	11 744	680 960	210 799
Share (%)	*2.69*	*96.82*	*22.30*
Location			
Rural	156 104	409 170	882 387
Share (%)	*35.81*	*58.18*	*93.36*
Urban	279 869	294 153	62 786
Share (%)	*64.19*	*41.82*	*6.64*

51Drivers here include Motor-Cycle drivers; car, taxi and van drivers; bus and tram drivers; heavy truck and lorry drivers.

Figure 1: Share of Employment By Education Cohort (OHS,1995)



	No Educ	SubA-Std5	Std6-9	Matric	Tertiary
Drivers	9.38	28.83	46.76	11.97	3.05
domesw	19.96	49.61	26.47	2.44	1.52
farmw	25.73	54.03	18.45	1.37	0.42

The location data illustrate that while most drivers are urban-based, a fairly significant share do in fact work and reside in rural areas. Interestingly, the majority of domestic workers are based in rural areas. While the national figures are mimicked in the case of drivers, the location distribution for the other two occupations reveals a disproportionate share of these workers are in rural areas. The location distribution for domestic and farm workers therefore reflects their concentration in areas of the economy that are poor job generators and where jobs are available, they are paid poorly with very low levels of employment security.

Figure 1 below presents the distribution of the three occupations according to education levels. It is immediately clear that the distribution for drivers is distinct from that of domestics or farm labourers. While the majority of drivers possess incomplete secondary qualification, most farm and domestic workers have only primary education, with over a quarter of the former having no education.

The national distribution of employment by education shows that 22.2% of all workers have primary education. In other words, while the distribution for drivers matches the national trends more closely, the corresponding figure for domestics and farm workers is yet another cut displaying their vulnerability in the labour market. The national figure for a matric is 22.7%, thus while at least 12% of drivers have this qualification, it is well below the national mean. Again though, the other two occupations fall well short of the average.

Thus while drivers, domestics and farm workers are all nominally classified as labourers, it is evident that the latter two groups reveal employment patterns that suggest they may be a distinct, and particularly marginalised group, within the broad band of workers categorised as unskilled. Nowhere is this fact more true than when examining the wage data for the three occupations. Table 2 below presents this evidence, by looking at the median and mean wages for the three jobs.

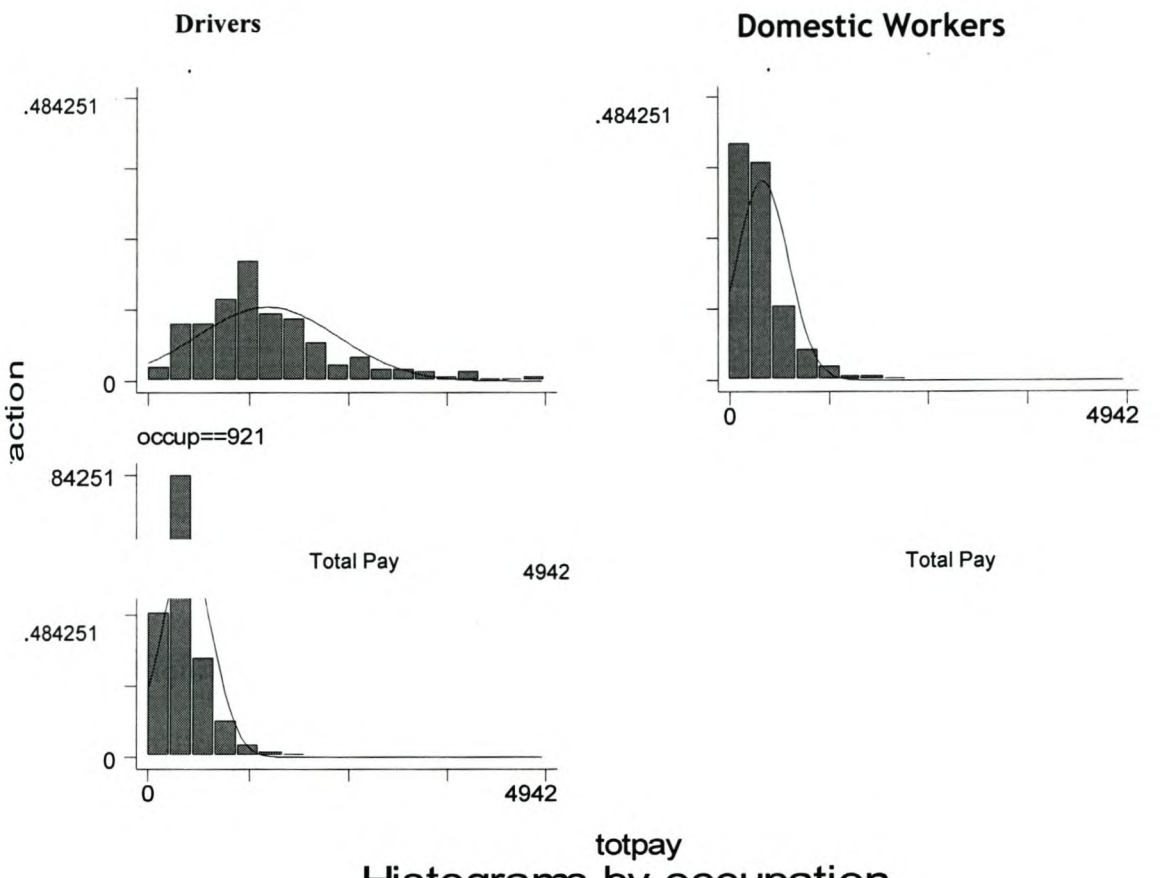
Table 2: Median and Mean Wages by Occupation, (OHS,1995)

Occupation	Driver	Domestic Worker	Farm Worker
Median	1300.0	333.5	407.5
Mean	1517.7	407.0	466.7

As evidence from the previous chapters has shown, the lowest earners in the labour market are domestic workers, with a median wage of R333.5 per month. Farm workers earn just over R400 per month. In contrast drivers earn a median that is 3 times higher than farm labourers and close to 4 times above that of domestics. The national median wage is R1400, which is marginally above that of drivers, but substantially more than the other two occupations. In addition, the earnings data by race indicate that national mean African and Coloured earnings are again between 2.5 and 3 times higher than that for domestics and farm workers. To put into perspective how low these earnings are: domestic workers earn a third of what the average miner earns, and fourteen times less than the average skilled professional. Extremely low wages lead to the familiar outcome of individuals having a job, yet remaining vulnerable. In terms then of a parallel labourer category, the latter occupations are very low earners, and in terms of national trends domestics and farm labourers must be considered as a special category of particularly disadvantaged employees. In this respect, the histograms together with the fitted normal distributions below, vividly present this picture of extreme vulnerability amongst domestics and farm workers[52].

52 Occupation 832 refers to drivers, 910 to domestic workers and 921 to farm labourers.

Figure 3: Histograms of Drivers, Domestic and Farm Workers (OHS95)



The histograms make it visually very clear that the overwhelming majority of domestics and farm workers are stacked at the lowest end of the earnings distribution. Conversely, the distribution of drivers' earnings is far more evenly spread. The importance of this distributional data will become clear in the simulations below, given that through the use of survey data we will be able to change the earnings of each individual in the sample, and hence affect the distribution in its entirety. This would imply that increases in the wages of individuals, and the impact they have on their poverty status, will depend significantly on where in the distribution they lie. In addition, the overall income distribution pattern will also influence the net outcome from the simulated earnings increases.

Poverty and Employment Effects from Wage Adjustments

Given the high levels of indigence noted above, it is useful to determine whether certain categories of labour market interventions may have a tangible impact on the vulnerability of the affected workers. Specifically, it may be useful to undertake a simulation exercise, wherein the wages of the three occupations are increased, and then to examine the impact it has on poverty levels amongst the three categories. In addition though, it is clear that these wage adjustments will have disemployment effects. Therefore the second, and discrete, component of the analysis is to ascertain the employment effects of the same wage rate increases.

This simulation exercise suffers from at least three drawbacks. Firstly it only accounts for the first-round poverty effects of a rise in the wages of individuals. It is in essence a very confined comparative static exercise. Hence, the possible additional poverty-reducing impacts that may arise from additional resources provided to individuals is not accounted for. Secondly, and in relation to the first drawback , no indirect effects of a wage hike are accounted for. These effects operate in particular on the demand-side where higher wages change the total cost structures of firms and employers, and this in turn may affect productive activity and income generation elsewhere in the economy. Finally, the simulation operates only at the individual-level and does not reflect on the impact on household poverty.

Poverty Impact Simulations

The table below orients one concerning the incidence of poverty amongst the three occupations. The table presents the same two poverty lines utilised in Chapter 3: R293 per month and R650 per month. While some of the data below has been presented in a somewhat piecemeal fashion in the preceding chapters, it is worth reiterating and expanding on them for the purposes of this chapter. Hence, the table below confirms that both poverty lines yield high levels of indigence. At the lower poverty line, over a quarter of farm workers and close to 40% of domestics are poor. By contrast, 2.1% of all drivers earn below R293 per month. The degree of vulnerability amongst domestics and farm workers is illustrated by the fact that at this poverty line, the national headcount index is only 7.25%.

Table 3: Baseline Poverty Levels, By Occupation (OHS95 & author's own calculations)

Poverty Line	Driver	Domestic Worker	Farm Worker
R293 per month			
Number	9235	267 439	251 628
Percentage	2.12	38.03	26.62
R650 per month			
Number	52 658	564 667	762 011
Percentage	12.08	80.29	80.62

Utilising the higher, and more realistic, poverty line results in significant increases in the headcount poverty index. Hence, over 80% of the two vulnerable occupations live in poverty at this line, compared to just over 10% of drivers. Note that the measures for domestics and farm workers converge, given the similarity in income distributions of the two occupations. The national measure, at this poverty line, is 25% and even for the African employed, the index is 33%. This suggests that relative to parallel national measures of poverty these two occupations experience the greatest identifiable degree of vulnerability in the South African workforce.

We now go on to examine the simulated impact on poverty levels amongst these three occupations of specific wage adjustments. In particular we look at the poverty outcomes from wage increases respectively of 5%, 10%, 50% and 100% to each of the individuals in the sample. Note that given the use of survey data, we are able to apply the simulated increase to each individual in the distribution. Table 4 below provides the results for a 5% and 10% increase in the wage rate respectively. The table indicates very clearly that the poverty impact from the wage adjustments would, at best, be modest.

Table 4: Poverty Effect of 5% and 10% Increase in Wages, based on R650 poverty line (OHS95 & author's own calculations)

Occupation	Drivers	Domestic Worker	Farm Worker
5 % Increase in Wage			
No. in Poverty	50 896	555 708	742 700
% in Poverty	11.67	79.01	78.58
Reduction in Poverty (No.)	1762	8959	19 311
% Reduction in Poverty	3.89	1.59	2.53
10 % Increase in Wage			
No. in Poverty	43 125	532 290	715 119
% in Poverty	9.89	75.68	75.66
Reduction in Poverty (No.)	9533	32 377	46 892
% Reduction in Poverty	18.13	5.74	6.15

Hence, the 5% rise in wages would shift only 19 000 farm workers and about 9 000 domestics out of poverty. This constitutes a reduction of poverty in the range of 1.6 to 2.5 percentage points. Noticeably, the figures for drivers are higher, suggesting of course that the wage adjustment would have a more tangible effect on their poverty status. Should the wage of each individual in the two marginalised occupations increase by 10%, the results remain equally unspectacular. Here, the percentage reduction in poverty would be about 6% for the two groups. Hence a wage hike to the value of inflation for the same year, would have a relatively insignificant impact on the poverty status of domestics and farm workers. Note however, that the impact on drivers is very significant. Here it is evident that poverty measures are highly responsive to the wage change. Specifically, the 10% wage rise causes a more than 10% reduction in poverty levels amongst drivers. This suggests that most of the poor drivers are in fact stacked disproportionately quite close to the poverty line. A sufficient wage adjustment then, would ensure a significant fall in poverty incidence.

Continuing with the wage simulations, it is possible to think of a much higher set of wage adjustments, in order to get a comprehensive sense of the elasticity of poverty with respect to wage adjustments. Table 5 below therefore provides the poverty results for a 50% and 100% wage change. In terms of the former, the results show a tangible reduction in poverty with over 200 000 farm workers and close to 120 000 domestics being taken out of poverty. It is interesting that the results for poor drivers are still higher, although not as sensitive a response is encountered as with the 10% wage change.

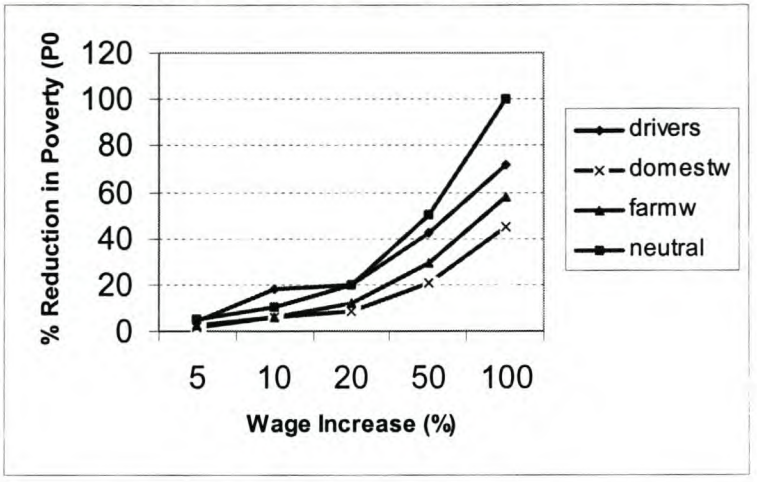
Table 5: Poverty Effect of 50% and 100% Increase in Wages, based on R650 poverty line (OHS95 & author's own calculations)

Occupation	Drivers	Domestic Worker	Farm Worker
50 % Increase in Wage			
No. in Poverty	30 337	447 041	535 478
% in Poverty	6.96	63.56	56.65
Reduction in Poverty (No.)	22 321	117 626	226 533
% Reduction in Poverty	-42.38	-20.84	-29.73
100 % Increase in Wage			
No. in Poverty	14 718	312 663	323 971
% in Poverty	3.38	44.46	34.28
Reduction in Poverty (No.)	37 940	252 004	438 040
% Reduction in Poverty	-72.02	-44.63	-57.48

In turn, the 100% wage increase case shows that close to half and over a third of farm workers and domestics would be pulled above the poverty line. Note though, that the number in poverty for each occupation is still over 300 000. Hence for domestics and farm workers, there is still an insensitive poverty reduction response to the wage adjustment. A doubling of each individual's wage in the two distributions therefore, would elicit a 45% and 57% poverty incidence fall for domestics and farm labourers respectively. While the sensitivity to the wage hike is greater for drivers, with poverty falling by 72%, the response does not still fully compensate for the wage adjustment.

It should be evident from the above that in general poverty is inelastic with respect to changes in wage of each person in the sample. Figure 3 below graphically presents the data from Tables 4 & 5. The figure maps the changes in wages to the outcome in poverty levels, for each of the three occupations. These are in turn benchmarked against a 'neutral' outcome graph, which basically plots a 5% wage change as resulting in a 5% reduction in poverty and so on. In other words, this function would present the equivalent of a unit elastic poverty response to wage changes. It should therefore be evident from the graph that the poverty response, with the exception of the 10% case for drivers, to wage changes has been inelastic. In other words, the equal changes in wages, do not result in equivalent alterations in incidence of poverty. Put differently, poverty measures are highly insensitive to very large wage adjustments for drivers, domestics and farm labourers. In particular, Figure 3 shows that the responsiveness of poverty levels amongst the latter two occupations is particularly low with respect to wage adjustments.

Figure 3: Neutral and non-Neutral Impacts of Wage Changes on Poverty



The results reflect on the nature of the income distribution, with respect to the poverty line, of domestics and farm labourers. The fact that most of these workers are earning and working *well below* rather than simply close to the poverty line, means that even huge, and highly unrealistic, wage adjustments will do very little to eradicate poverty amongst these workers. The extreme degree of vulnerability and indigence of these workers ensures this outcome under most conceivable wage scenarios. This result of course means that the wage mechanism has limited use as an instrument of poverty reduction: that even if all other factors were held constant, increasing the wage rate of targeted workers will do very little to significantly erode the incidence of poverty amongst the most vulnerable employees.

Employment Impact Simulations

The above has shown that poverty levels are inelastic with respect to wage adjustments, meaning that the price of labour cannot easily be utilised as a poverty alleviation tool. Moreover, the obvious immediate impact of such a wage adjustment would the negative impact on employment levels. In this section then, we briefly examine the short-run employment effects of the wage adjustments, based on elasticities calculated for the South African economy by the World Bank (Fallon & Lucas, 1998). Fallon & Lucas (1998) calculated elasticities for all formal sectors of the economy barring Agriculture, covering Black employees. The estimates they derived are provided in Appendix 4 below. The aggregate elasticities for the period 1961-1993 were an average long-run wage elasticity of -0.71 and an average short-run (impact) elasticity of -0.156. The former, -0.71, is probably the most widely quoted figure and has been corroborated by other evidence (Bowles & Heintz, 1996). Noticeably, other more recent studies have yielded different, and in come cases, lower wage elasticities (Fields, Leibbrandt & Wakeford, 1999).

While the World Bank study does provide elasticity measures by sector, the non-coverage of Agriculture and the fact that drivers are not easily attached to any given sector, meant that the most optimal solution was to assign the aggregate elasticities to each of the occupations in the simulations. Hence, for each wage simulation undertaken, the assumption is of a short-run elasticity of -0.156, and a long-run estimate of -0.71.

Table 6 below presents the employment effects from a 5% and 10% wage adjustment. The short-run here refers to a period of up to one year. While the long-run results are not presented here, they clearly would yield larger disemployment effects, given the higher value elasticity. The long-run results are presented in Appendix 5 below. The results suggest that with a 5% wage hike, over 5 000 and more than 7 000 domestics and farm labourers would lose their jobs in the short-term. Collectively, the 5% wage increase would amount to 16 000 lost jobs.

Table 6: Employment Effects from 5% and 10% Wage Increases (OHS95 & author's own calculations)

Race	Drivers	Domestic Workers	Farm Workers
Total	435 973	703 323	945 173
5 % Increase in Wage			
Short-run elasticity	-0.78	-0.78	-0.78
	-3401	-5486	-7372
New short-run empl. Level	432 572	697 837	937 801
10 % Increase in Wage			
Short-run elasticity	-1.56	-1.56	-1.56
Short-run empl. Loss	-6801	-10 972	-14 745
New short-run Empl. Level	429 172	692 351	930 428

With the 10% wage simulations, the results are simply doubled, given the elasticity of -1.56. Hence a 10% wage adjustment translates into job losses in excess of 32 000 individuals. It is of course difficult, using this framework, to assess the simultaneous impact on poverty and employment from the wage changes, However, what the two discrete experiments suggest is that, should there be a wage adjustment contemplated for specific occupations such as the one above, then combined with the modest poverty reduction effects, there will be fairly worrying job losses.

The results for the 50% and 100% wage increases provide below, serve only to reinforce this point. Hence it is evident that by giving workers 50% more than they previously earned would see the job attrition rate increasing to over 160 000 jobs. A comparison can be made here: while the 50% wage hike meant that over 360 000

employees in the three occupations no longer lived in poverty, it also meant that the net number of workers in the occupations fell by close to half this number.

Table 7: Employment Effects from 50% and 100% Wage Increases (OHS95 & author's own calculations)

Race	Drivers	Domestic Workers	Farm Workers
Total	435 973	703 323	945 173
50 % Increase in Wage			
Short-run elasticity	-7.8	-7.8	-7.8
Short-run empl. Loss	-34 006	-54 859	-73 723
New short-run empl. Level	401 967	648 464	871 450
100 % Increase in Wage			
Short-run elasticity	-15.6	-15.6	-15.6
Short-run empl. Loss	-68 012	-109 718	-147 447
New short-run empl. Level	367 961	593 605	797 726

The figures for the 100% hike reveal that while the numbers in poverty fell by over 700 000, in the process some 325 000 jobs would have been sacrificed. Thus while excessive wage gains would be necessary to achieve modest poverty reduction gains, these gains are further eroded through the resulting disemployment effects. It is therefore important to keep in mind that there are of course multiplier effects from the job losses, at the household level. So while individuals may be losing jobs, the impact is transmitted at the household level, where both adults and children are impacted on.

Ultimately then, the trade-off between poverty reduction on the one hand and the risk of employment loss is a severe one that derives from any wage adjustment plan. The Department of Labour's stated intention to call for public submissions on a minimum wage for domestic and farm workers is an indication of the consideration being given to a wage adjustment package for these workers. The crisp point made here is that employment losses will be significant and will of course increase monotonically with any given wage hike contemplated by the Department.

Conclusion

The above has shown firstly that both domestic and farm workers are the most vulnerable cohort of employees in the South African labour market. The comparison with a third labourer category, that of drivers, only served to reinforce this fact. In this light the Department of Labour is considering a minimum wage policy for these two indigent groups. The chapter traced out some of the possible effects of pursuing such a wage policy. Essentially the trade-offs revolve around the poverty reduction effects compared with the disemployment impacts from the wage adjustments.

The results showed firstly that a wage policy pursued to reduce indigence amongst the target occupations will have a relatively small impact on poverty levels. Specifically, poverty incidence was shown to be relatively inelastic with respect to wage changes. It took very large, and in policy terms highly unlikely, wage adjustments to ensure a tangible poverty reduction impact. Secondly, it was evident that the results displayed the fact that most poor domestics and farm labourers were in fact quite far below the poverty line rather than earning just below R650 per month. Thirdly the employment-wage results show that the Department's policy would run the serious risk of significant short-run employment losses to accompany the poverty-reducing outcomes.

The wage, it would seem, has a limited role to play in eradicating poverty amongst these two groups of workers. In essence, the analysis suggests that poverty eradication amongst domestic and farm workers cannot take place solely through a minimum wage policy. This is not the problem of minimum wage legislation *per se*, but rather the very high incidence of poverty found amongst domestic and farm workers. Ultimately, if the Department of Labour were considering a minimum wage policy directed at reducing poverty levels amongst these workers, it would not serve the purpose of significant poverty alleviation amongst its target population. This is true, it must be remembered, irrespective of what employment losses may occur from the minimum wage as well.

Should the Department of Labour opt for a modest minimum wage, the poverty reduction consequences would of course be minimal and so too would the disemployment effects. The Department would implicitly then be issuing a 'moral signal' to employers - that improved wages for these workers are to be striven for. Such a wage would set a first-step benchmark for good wage practice amongst employers. Indeed, such an initial minimum wage may set a positive trend, and see employers gradually increase the wages paid to these workers. Ultimately, given the above figures, this option may be the best and most optimal available to the Department.

Conclusion

The thesis has traversed a wide range of issues and empirical facts, centred around the labour market. There are several key deductions from this piece of work, that are applicable both individually and in combination to the formulation of policy designed to improve the functioning of the labour market, as well as engendering effective poverty-reduction strategies.

The labour demand analysis for the long-run in the main indicated that there was a fundamental shift in labour demand patterns, borne out by a combination of structural and technological factors. This shift, in the form of a heavily skills-biased labour demand preference, is the critical trend that has been reinforced in the post-apartheid period. The long-run analysis has pointed to the evolution of a chronic skills shortage in the South African labour market. While this shortage is corroborated with evidence from the post-apartheid period, two new shifts are evident. Firstly, the restructuring of the public sector has ensured that significant sections of the workforce in semi-skilled, unskilled and in certain cases even skilled workers in this sector are losing their jobs. Secondly, the post-apartheid period analysis suggests that the term 'skills shortage' needs to be more clearly defined: a tertiary qualification is a necessary but not sufficient condition for employment. Hence, while teachers and engineers are both categorised as degreed individuals, it is the latter rather than the former that employers are hiring or experiencing a shortage of. The labour demand analysis therefore suggests that while there is a skills shortage in the economy, it is for very specifically defined occupational categories within this rather broad band of skilled workers.

One of the results of the skills shortage has been a premium employers are prepared to pay for skilled workers. The data in Chapter 3 provides provisional evidence for the existence of such a premium. Mindful of the qualifications around the interpretation of skill levels, the data suggested that the wage inequality operative in the top half of the wage distribution was greater than that found in the bottom half of the wage distribution for Asian and White workers, and non-Community Services workers. The wage paid to the 90^{th} percentile worker relative to the median worker, was significantly greater than the median-10^{th} percentile wage differential for these cohorts. Employers, it would seem, have understandably responded to the skills shortage by increasing the price on this factor. In so doing, one of the key results from these labour demand shifts the economy has experienced, has been a high level of wage inequality augmented by a premium paid to scarce skills. The

constant reminder in these results though was the high proportion of very low earners in the sample, a result that was true for African and Coloured workers of both genders.

Given that access to income, or lack of it, is a key determinant of the poverty status of a household, the labour market remains the key conduit for understanding the incidence of poverty in a society. This was the purpose of Chapter 4 - to reveal the outcome in a sense of the employment shifts that had occurred in the 1970-95 period. Despite not having adequate data for 1999, we would expect that this cross-sectional examination of vulnerability not to have altered dramatically over the 5-year period. The results from Chapters 4 and 5, bring into sharp contrast how the long-run labour market dynamics have engendered a deeply segmented domestic labour market. The labour market is thus characterised by high levels of poverty for individuals who are separately or simultaneously African, female, young or living in rural areas with low levels of education. These markers of vulnerability are the legacy largely, but not exclusively, of long-run skills-biased employment shifts. The strongest manifestation of these labour demand trends is the inordinately high levels of unemployment in the society. Indeed, they dominate the analysis of vulnerability provided across the chapters. In addition though, as illustrated in Chapter 4, there remain a significant, yet fairly well-defined cohort of working poor, concentrated essentially amongst farm and domestic workers.

If one were to attempt a rather rudimentary matching of the demand trends with the supply characteristics of the economically active population, a number of possible policy interventions do arise. On the supply-side it is evident that all but one of the determinants of labour supply are exogenous. Race, gender, age and location are essentially exogenous labour supply determinants. Solutions to the mismatch between demand and supply are not to be found here. The one endogenous factor amongst the set of independent variables is education - it is the one variable that can be addressed by public policy. A variety of detailed policy interventions can be designed to affect this variable, which we do not delve into here. However two key points on the role of education as a labour market policy instrument, require mentioning. The first, alluded to above, relates to the heterogeneity of a tertiary qualification. The second relates to some of the drawbacks in measuring the human capital variable simply as the number of years of education accumulated by an individual. The analysis in Chapter 2 made it clear for example, that *despite* the fact that some African workers had high-level qualifications, this was not sufficient to ensure employment. The result is a powerfully representative of the maxim that education, and higher education in particular, is a heterogeneous product. This

heterogeneity ensures that all individuals exiting the higher education system will undoubtedly not possess the same probability of finding employment in the labour market. Secondly then, and related to this point, is the fact that researchers and policymakers need to be mindful of the fact that the pure quantity of years of education accumulated, does not ensure employment. Apart from the specific type of degree that is completed (the heterogeneity issue), there are a variety of important additional supply characteristics that together affect employment probabilities in the labour market. The list of omitted variables that are crucially linked to labour demand needs include for example, quality of education, family and neighbourhood effects, an individual's cognitive skills, the attributes of an individual and finally 'ability'. These variables remain extremely difficult to measure, yet it is clear that they remain critical to a robust appreciation of the specific set of labour supply characteristics that employers' require in a prospective hire. Thus, while recognising and measuring the shortage in the labour market is a relatively simple exercise, it is in designing an appropriate long-run education policy strategy that gives credence to all these components of labour supply which remains a serious challenge for domestic policy makers.

In the context of the skills shortage from the demand-side, the one key short-run intervention is that of skilled worker immigration. It is well known that South Africa, in addition to the existing shortage of top-end workers, experiences a relatively high volume of skilled worker emigration from the country to a select set of industrialized economies. What is therefore required is an active policy from the state to turn what is currently a positive net emigration from South Africa into a positive net immigration to the country. This increased flow would be key to unlocking the current skills bottlenecks in the country, and is potentially a boon to long-term growth. Given the parallel nature of labour demand trends in the developed world, the EU and US labour markets for example, have been particularly effective in designing immigration policy and practices to meet this demand. These strategies have revolved variously around quantity quotas by sector, labour price ceilings by sector and improving the efficiency of immigration procedures for these high-demand skills. South Africa therefore needs to draw on some of these policy examples, and look at the best adaptation for local conditions.

From the above then, we have an exceedingly brief overview of two possible interventions - one being a short-run demand-side and the other a longer-run supply-side lever - in order to begin the process of reducing the skills (or high-end occupational) shortage in the South African labour market. These concerns however are firstly, labour market policies and secondly, concentrate on the *future*

trajectory of labour demand in the domestic economy. One of the key outcomes of the historical employment patterns, has been rising levels of unemployment as a result of attrition rates at the bottom-end of the labour market, coupled with a growing number of new entrants with incorrect supply characteristics. This has been manifest in extremely high levels of joblessness in the economy. Chapters 4 and 5 attempted to measure and analyse the various determinants of this manifestation. The part result of these shifts, as argued above, has been a growing quantum of zero earners in the labour market, coupled with a high incidence of marginalised workers. It is on the basis of trying to deal with the consequences of these shifts in employment, *ex post*, that it is critical to examine policy options alternative to those considered above.

There would seem to be two key approaches here. Firstly, that one conceives of a poverty alleviation strategy for a specific section of the unemployed as argued in Chapter 6. Secondly, that interventions such as minimum wages be carefully designed to protect vulnerable workers - as covered in the final chapter. In terms of the unemployed, it is evident that a certain segment of this cohort will never obtain a job in their lifetime - a point emphasised and detailed in Chapter 6. Recognising this cohort of the unemployed as a poverty eradication (rather than job creation) issue, would be the first step in designing a matrix of appropriate policies - of which an income grant is just one possibility. These interventions should be designed specifically to ameliorate the consequences experienced by these workers, of the economy's new labour demand trajectory. While the issue of a minimum wage for the working poor needs to be approached with great care, given its very well-known and widely accepted disemployment effects that were measured in Chapter 7, it remains, if used in a limited manner, an important signal to employers that unduly low wages that force workers into poverty will be punishable by law.

Ultimately, then, the above thesis has tried to provide an empirically-intensive, and hopefully informative, representation of some of the key challenges facing the South African labour market. Many of these constraints are a result of the particular evolution of the labour market. It must be remembered however, that insitutionalised discrimination and segregation only served to exacerbate these manifestations. South Africa's break from this past, remains one critical difference allowing for a new and more effective set of policy responses to the problems that continue to plague this country's labour market.

APPENDICES

Appendix 1 (Chapter 1)

Table 1A: Shares in Formal Employment By Sector and Occupation: 1970-1995

Occupation	Agric.	Mining	Manuf	Utilities	Cnstrn	Wholes	Trspt	Finance	Comm	Total
Prof/Semi-P/Tech										
Share,70	0.1	1.1	3.3	5.1	2.0	1.8	3.3	13.4	15.8	4.7
Share,95	0.3	4.6	7.3	17.3	5.2	4.1	14.0	29.4	38.5	16.5
% ch	401.7	304.7	118.9	238.9	157.0	123.5	326.5	120.0	144.1	250.2
Adm/Exec/Mngr										
Share,70	0.0	0.3	2.8	0.6	2.3	5.7	2.1	6.1	0.8	1.5
Share,95	0.5	2.8	5.7	2.7	5.2	10.7	6.7	8.6	2.0	4.8
% ch	1368.9	699.5	99.6	366.5	121.4	86.4	224.6	42.1	168.0	216.2
Clr & Sales										
Share,70	0.1	2.6	11.6	7.5	3.2	45.0	14.8	57.9	6.0	9.7
Share,95	1.0	8.1	8.9	11.0	3.7	18.1	12.9	35.2	11.6	12.0
% ch	664.6	212.7	-23.2	46.9	16.1	-59.7	-12.8	-39.2	93.9	23.3
Service										
Share,70	0.2	3.7	3.1	5.7	1.5	13.4	5.0	14.0	64.8	16.5
Share,95	1.4	7.9	5.5	7.7	1.6	39.1	8.8	16.8	28.9	18.4
% ch	625.3	111.2	76.8	36.1	10.4	192.3	75.9	20.0	-55.4	11.5
Farm/Fish/ For										
share,70	98.4	0.7	0.5	1.0	0.2	0.4	0.3	0.2	4.0	33.4
share,95	82.3	0.8	0.6	0.0	0.1	0.8	0.6	0.3	4.2	13.0
% ch	-16.4	13.3	15.5	-100.0	-52.1	97.5	135.9	26.3	5.3	-61.0
Prd wrk & oper/Arti										
share,70	0.5	86.0	57.1	38.7	55.8	14.5	20.4	1.8	2.3	22.3
share,95	1.7	48.9	47.4	41.8	59.6	12.9	12.2	3.3	3.7	18.1
% ch	229.6	-43.2	-16.9	7.9	6.8	-11.3	-40.2	83.1	56.3	-18.8
Labourer										
share,70	0.3	2.1	16.2	38.4	31.7	10.2	23.3	2.0	4.8	7.8
share,95	1.6	15.0	16.0	9.4	19.4	7.8	5.6	1.3	2.7	7.2
% ch	367.7	624.8	-1.0	-75.4	-38.9	-23.2	-75.9	-37.9	-43.2	-7.7
Transport										
Share,70	0.3	3.3	4.6	2.6	3.0	8.7	30.3	4.4	1.4	3.8
Share,95	11.1	11.2	8.2	8.6	5.0	6.1	38.6	4.8	5.3	8.8
% ch	4266.6	243.3	77.1	227.2	65.5	-29.5	27.7	9.3	270.2	131.7
Unspecified										
Share,70	0.0	0.1	0.7	0.5	0.3	0.3	0.7	0.2	0.2	0.2
Share,95	0.0	0.7	0.4	1.6	0.3	0.3	0.6	0.4	3.1	1.2
% ch	286.4	405.3	-40.3	202.3	-3.7	13.8	-10.4	63.7	1589.0	381.3
Total										
Share,70	100	100	100	100	100	100	100	100	100	100
Share,95	100	100	100	100	100	100	100	100	100	100

Table 1B: Shares in Formal Employment By Race, Gender & Sector: 1970-1995

	Agric.	Mining	Manuf.	Utilities	Cnstrn	Wholes	Trspt	Finance	Comm	Total
African										
Share,70	91.1	89.6	50.1	64.0	60.9	43.8	40.9	19.2	68.2	70.0
Share,95	75.1	75.2	55.9	51.6	55.8	52.0	52.2	32.0	64.5	59.5
% change	-17.5	-16.1	11.6	-19.3	-8.5	18.8	27.6	66.1	-5.5	-15.0
Coloured										
share,70	4.7	1.1	16.2	5.3	16.5	10.9	8.1	3.6	10.0	8.5
share,95	17.8	2.7	15.9	7.6	19.9	13.3	9.1	7.5	9.3	12.3
% change	277.4	157.5	-1.8	44.3	20.6	22.6	11.9	108.8	-6.5	44.3
Asian										
share,70	0.3	0.1	6.3	0.4	1.9	7.2	2.2	1.5	1.4	2.2
share,95	0.2	0.8	6.6	1.2	2.9	6.9	4.0	4.8	2.8	3.9
% change	-40.7	621.0	5.8	171.4	50.9	-3.6	86.1	215.2	102.3	76.5
White										
share,70	3.9	9.2	27.4	30.3	20.6	38.2	48.8	75.6	20.4	19.3
share,95	7.0	21.3	21.6	39.6	21.4	27.7	34.7	55.7	23.4	24.4
% change	76.7	131.3	-21.5	30.6	3.8	-27.4	-28.9	-26.3	14.7	26.2
Male										
share,70	64.2	99.0	79.0	96.3	97.6	72.4	91.6	60.7	36.6	67.7
share,95	79.8	96.0	70.6	87.3	93.1	57.0	83.7	55.1	52.3	66.5
% change	24.4	-3.1	-10.7	-9.3	-4.5	-21.3	-8.6	-9.2	42.8	-1.8
Female										
share,70	35.8	1.0	21.0	3.7	2.4	27.6	8.4	39.3	63.4	32.3
share,95	20.2	4.0	29.4	12.7	6.9	43.0	16.3	44.9	47.7	33.5
% change	-43.7	313.7	40.4	241.6	183.2	55.9	94.1	14.2	-24.8	3.8
Total										
share,70	100	100	100	100	100	100	100	100	100	100
share,95	100	100	100	100	100	100	100	100	100	100

Appendix 2 (Chapter 2)

Table 2A: Employment Shifts by Sector, 1995 and 1999 (OHS, 1995 and 1999)

Sector	Unspecified		Agriculture		Mining*		Manufacturing		Utilities		Construction		Trade	
Occupn./Year	95	99	95	99	95	99	95	99	95	99	95	99	95	99
Unspecified	75846	94314	775	3703	4598	5864	6103	34911	1339	3555	1195	2729	5115	9576
Managers	11674	12897	6574	30875	15644	17562	74665	112321	1964	6195	23060	43487	221437	211643
Profess.	1531	3918	677	2421	6490	9755	13503	34034	2826	3033	4815	4339	8156	18733
Technicians	4056	3733	3107	4006	17926	13262	79541	109861	10759	5105	14758	5272	49519	76444
Clerks	24681	17026	12102	11057	52712	22097	132022	122366	10921	9886	15071	15903	286255	299430
Serv&Sales	4781	7181	8636	18050	35978	17358	33487	37711	3855	5713	2039	5397	480733	623513
Skllagdomes.	738	0	103132	315460	1197	1801	5024	6128	0	330	264	435	3901	11640
Craft	6278	5345	14604	28863	218096	172285	306129	384438	26911	22299	265629	371780	192313	244781
Mach. Oper.	25257	7250	129116	132585	130317	174420	497162	417473	14151	8927	24466	19674	84010	66291
Elementary	31759	8851	905989	598295	110043	43716	273320	256213	11315	13439	82195	100673	318578	546837
Total	**186601**	**160515**	**1184712**	**1145315**	**593000**	**478120**	**1420956**	**1515456**	**84041**	**78482**	**433492**	**569689**	**1650017**	**2108888**

Table 2A contd. : Employment Shifts by Sector, 1995 and 1999 (OHS, 1995 and 1999)

Sector	Transport		Finance		Services		Domestic		Total	
Occupn./Year	95	99	95	99	95	99	95	99	95	99
Unspecified	2648	7284	1819	7319	29388	15824	0	487	128826	185566
Managers	65898	75891	48966	104485	38372	80047	585	0	508839	695403
Profess.	4748	9606	48849	119965	233726	352406	0	93	325321	558303
Technicians	53867	40624	123229	174108	697731	620413	1180	973	1055673	1053801
Clerks	89420	95587	220060	243379	299072	239524	0	1178	1142316	1077433
Serv&Sales	13319	24805	73564	159147	405099	333491	12956	12999	1074447	1245365
Skllagdomes.	865	1876	737	11871	7960	29540	689893	938931	813711	1318012
Craft	49212	47176	18867	25218	54237	57785	1447	10168	1153723	1370138
Mach. Oper.	136861	190291	10103	19929	70095	55813	995	6121	1122533	1098774
Elementary	52362	49953	36703	75088	315702	223115	93831	9714	2231797	1925894
Total	**469200**	**543093**	**582897**	**940509**	**2151382**	**2007958**	**800887**	**980664**	**9557185**	**10528689**

Appendix 3(Chapter 5)

Table 3A : Urban African Male and Female Labour Participation Equations for Expanded and Narrow Definitions of Unemployment

	Urban Male				Urban Female			
	Expanded		Narrow		Expanded		Narrow	
Variable	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar
None-Std5	.00416**	5.057	.00770**	5.05754	.008409**	5.05748	.00715*	5.057
Std 6-10	.00675**	1.857	.01722**	1.85798	.03802**	1.8025	.06277**	1.8026
Tertiary	-.0012	.1366	.00080	.136614	-.012424	.14637	.012587*	.1463
26-35	.04769**	.3700	.1295**	.370018	.11867**	.37385	.17698**	.3738
36-45	.05944**	.2720	.1759**	.272077	.12216**	.26495	.24484**	.2649
46-55	.04078**	.1420	.14104**	.142091	.071356	.14082	.22022**	.1408
56-65	.02572**	.0484	.12731**	.04884	.01957	.04308	.19905**	.0430
No. of Kids <7	.00653	.6804	.0138**	.680472	-.01264**	.93524	-.02184**	.9352
No. of Kids 8-15	.00137	.7273	-.0025	.727369	.00071	.94158	-.00553	.9415
No of males 16-59	-.00198	1.989	-.0231**	1.98956	-.00872	1.3584	-.01304**	1.358
No of fems 16-59	-.01114**	1.461	-.0256**	1.46165	.0211**	2.12692	.01154*	2.126
No of Adults >60	-.02709**	.2766	-.06931**	.276624	.00075	.28785	-.01897**	.2878
Other hhld income	-4.05e-07**	22205.2	-3.63e-07	22205.2	-2.12e-06*	26645.	-1.96e-06**	26645
Other hhld income sqred	7.98e-13	1.5e+09	1.80e-12	1.5e+09	2.33e-12**	2.8e+09	2.15e-12**	2.8e+09
Obs. Prob	.9367		.8243		.7925		.6377	
Pred. Prob (at x-bar)	.9519 (at x-bar)		.8540 (at x-bar)		.8105 (at x-bar)		.6508 (at x-bar)	
No Obs	6521		6521		7707		7707	
Chi(2)	328.2**		908.61**		548.9**		785.33**	
Pseudo R2	0.098		0.1386		0.0665		0.076	

** Significant at the 1% level * Significant at the 5% level

Table 3B: Urban African Male and Female Employment Equations for Expanded and Narrow Definitions of Unemployment

	Urban Male				Urban Female	
	Expanded		Narrow		Expanded	
Variable	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar
None-Std5	-.01593**	5.085	-.01438**	5.108	-.00227	5.1671
Std 6-10	.01392*	1.883	.00231	1.914	.06397**	1.9462
Tertiary	.03879**	.1395	.042044**	.1470	.11611**	.16291
26-35	.05078**	.3749	-.02919	.3745	.28184**	.39632
36-45	.12273**	.2817	-.01835	.2987	.42543**	.27488
46-55	.16620**	.1437	.03033	.1512	.39832**	.13170
56-65	.23943**	.0461	.08335**	.0499	.39031**	.03621
E.Cape	-.02294	.0938	.06925**	.0862	-.06509*	.13070
N.Cape	-.05055	.0124	.00093	.0119	-.10312*	.01186
Free Stat	-.02629	.0841	.10175**	.0768	-.07232*	.10782
Kwaz/Natl	.01830	.1522	.02675	.1534	-.00886	.1727
North-W	.07827*	.0809	.06247**	.0828	.02066	.06899
Gauteng	.0513*	.4459	.06451**	46052	-.00559	.38568
Mpumal	.03884	.0391	.07693**	.0362	-.15908**	.0366
N.Prov	.04587	.0258	.1129**	.0242	-.11747**	.02743
Lamda	-1.3549**	.1206	-.56492**	.2726	.18644**	.33571
Obs. Prob	.7329		.8328		.6061	
Pred. Prob At x-bar)	.7576 (at x-bar)		.8610 (at x-bar)		.6248 (at x-bar)	
No Obs	6056		5206		5957	
Chi(2)	1082.7**		681.4*		1148.7**	
Pseudo R2	0.1481		0.1407		0.1427	

** Significant at the 1% level * Significant at the 5% level

Table 3C: Urban African Male and Female Earnings Equations for Expanded and Narrow Definitions of Unemployment

	Urban Male		Urban Female	
Variable	**Expanded Unemployment**	**Narrow Unemployment**	**Expanded Unemployment**	**Narrow Unemployment**
None-Std5	.04804**	.0499**	.0426**	.0448**
Std 6-10	.1071**	.1052**	.0741**	.0924**
Tertiary	.05094	.0447	.0343	.0485
E.Cape	-.03586	-.0455	-.1482**	-.1700**
N.Cape	-.0574	-.0407	-.2584**	-.2725**
Free Stat	-.21795**	-.2336**	-.3370**	-.3707**
Kwaz/Natl	.0883	.0893*	-.0624	-.0609
North-W	.1077	.1017	-.1258**	-.129*
Gauteng	.1599**	.1581**	.1697**	.1629**
Mpumal	.08287	.079	.1065	.0643
N.Prov	.32880**	.3037**	.0759	.0555
Mining	.1661762**	-.1603029**	.4207	.4217
Manuf	.2845647**	.2828365**	.2309	.2262
Electricity	.5899361**	.5866131**	.533	.5350
Constr	.1137356	.1129959	.3380	.3297
Wholes	.1247791	.1256877	.1888	.1848
Transport	.372437**	.3683933**	.4944**	.4952*
Finance	.3085486**	.3042547**	.4715*	.4702*
Comm Serv	.3275005**	.3256818**	.3941*	.3899
Other	.227513	.020014	.1066	.1224
Armed Forces	.8778821**	.8646148**	.7430	.7425
Managers	1.112009**	1.114832**	.929**	.9507**
Profess	0.9747265**	.9663315**	.9155**	.9360**
Technicians	.7456466**	.7399523**	.7825**	.7989**
Clerks	.5202852**	.5163703**	.5080**	.5249**
Serv&Sales	.4786886**	.4743847**	.2533	.2686
Skilld Agric	-.073708	-.0684681	.6278	.6321
Craft	.4804153**	.4768006**	.0935	.1083
Mach Operator	.470309**	.4668909**	.2986*	.3162*
Unspecif	.3251987**	.3239393**	.4489**	.4670**
Domes Helper	.2419549	.2379359	.0871	.1027
Mining lab	.2490426	.2472353	-.0440	-.0381
Manuf lab	.3638321**	.3604891**	.2534	.2663
Trprt lab	.2505165	.2492946	-.1385	-.1355
Domes Worker	-.4324948**	-.4373609**	-.4373*	-.4223
Union Member	.163868**	.1641**	.1741**	.1768**
Exper	.02947**	.0282**	.0122**	.0174**
Expersq	-.00032**	-.0003**	-.0001**	-.0001**
Log of Hours p.m.	.1803**	.1736**	.1623**	.1629**
Constant	4.8883**	4.969**	5.065**	4.809**
Lambda	-.1288**	-.2411**	-.2774**	-.1604
No of Obs	6018	5185	5922	4689
Model Chi2	1142.33**	755.44**	1185.7**	737.16

** Significant at the 1% level * Significant at the 5% level

Table 3D : Rural African Male and Female Labour Participation Equations for Expanded and Narrow Definitions of Unemployment

	Rural Male				Rural Female			
	Expanded		Narrow		Expanded		Narrow	
Variable	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar
None-Std5	.00339*	3.794	.00461	3.794	-.00147	3.664	.00169	3.664
Std 6-10	.00298	1.017	.0146**	1.017	.05909**	.9386	.05025**	.9386
Tertiary	.00721	.0745	.03130*	.0745	-.03539*	.0762	.00267*	.0762
26-35	.06557**	.3282	.15007**	.3282	.07492**	.3224	.09867**	.3224
36-45	.08092**	.2248	.19841**	.2248	.03958*	.2442	.13210*	.2442
46-55	.05995**	.1442	.17883**	.1442	-.07081**	.1543	.07275**	.154
56-65	.00657	.0580	.15387**	.0580	-.21457**	.0547	-.01019**	.0547
No. of Kids <7	-.00131	.8929	.0026	.8929	-.02523**	1.228	-.02566**	1.228
No. of Kids 8-15	-.0022	1.032	-.01241**	1.032	-.01393**	1.271	-.01911**	1.271
No of males 16-59	-.01229**	1.938	-.0295**	1.938	-.01024	1.323	-.01518	1.323
No of fems 16-59	-.00456*	1.568	.01966**	1.568	.03333**	2.166	.01238**	2.166
No of Adults >60	-.03176**	.3625	-.10120**	.3625	-.00143	.3831	-.03698	.3831
Other hhld income	-2.19e-06**	12414	-5.10e-06**	12414	-1.94e-06**	17180	-4.14e-07	17180
Other hhld income sqred	1.96e-11**	7.1e+08	5.18e-11**	7.1e+08	1.98e-12**	1.6e+09	8.38e-14	1.6e+09
Obs. Prob	.8862		.7255		.5723927		.3895	
Pred. Prob (at x-bar)	.9230 (at x-bar)		.7774 (at x-bar)		.5775 (at x-bar)		.3849 (at x-bar)	
No Obs	9137		9137		11841		11841	
Chi(2)	842.47		1777.8**		1009.3**		832.2	
Pseudo R2	0.1344		0.1686		0.0626		0.0523	

** Significant at the 1% level * Significant at the 5% level

Table 3E : Rural African Male and Female Employment Equations for Expanded and Narrow Definitions of Unemployment

	Rural Male				Rural Female			
	Expanded		Narrow		Expanded		Narrow	
Variable	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar	Marginal Effects	x-bar
None-Std5	-.00724**	3.8013	-.00365	3.7785	.0025	3.8942	-.00586	3.9199
Std 6-10	.0059	1.0072	-.00543	1.0055	.00363	1.1610	-.0602**	1.2250
Tertiary	.0519**	.0751	.0341*	.08079	.15577**	.09371	.18805**	.11438
26-35	.02973	.33754	.01835	.33751	.17383**	.36172	.05610**	.35061
36-45	.06921**	.24030	.03011	.25760	.31589**	.24621	.10424**	.26615
46-55	.12879**	.14988	.04884**	.16165	.40319**	.12676	.21521**	.14366
56-65	.26790**	.05208	.09339**	.05849	.44982**	.03099	.24965**	.03773
E.Cape	-.36825**	.15302	-.09449	.1333	-.34332**	.19162	.06836	.1821
N.Cape	-.00751	.0087	-.12155	.01068	.11547	.00297	.10189	.00417
Free Stat	-.12948	.09123	-.00748	.10507	-.07559	.07263	-.02837	.08728
Kwaz/Natl	-.20595*	.23660	-.08260	.23725	-.26387**	.26490	.0877	.27169
North-W	-.31503**	.15361	-.07203	.15270	-.28464**	.12382	.09488	.11817
Gauteng	.0149	.03873	-.00889	.04601	-.00525	.0234	-.03883	.03088
Mpumal	-.27706**	.15002	-.02809	.15217	-.28012**	.1170	.06296	.11361
N.Prov	-.17699	.15103	-.01851	.14237	-.34838**	.19861	.10333	.18577
Lamda	-1.1393**	.18971	-.31876**	.38249	-.14034	.64426	-.65184**	.93297
Obs. Prob	.7005		.8556		.4926		.7239	
Pred. Prob At x-bar)	.7357 (at x-bar)		.8946 (at x-bar)		.4953 (at x-bar)		.7524 (at x-bar)	
No Obs	8147		6725		6853		4721	
Chi(2)	1838.6**		986.15**		978.65		678.4**	
Pseudo R2	.1882		.1840		.1030		.1236	

** Significant at the 1% level * Significant at the 5% level

Table 3F: Rural African Male and Female Earnings Equations for Expanded and Narrow Definitions of Unemployment

	Rural Male		Rural Female	
Variable	**Expanded Unemployment**	**Narrow Unemployment**	**Expanded Unemployment**	**Narrow Unemployment**
None-Std5	.0262**	.0273**	.0478**	.0488**
Std 6-10	.1004**	.1013**	.0890**	.0922**
Tertiary	.0114	.0102	.0371	.0048
E.Cape	-.4011**	-.4103**	-.0656	-.0444
N.Cape	-.4151**	-.4085**	-.1938	-.1476
Free Stat	-.5753**	-.5771**	-.7315**	-.715**
Kwaz/Natl	-.2224**	-.2248**	.1796	.2003
North-W	-.3300**	-.3336**	-.0327	-.0311
Gauteng	-.3541**	-.3568**	-.0183	.0089
Mpumal	-.3225**	-.3338**	.1668	.1804
N.Prov	-.2000**	-.2089**	.2416	.2591*
Mining	.7579127**	.7570094**	.2203	.2244
Manuf	.6252782**	.6272172**	.2482*	.2595**
Electricity	.8139617**	.8148491**	.5340	.5443*
Constr	.5345509**	.536156**	.4242*	.4268**
Wholes	.5716519**	.5738369**	.1798	.1843*
Transport	.7709761**	.7735797**	.5935**	.5932**
Finance	.5965777**	.5997498**	.4253**	.4230**
Comm Serv	.7018911**	.7037523**	.3021**	.3087**
Other	-.3265729**	-.32589**	.3742**	.3783**
Armed Forces	.49524**	.493589**	(dropped)	(dropped)
Managers	.6469359**	.6474902**	.8197**	.8297**
Profess	.9065049**	.9038113**	1.104**	1.097**
Technicians	.5282483**	.5276259**	1.022**	1.020**
Clerks	.2504032**	.2509869**	.6078**	.6127**
Serv&Sales	.141053**	.1413896**	.3725**	.3735**
Skilld Agric	.3405803**	.3402449**	-.0404	-.0176
Craft	.1922901**	.1922264**	.2898**	.2979**
Mach Operator	.1111536**	.1112566**	.2742*	.2817**
Unspecif	-.0562722	-.0549814	-.0151	-.0055
Domes Helper	-.0486589	-.0478983	.2741**	.2729**
Mining lab	-.1081574*	-.106682*	.2514	.2532
Manuf lab	-.2533656**	-.2527708**	.1950	.1891
Trprt lab	-.0079984	-.0101031	-.6912	-.6433
Domes Worker	-.8721786**	-.8712416**	-.2885**	-.2936**
Union Member	.2366**	.2359**	.2969**	.2947**
Exper	.0397**	.0392**	.0272**	.0243**
Expersq	-.0005**	-.0005**	-.0003**	-.0003**
Log of Hours p.m.	.0324	.0307	.1035**	.1012**
Constant	6.172**	6.179**	4.695**	4.752**
Lambda	-.0889*	-.1321**	-.1706**	-.3425**
No of Obs	8106	6701	6801	4704
Model Chi2	1927.80**	995.55**	1026.9**	708.2**

** Significant at the 1% level * Significant at the 5% level

Appendix 4 (Chapter 6)

Figure 4A: Relationship between Household Size and Income

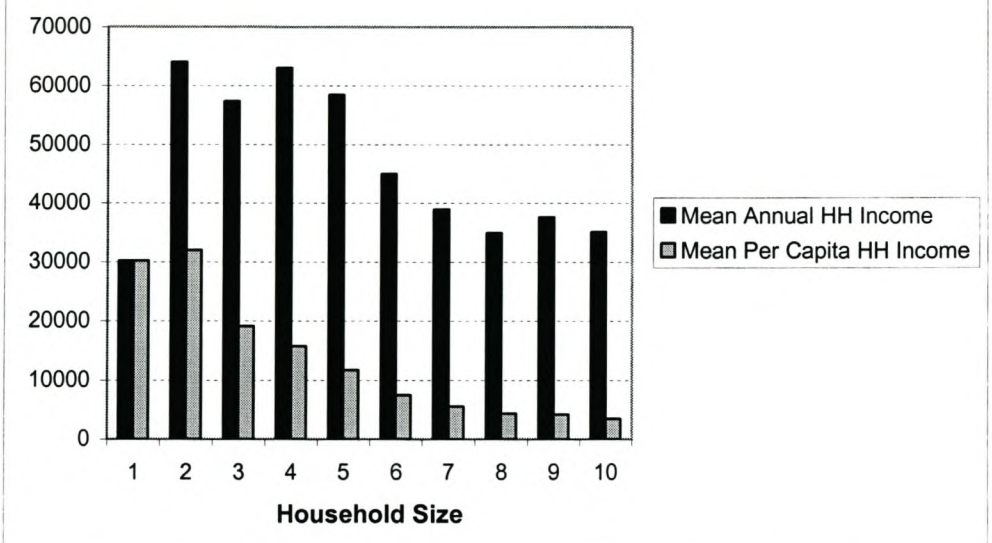


Figure 4B: Poverty Incidence Curves for Pre-Transfer Income and Alternate Transfer Income Values

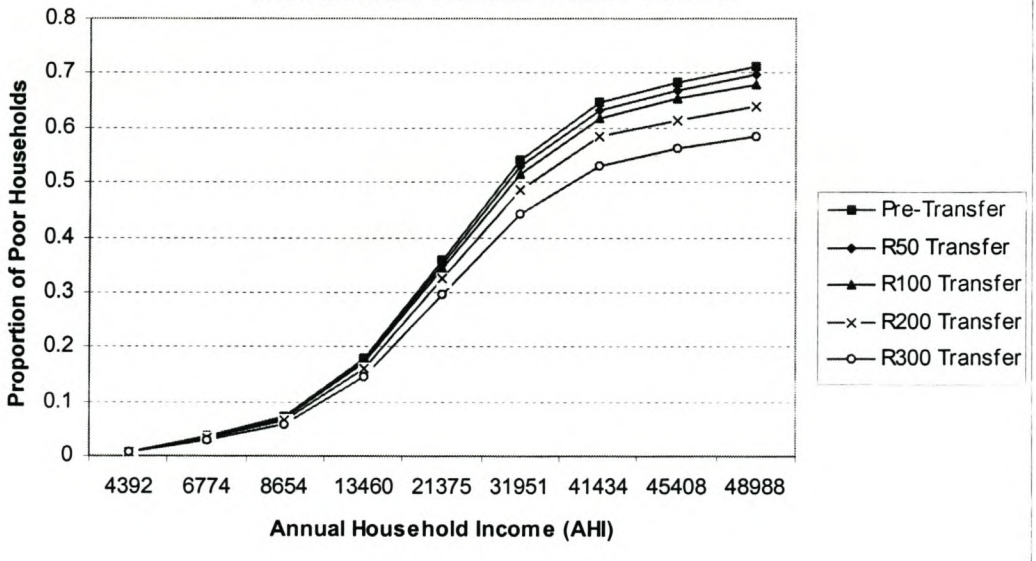
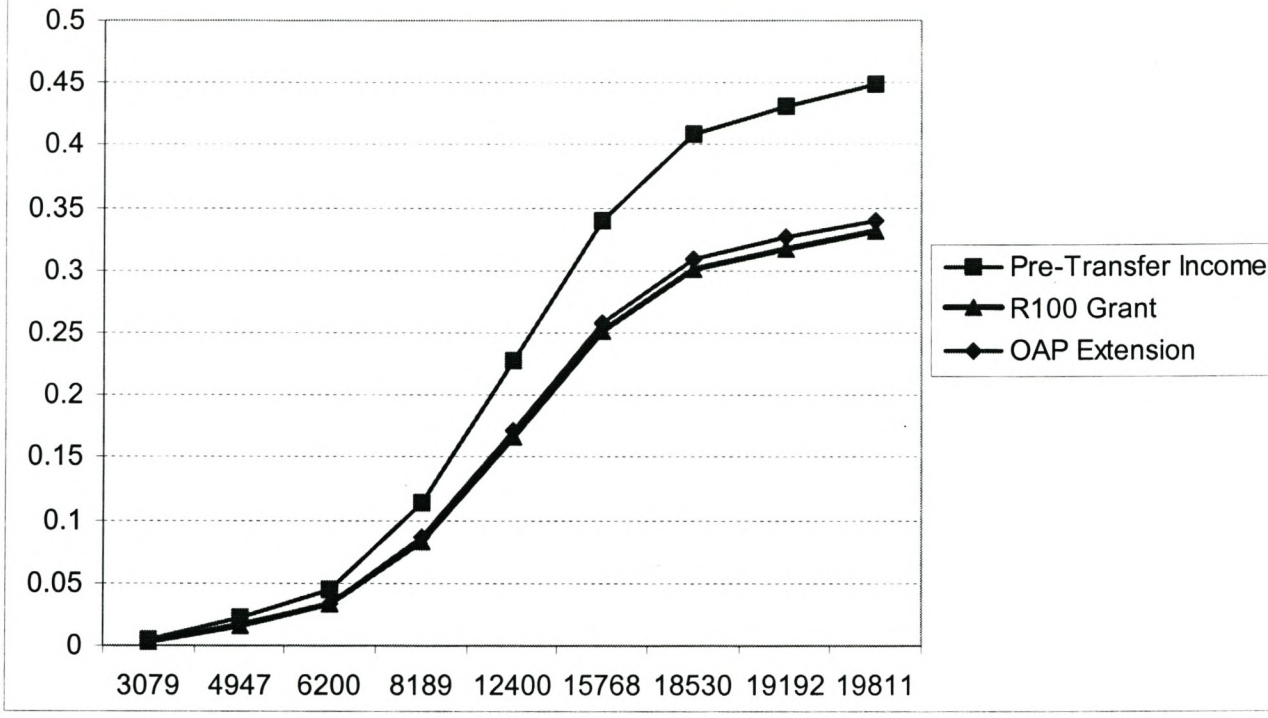
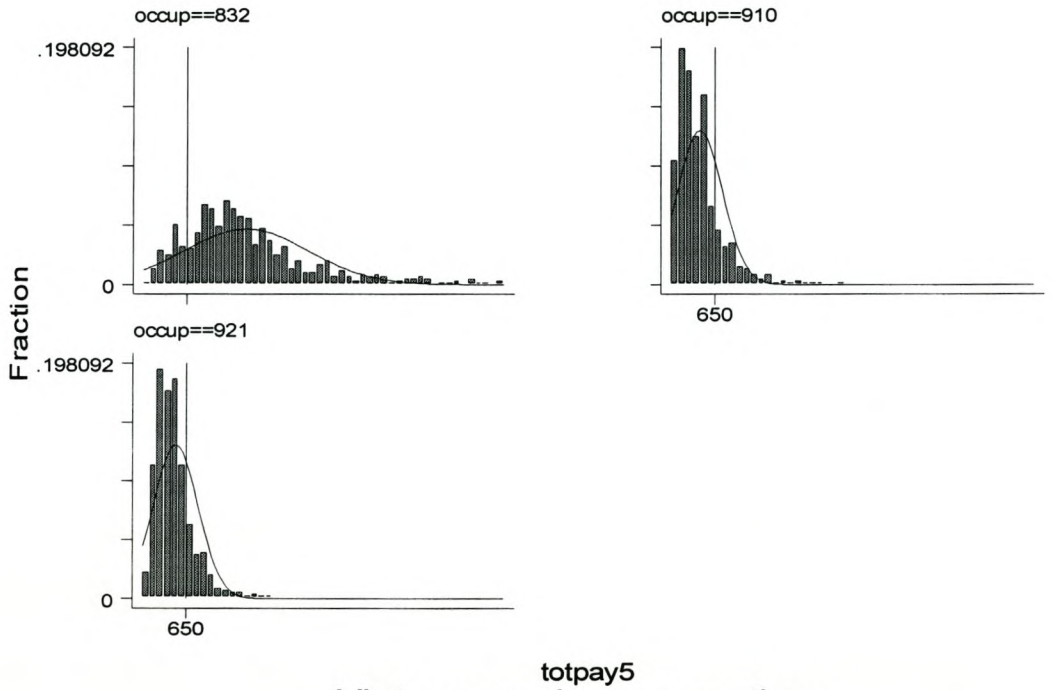


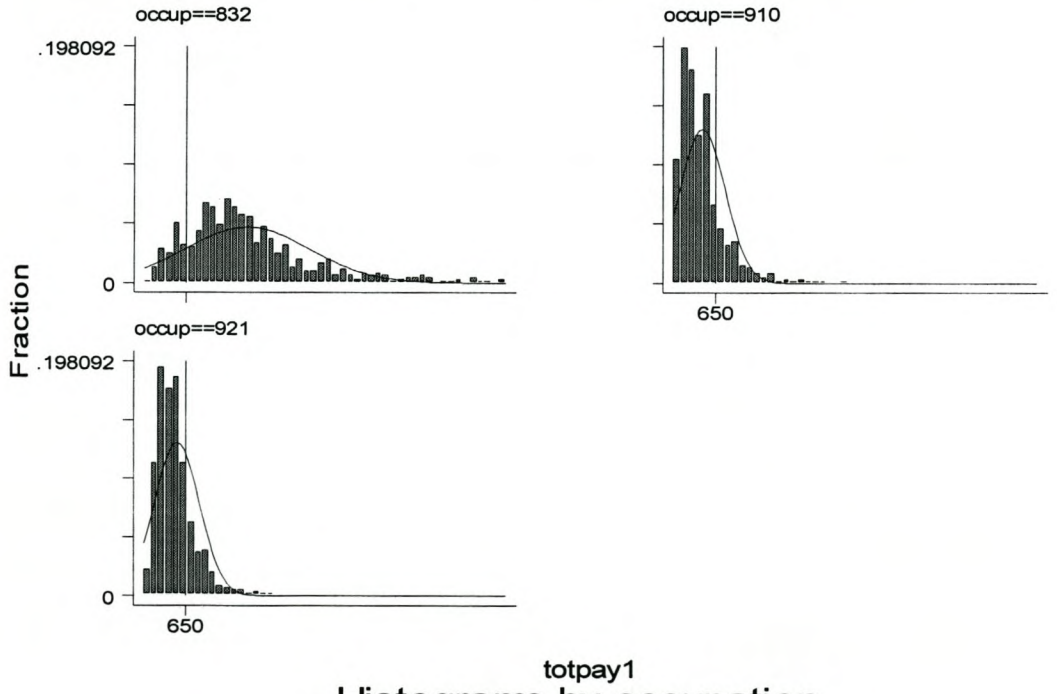
Figure 4C: Poverty Incidence Curves for Pre-Transfer Income, R100 Grant and OAP Extension

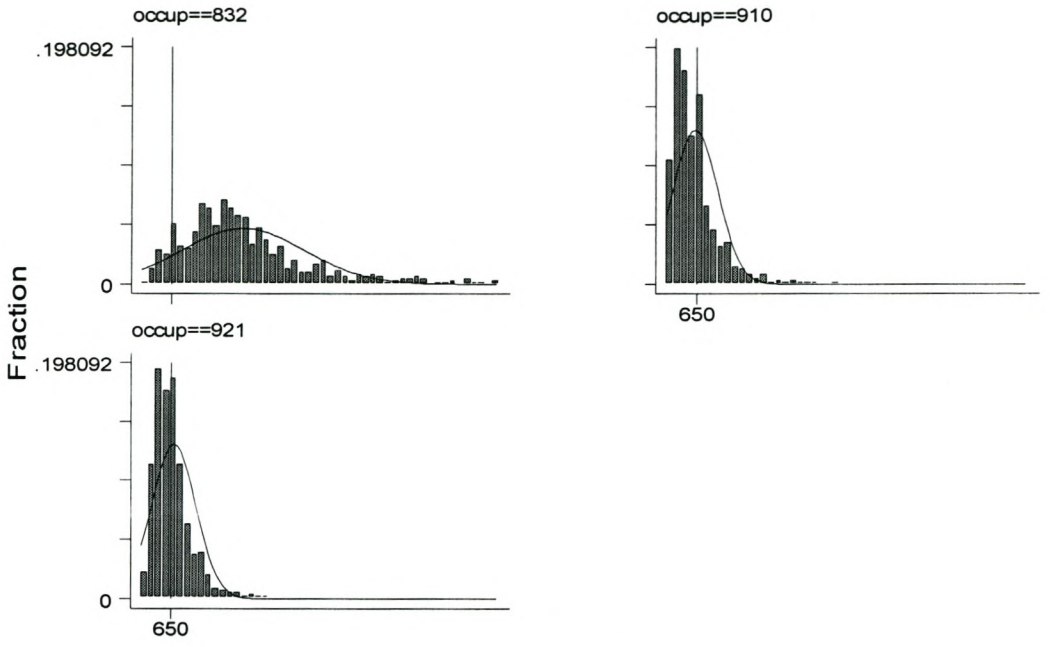


Appendix 5 (Chapter 7)

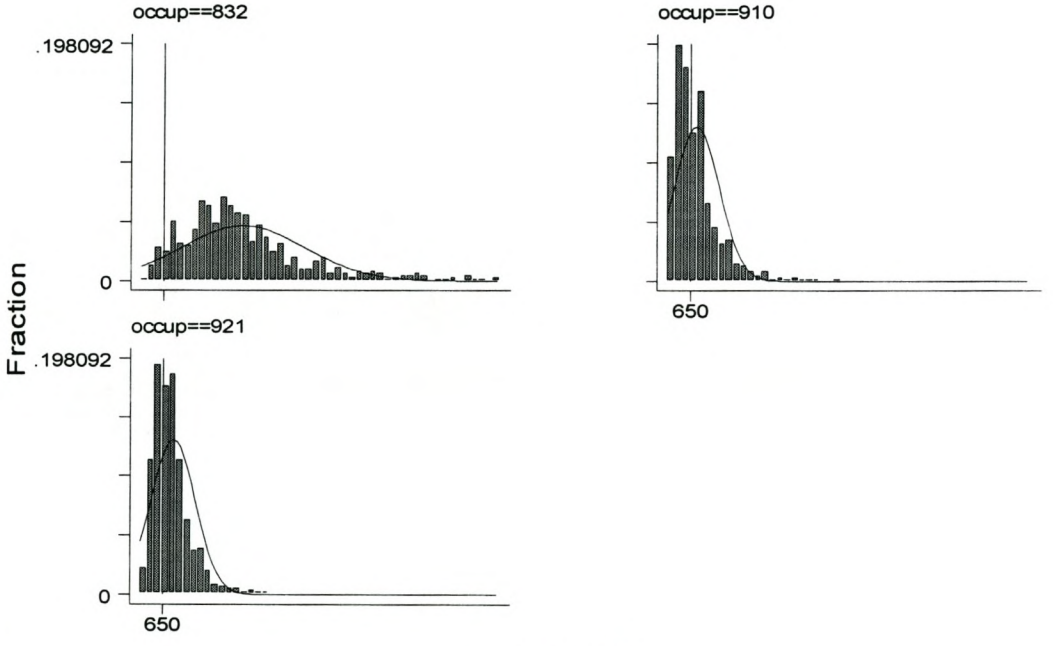
The following four set of histograms represent the graphic results from the wage simulations, where *totpay5* is the 5% increase, *totpay1* the 10%, *totpy50* the 50% rise and *totpy100*, the doubling of the wage (Figure 5A)







Histograms by occupation



Histograms by occupation

Table 5B: Long-Run Employment Effects from 5% and 10% Wage Change

Race	Drivers	Domestic Workers	Farm Workers
Total	435 973	703 323	945 173
5% Wage Increase			
Long-run elasticity	-3.55	-3.55	-3.55
Long-run empl. Loss	-15 455	-24 933	-33 506
New long-run empl. Level	420 518	678 390	911 667
10% Wage Increase			
Long-run elasticity	-7.09	-7.09	-7.09
Long-run empl. Loss	-30 910	-49 866	-67 013
New long-run empl. Level	405 063	653 457	878 160

Table 5C: Long-Run Employment Effects from 50% and 100% Wage Change

Race	Drivers	Domestic Workers	Farm Workers
Total	435 973	703 323	945 173
50% Wage Increase			
Long-run elasticity	-35.45	-35.45	-35.45
Long-run empl. Loss	-154 552	-249 328	-335 064
New long-run empl. Level	281 421	453 995	610 109
100% Wage Increase			
Long-run elasticity	-70.9	-70.9	-70.9
Long-run empl. Loss	-309 105	-498 656	-670 128
New long-run empl. Level	126 868	204 667	275 045

Table 5D: Long-Run and Short-Run Wage Elasticities for Black Formal Sector Employees (Fallon & Lucas, 1998)

Sector	Long-Run	Short-Run
Beverages	-0.184	-0.095
Tobacco	-0.057	-0.018
Textiles	-0.984	-0.346
Wearing Apparel	-2.508	-0.709
Wood Products	-0.196	-0.603
Furniture	-0.364	-0.139
Chemicals	-1.166	-0.344
Rubber and Plastic	-0.243	-0.153
Non-met Minerals	-2.929	-0.451
Basic Metals	-0.758	-0.166
Fabricated Metals	-0.466	-0.175
Non-Electr. Mach.	-0.632	-0.408
Transport Equipment	-0.440	-0.201
Mining	-0.146	-0.118
Construction	-0.554	-0.360
Services	-0.948	-0.147
Weighted Mean	***-0.709***	***-0.156***

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Hello all,

This is to experts on microfinance regulation in Ethiopia. I came across a very interesting report (Shiferaw, Bekele, and Wolday Amha. 2001. *Revisiting the Regulatory and Supervision Framework of the Micro-Finance Industry in Ethiopia*, *Report No. 13*. Aas, Norway: Drylands Coordination Group. Available from http://www.drylands-group.org/Rep13_2001.pdf). But I failed to verify whether all regulated 'Micro Financing Institutions' are also offering some kind of savings service. According to the MFI Law, **all** MFIs are regulated and supervised by the Central Bank, not only deposit-taking MFIs. Can anyone help?

Thanks,
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The good folks at CARE recently sent me an interesting study on their work in Africa:

Hugh Allen, "Care International's Village Savings & Loan Programmes in Africa: Micro Finance for the Rural Poor that Works," Atlanta, Georgia: CARE, August 2002. CARE's website is www.care.org. Anne Woods may also provide information on how to get copies of the study. Her email is woodsa@care.org.

Allen provides information on CARE's unique microfinance efforts in a handful of countries: Niger, Zimbabwe, Zanzibar, Uganda, and Mali. The largest and most interesting program is in Niger with a total of 162 thousand women in more than 5 thousand groups. The smaller programs in other African countries are variants of the Niger model.

Three features of the program in Niger piqued my interest: it is only one small step removed from informal finance, it stresses deposit mobilization, and it doesn't spend much on high priced expats or on sending staff to galactic conferences.

As Frits Bouman noted some years ago, there are two common types of informal self-help financial groups in low-income countries: the ubiquitous roscas (tontines and susus) and the less common ascas. Sometimes the money accumulated by traditional ascas are used as a loan fund. CARE's program in Niger copies this asca technique. CARE trains local promoters who, in turn, organize women into groups of about thirty. The women in these groups commit to save small amounts periodically over a period of about a year with the savings being used to make loans to members in the group. The loans are typically for only a month and carry an interest charge of 10 percent. As a result, those members of the group who are primarily depositors receive a hefty return on their savings when the members of the group receive their deposits plus earnings at the end of the agreed-upon term of the group, typically 9 to 12 months. Aside from some initial subsidized training, group members don't capture other outside subsidies or funds.

What puzzles me most about the Niger case is why an outside agent is needed to organize an asca, something that is so common in most of Africa. I don't know Niger, but I'd predict that elders in most villages in black Africa require families to make periodic contributions to a village fund or asca. I'd also predict that most of the folks living in or near towns are often involved in roscas, a non-identical twin of the ascas. Showing Africans how to organize a self-help financial group is like teaching them to like the opposite sex or training them to stay out of the hot sun. What is the value added that CARE brings to organizing these copies of traditional self-help financial groups? If the women realize such great benefits from joining these groups, why didn't they organize groups spontaneously before the CARE folks arrived?

Are the Muslim women in Niger so repressed that they don't have social contact with thirty other women without CARE's assistance? Are they so poor that smaller ascas wouldn't mobilize enough funds to make grouping of interest to potential members? Is giving the group a small stong box for their funds enough to elicit group formation? I need some major help in understanding what is going on in Niger.....jane.