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Investigating the linkages between the formal and informal sector in South Africa

By

Vonani Chris Mashimbyi

3822680

Author Notes:

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Supervisors:

Dr. Christie Swanepoel
Miss Mariana Moses

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DECLARATION

I, **MASHIMBYI, VONANI CHRIS**, declare that ***Investigating the linkages between the formal and informal sector in South Africa***, has not been submitted before for any degree, or examination at any university, and that all the sources used or quoted have been indicated and duly acknowledged by means of referencing.

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ABSTRACT

There have been many studies focussing on informal sector in South Africa in the last 25 years. This paper adds to the wealth of research that has been conducted in this field. It examines the linkages between the formal sector and informal sector, and how they interact with each other. The study uses probit models and fixed effects models to investigate how variables such as age, education and skill level affect employability and income in the labour market. This paper uses two data sets: wave 1 to wave 5 panel data of the 2008-2016 National Income Dynamics Study (NIDS) to investigate the nature of the formal sector and the informal sector in South Africa. To study the linkages between the firms in the formal and informal sector, it uses the eThekwini Large and Medium Manufacturing Firm Survey dataset collected in 2013/2014.

The first result regarding the informal sector is that it decreased in size between the first and fifth wave of NIDS. It was 20.5% in wave 1 and 14.9% in wave 5. Whilst the formal sector size increased by almost 10%. Industries such as the manufacturing sector has decreased in employment size from 16.1% in wave 1 to 11.2% in wave 5. In addition, 36.2% of firms find labour regulations and relations cumbersome in business. The study found evidence of forward linkage relationship between the formal sector and the informal sector. In the manufacturing industry, 18.0% of raw inputs are purchased from the informal sector, while 41.4% of components are purchased from the informal sector. Age, race, education level, skill and trade union are highly significant determinants in formal and informal employment. Education level, however, is not a significant factor for individuals who want to work in the informal sector.

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LIST OF ABBREVIATIONS

1. CDA- Currency Demand Approach
2. COFESA- Confederation of Employers South Africa
3. ELMMFS- eThekwini Large and Medium Manufacturing Firm Survey
4. ECI- Economic Census of India
5. GDP-Gross Domestic Product
6. GLSSV- Ghana Living Standard Survey Data
7. ICLS-International Conference of Labour Statistics
8. ILO-International Labour Organization
9. LFS- Labour Force Survey
10. MBOPS - Members-Based Organizations of the very Poor
11. MIMC- Multiple Indicators Multiple Causes
12. MLP- Multiple Linear Probability
13. NIDS- National Income Dynamics Study
14. NEDLAC- National Economic Development and Labour Council
15. PMM- Predictive Mean Matching
16. PDF - Probability Density Function
17. QLFS-Quarterly Labour Force Survey
18. SALDRU- Southern Africa Labour and Development Unit
19. SESE- Survey of Employers and Self-Employed
20. Stats SA- Statistics South Africa
21. VAT-Value Added Tax
22. UIF-Unemployment Insurance Fund

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CHAPTER 1: INTRODUCTORY CHAPTER

1.1 Background and problem statement

South Africa is a country characterized by a high unemployment rate and low economic growth. In the fourth quarter of 2019, the Quarterly Labour Force Survey (QLFS) estimated the unemployment rate to be at 29.1% (Statistics South Africa [StatsSA], 2020a, p. 1). In the same year, Growth Domestic Product (GDP) contracted by 0.8% in the third quarter, followed by another 1.4% contraction in the fourth quarter (StatsSA 2020b, p. 2). The country was in a technical recession when the year 2019 concluded. Economic challenges such as the above disrupt the project of building a better South Africa – a plan conceived in 1994 – where there is reduced poverty, low inequality, and access to economic opportunities.

In 1994, the first democratic government of South Africa devised integrated strategies that would address issues of gross inequalities prevalent in communities all over the country. Inspired by East Asian countries such as Japan, for the next 26 years, the new democratic dispensation implemented different types of macro-economic policies to realise its ambitions of building a developmental state. These policy frameworks include the 1994 Reconstruction and Development Programme (RDP); the 1996 Growth, Employment and Redistribution (GEAR); the 2005 Accelerated and Shared Growth Initiative for South Africa (ASGISA); the 2010 New Growth Path (NGP) and now, the National Development Plan (NDP) introduced in 2012 (Edwards *et al.*, 2018, p. 4-13). Given the current economic state, it is evident that progress has been slow. With support, the informal sector could be one of the contributing vehicles towards achieving inclusive growth in the South African economy.

The size of the informal sector in South Africa is small, relative to other developing countries. In the fourth quarter of 2019, the informal sector employed 2.9 million people (StatsSA, 2020a, p. 1). The South African government understands the potential of the informal sector to create employment. The government has envisaged a scenario where employment levels in the informal sector grow to 5 million by 2030 (National Planning Commission [NPC], 2012, p. 121). Due to the reasons above, the significance of the informal economy, a historically neglected sector defined by low operating costs and competitive markets cannot be overstated. In 2003, former president Thabo Mbeki mischaracterized the informal sector as structurally disconnected from the formal sector and the global economy, and incapable of self-generated growth and development (Rogan and Skinner, 2017, p. 4). This way of thinking sometimes informs bad government policy. For example, the Accelerated and Shared Growth Initiative of

South Africa, called for the elimination of the informal sector through total formalization (RSA, 2006, p. 11, cited in Rogan and Skinner, 2017, p. 4). Well-informed governments are more likely to create better economic policies that can support and serve the informal sector better. This includes understanding the origins of the informal sector itself. The informal sector became popular in the 1950s through the dual-sector model, a developmental economic theory invented by Arthur Lewis.

In 1954, Arthur Lewis proposed in his seminal paper that there exist two distinct sectors: the traditional economic sector and the modern economic sector. The former is overpopulated, and labour-intensive. Some of its defining qualities include petty trade and small-scale production (Lewis, 1954). The latter is capital-intensive, industrial, and characterized by high productivity (Lewis, 1954). Years later, in 1972, the International Labour Organization (ILO) would confirm the existence of this subsistence economic sector composed of small enterprises in the outskirts of Nairobi, Kenya. Lewis argued that the capitalist economy would eventually absorb the labour-intensive economy and the labour-intensive economy would cease to exist. According to the theory, the subsistence economy would disappear because of the labour transition phenomena that exist between the two sectors, among other factors. During economic downturns, workers transition from the formal sector to the informal sector. During economic upturns, workers transition from the informal sector to the formal sector. Once the economy recovers, workers would prefer to remain in the formal sector and therefore see no reason to return to the informal sector. The underlying idea is that economic recessions are rare events relative to upturns. Lewis named this theory the 'Lewis Turning Point' and many economists globally, have used it in different studies (Lewis, 1954).[1]

In the 1960s and 1970s, the economic situation of the time tested the 'Lewis Turning Point' in practical terms. After World War II, Western Europe implemented the Marshal Plan. The Marshal Plan was an initiative committed to rebuilding the infrastructure in Western Europe after it was destroyed in the war (Magid, 2012). During this period when the recovery program was taking place, Europe experienced economic growth (Magid, 2012, p. 5). The expansion of mass production in North America took place around the same time as well (Chen, 2012, p. 2). Naturally, the subsistence economy shrunk and employment in the formal sector grew, bolstering the ideas advanced in the 'Lewis Turning Point'. However, this was not the case in the developing world. Although some developing countries experienced economic growth

[1] Arthur Lewis would go on to win a Nobel Prize in 1979, for his 'Lewis Model' contribution in development economics.

during the 1980s, it was not enough to affect the subsistence economy in a meaningful way. For example, in the 1980s and the 1990s when Latin America and Asian countries cycled in and out of recessions with churning between the formal sector and informal sector, the informal sector did not disappear (Tokman, 1979). The informal sector in the developing world remains an important part of the economy. Some economists such as Hans Singer, former Director of the Economic Division of the United Nations Industrial Development Organization (UNIDO), even said there is no reason to expect the 'Lewis Turning Point' in developing countries (Chen, 2012, p. 2).

The informal sector saw a massive growth in its global size during political transitions in the continent of Africa and in the former Soviet Union (Chen, 2012, p. 6). Today, world economies recognise the informal sector as a labour market category, and is of interest to various fields of study, including economics, anthropology, and political science (Chen, 2012, p. 6). Many credit Keith Hart for naming the informal sector, following his study on low-income economic activities in Ghana (Chen, 2012, p. 2; Hart, 1973).

Like the formal sector, the informal sector comprises industries such as retail, construction, manufacturing, transportation, and communication. It may have the ability to generate employment for the poor and unemployed people of South Africa at a large scale (Yu, 2010). It has the potential to be an integral part of the economy that could serve as a mechanism to address challenges such as inequality. This would require support of government with policies apprised by pertinent research (ILO, 1972). This begins with having fundamental understanding of the South African informal economy and its unique qualities, including the type of people who participate in it.

The aim of this project is to add new knowledge about the informal sector in South Africa. It provides an in-depth statistical analysis of the informal sector's characteristics, structure, and makeup and how it relates to the formal sector. This paper notes, for the record, that the informal sector is not a solution to all economic problems faced by South Africa. This paper is aware of that fact. However, this paper is of the position that relevant research must define and inform economic policies that affect the informal sector. The goal of this research is to help contribute from that vantage point.

1.2 Research objectives

The main research objective of the study is to investigate the informal sector in South Africa using the National Income Dynamics Study (NIDS) dataset and eThekwini Large and Medium Manufacturing Firm Survey (ELMMFS) dataset. The paper focuses on the size of the informal sector in South Africa and on the factors that affect it. The study uses the NIDS data to analyse the informal sector at an individual level, including income. Similarly, the study also employs the ELMMFS data to understand informality in large and medium manufacturing firms and how the formal and informal sectors are linked to each other.

Specific objectives include:

1. To investigate the size of the informal sector in South Africa and how it has changed between 2008 and 2016.

2. To study the individual profiles of informal sector participants.

3. To examine the relationship between the informal sector and formal sector in South Africa and what kind of linkages exist.

4. To evaluate the likelihood of employability in the formal sector or the informal sector, given a previous sector of employment.

5. To evaluate how certain characteristics affect income in the formal sector and informal economy.

1.3 Research questions

This study aims to fill the gap of knowledge about the informal sector and then highlight its benefits. The study will also explore the contribution of the informal economy to the entire South African economy. In order to achieve this, the following research questions are identified.

1. What is the size of the informal sector employment in South Africa?

2. How do changes in the profile of the South African population affect the informal sector?

3. What are the linkages between the formal and informal sector in South Africa?

4. What are the labour force transition patterns of employability in the South Africa?

5. How do person-characteristics affect income in the formal sector and the informal sector?

1.4 Outline of the study

The study comprises of five chapters. Chapter 1 provides a general background of the topic. It explains the importance of the study and concludes with a brief overview of the objectives of the study. Chapter 2 presents facts about the topic through the conceptual framework and the theoretical framework. The conceptual framework brings context to the topic by defining key concepts of the research topic. The theoretical framework bases the research on existing, sound academic principles. A detailed review of past studies on the research topic follows the theoretical framework. The past studies may or may not be consistent with the research topic due to certain assumptions but fit within the narrative of the study.

In Chapter 3, the focus is on the methodology and data utilized to answer the research questions and justify the research objectives. The study adopts some techniques used in other papers as well as original techniques to investigate informality in South Africa.

Chapter 4 analyses the findings made through the above methodology and data. The chapter presents and interprets findings of the study. Where necessary, the study cross-examines, compare, and contrast the findings with the existing research. Chapter 5 concludes with a summary of findings. Chapter 5 makes conclusive remarks about the subject of the study, mentions limitations of the study and propose recommendations. Some of the limitations of this study is that it focuses only on backward linkages, forward linkages and churning only. There are many other linkages that could be explored, however, the data used in this study limits this possibility.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Chapter 2 presents a review of research work on the topic of the informal sector. The study discusses existing methodologies and findings on the topic. The chapter begins with discussing the conceptual frameworks such as definitions of formal sector and informal sector. The chapter also reviews key theoretical frameworks in the informal sector. These frameworks include the dualistic labour market theory, the alternative theory and structural articulation theory. This exercise of analysing existing research on the informal sector informs this study in identifying gaps and knowledge deficit on the topic. The result of this exercise is a credible research paper that is consistent and aligned with techniques generally employed in informal sector research.

2.2 Conceptual Framework

The differences between the formal sector and the informal sector are not always obvious. Therefore, definitions of these sectors that clarify the differences between the two are important. Different countries use distinct definitions of the informal sector depending on the reliable statistical data available to them. Currently, a universal definition that describes the informal sector does not exist. However, institutions such as the International Labour Organization (ILO) have provided guidelines that informs varying definitions of informal sector in different countries. This section provides definitions of the formal sector and the informal sector used in South Africa.

2.2.1. The formal sector

The formal sector comprises of regulated and registered enterprises. Formal sector enterprises engage in legal production and trade of goods and services. Formal enterprises operate in protected markets. They pay tax and adhere to stringent compliance standards such as tariffs, quotas, and trade licenses (ILO, 1972, p. 6). The ILO describes the formal sectors using the following defining characteristics: difficult entry, frequent reliance on overseas resources, corporate ownership, large scales of operation, capital-intensive and modern technology, and formally acquired skills (ILO, 1972, p. 6).

2.2.2. The informal sector

The world adopted and used the term, 'informal sector' in economics in the early 1970s, about 40 years ago. Today, the informal sector is an important labour market category and is crucial for employment creation, production, and economic growth for many countries. The lack of reliable data and statistics about the informal sector has slowed down the progress of developing an internationally accepted definition. A universal operational definition of the informal sector would help bring clarity and understanding to the magnitude and nature of the informal economy in the world. Such a definition would be a blueprint from which countries of different economic profiles could create effective policies and practical solutions that would serve the sector in a more meaningful way.

Keith Hart used the term 'informal sector' in the early 1970s to describe economic activities outside the framework of corporate public and private sector institutions (Hart, 1973, p. 68-70). He studied a range of peculiar subsistence economic activities in the low-income section of the labour force in Accra, Ghana. These informal activities required little capital, low-level technology, and no access to markets. Some of these economic activities were operating beyond the boundaries of the law; therefore, avoided government regulations or paying taxes (Hart, 1973, p. 68-70). The sector comprises of small-scale economic activities consisting of self-employed persons who hire family labour or a few workers (ILO, 1972, p. 223-232).

In 1993, at the 15th International Conference of Labour Statistical (ICLS), The ILO proposed the informal sector definition and the enterprise-based definition of employment in the informal sector. The informal sector was described as a sector consisting of units engaged in production of goods and services, with a principle aim of generating employment and income to the persons involved (ILO, 1993, p. 2-3). Informal sector employment comprised all jobs in the unregistered and/or small-scale private business entities involved in the production of goods and services with an object of sale or barter (ILO, 1993, p. 2-3). The ILO based this definition of the informal sector on the concept of the informal sector enterprise, thus, the enterprise-based approach. Informal enterprises do not pay taxes or comply with any government regulations such as labour laws and environmental laws (Abeberese and Chaurey, 2017, p. 5). Therefore, the informal economy encompasses all activities by workers or economic units that are by law not covered by formal arrangements.

The concept of informality has evolved over time, broadening its scope from specific types of enterprises to an economy-wide phenomenon. A new framework that could better capture this

growth of informality became necessary. At the 17th ICLS in 2002, the ILO introduced an alternative definition of informal sector employment. The 17th ICLS criticised the enterprise-based approach, for not capturing all aspects of increasing informalization of employment in all sectors of employment. They argued that persons who are self-employed or casual workers seldom classify themselves as employed, and therefore, by extension, do not consider themselves informally employed (Huismanns, 2004, p. 1). The ILO introduced the labour-based approach to address some of the shortfalls of the enterprise-based approach. The labour-based approach was defined as all economic activities in the formal sector or informal sector, carried out by employees or economic units that are not registered. This would include domestic workers, casual workers, part-time workers, industrial workers, and unregistered workers (ILO, 2003, p. 12-14).

Statistics South Africa (StatsSA) adopted the enterprise-based approach from the 15th ICLS to define employment in the informal sector from 1995 to 2007. StatsSA featured the enterprise-based definition in their two most popular publications until 2007: October Household Survey (OHS) and the Labour Force Survey (LFS) (Yu, 2010, p. 3-8). The enterprise-based approach classifies all employees who work for incorporated firms as formal employees. Alternatively, it classifies employees who work for non-incorporated firms as informal employees (Yu, 2010, p. 3-8).

The enterprise-based approach was problematic in practice because workers who were part of the surveys such as the LFS knew little about the registration status of the companies that employ them. In addition, the questionnaires used in the surveys were sometimes too complex for some employees to understand properly (Yu, 2010, p. 3-8). As a result, StatsSA adopted an additional definition of the informal sector modelled after both the 15th and 17th ICLS definitions, the labour-based approach. StatsSA used the new definition in 2008 on their first Quarterly Labour Force Survey (QLFS) publication. The labour-based approach classifies employees as formal employees if they have an employment contract or receive worker benefits such as paid leave and pension. The labour-based definition classifies employees as informal employees if employees do not receive worker benefits such as paid leave or pension (Heintz and Posel, 2008, p. 32). The definition also considers self-employment in small businesses that did not register for Value Added Tax (VAT) and Income Tax as an informal employment (Heintz and Posel, 2008, p. 32). Table 2.1 provides a summary of differences between the formal sector and the informal sector.

Table 2.1: Summary of differences between the formal sector and the informal sector

The Formal Sector	The Informal Sector
Difficulty of entry	Ease of entry
Reliance on overseas resources	Reliance on indigenous resources
Corporate ownership	Family ownership of enterprises
Large-scale productivity	Small scale of operation
Capital intensive and imported technology	Labour-intensive and adapted technology
Formally acquired skills	Skills acquired outside the formal school system
Protected markets (through tariffs and trade licenses)	Unregulated and competitive markets

Source: International Labour Organization, (1972, p. 6)

2.2.3. Linkages between the formal and informal sectors

Arimah (2001) has shown that the formal sector and the informal sector that are structurally disconnected from each other still have several linkages that exist between them. Other studies by Chen (2007, p. 3-4 and 2012, p. 11-13) also found that very few informal companies exist in isolation from the formal sector; trades of goods and services often take place between the two sectors through sectorial linkages. Sectoral linkages are systemic interactions and flows of information and/or materials between two or more entities from different economic sectors (Arimah, 2001, p. 117). It is critical to describe the nature of these linkages to understand the linkages between formal sector and informal sector. There are different types of linkages that exist. These linkages include direct and indirect linkages, distributive and productive linkages, consumption linkages, subcontracting linkages, technological linkages, and labour market linkages (backward linkages, forward linkages, and churning) (Arimah, 2001, p. 117-119). Here, the focus will only be on backward linkages, forward linkages, and churning.

2.2.3.1. Backward linkages

Backward linkages involve the supply of production inputs such as raw materials, finance, information, as well as goods and services to the informal sector from the formal sector (Chen, 2012, p. 12). The efficiency of the informal sector is often overstated. For example, Hsieh and Klenow (2009) state that if the backward relationship between the formal and informal sector can result in an inefficient allocation of resources, the informal sector could dominate the market share from formal sector. This is because the informal sector operates at lower marginal costs and does not comply with rules that the formal sector has to comply with, such as paying tax and employee benefits. However, the relationship between the two sectors benefits the

formal sector more than the informal sector. In fact, higher profits and productivity in the formal sector offset low operational costs in the informal sector. Furthermore, the formal sector has access to financial institutions where they can borrow loans to invest in businesses. The informal sector does not have such benefits. Backward linkages between the formal sector and the informal sector favour of the formal sector due to its institutional power (Arimah 2001, p. 119).

The power balance between formal enterprises and informal enterprises skew towards the formal enterprises. Dominant formal firms set the terms of trade or supply of inputs between the two sectors and these transactions occur in sub-sector networks, putting informal entities in vulnerable position of exploitation (Chen, 2012, p. 12). The relationship strains informal value chains, undermining growth in the informal economy. Modernised informal sectors mitigate instances of exploitation. However, evidence show that modernisation of the informal sector in African countries is slow (Ranis and Stewart, 1999, p. 29-30). In South Africa, Skinner (2005) surveyed 507 informal formal firms in Durban, KwaZulu-Natal. He found that forward linkages dominate backward linkages between the formal and informal sector. Out of the 507 informal enterprises, 98% sold their goods and services to the formal sector (Skinner, 2005, p. 33).

2.2.3.2. Forward Linkages

According to Arimah (2001, p. 118), forward linkages exist when there is distribution of raw materials or goods and services from the informal sector into the formal sector. The formal sector and the informal sector have a free-market arrangement where they engage in the trade of goods and services. Normally, these goods are excess supplies that the informal sector no longer needs and the formal sector can acquire them at discount prices. As a result, such forward interactions are beneficial to both the formal sector and the informal sector (Arimah, 200, p. 118-119). The mutual relationships between the two sectors allow them to be more competitive in the market and improve their growths. Lower costs in the informal sector attract the formal sector as this reduces operating costs (Arimah, 2001, p. 118-119).

2.2.3.3. Churning

The concept of churning defines the tendency of workers to transition between jobs or move in-and-out of jobs (Tattara and Valentini, 2004, p. 3). In this study, churning refers to the case where workers migrate between the formal sector and the informal sector. For example, during

the financial crisis of 2008, retrenched workers migrated from working in formal organizations such as banks to set up their own informal, small businesses. Churning can occur at an aggregate or individual basis. The above example describes a situation of aggregate migration, where many people move from the formal job sector into the informal job sector. Churning may happen due to various reasons such as retirement, resignation, hiring or firing of staff (Tattara and Valentini, 2004, p. 3).

2.3 Theoretical Framework

There are several theoretical models that relate to the informal-formal sector relationship, like the dualistic labour market theory, the alternative theory, and the structural articulation theory. The structural articulation theory, which builds on the shortcomings of the dualistic and the alternative theory, may be the most fitting to the South African context because studies such as Nackerdien and Yu (2018) have used it in their study.

2.3.1. The Dualistic Labour Market Theory

The dualistic school of thought defines the informal sector as an economy consisting of marginal activities, which are distinct from the formal sector, that provide income to poor people and safety during economic crisis (ILO, 1972; Hart, 1973). The dualistic theory is an archetypical model for developing countries. The dualistic theory defines two sectors: the modern sector where technologically advanced machines that require highly skilled labour are used, and the traditional sector, which is mostly agrarian, and utilises pre-industrial tools and unskilled labour. For a long time, the dualistic model was too fundamental to explain the dynamics of labour. Harris and Todaro (1970) expanded on the dualistic model by including the rural-to-urban element, and Fields (1975) remodelled the dualistic model to demonstrate how the presence and growth of an urban informal sector can reduce the unemployment rate.

The informal sector serves as a safety cushion for the poor when they cannot find employment in the formal sector. For example, one study found that 50.2% of workers who enter the day-labour market came from the formal sector (Blaauw, 2012, cited in Blaauw, 2015, p. 10). The informal sector is a cost-efficient way for unemployed people to create their own jobs when they cannot find employment in the formal sector. The theory says that the informal sector is temporary solution to unemployment. Nonetheless, the defining features of the informal sector of low-entry barriers and cheap labour may be the reasons why it has grown to what is, in terms of size.

The dualistic theory argues for very little government intervention. However, if the government does intervene, it should be in a beneficial way. If the government regulates the informal sector, participants of the informal sector, from the dualistic perspective, would be able to apply for credit, and have access to basic infrastructure and much needed services such as electricity (Chen, 2012, p. 5).

2.3.2. The Alternative Theory

The alternative theory addresses factors not included in the dualistic labour market theory. Some of these factors include the informal market's ability to create stable jobs, accumulate capital and contribute significantly to the national economy (Portes and Schauffler, 1993). The theory says that informal employment is not a substitute for lack of employment opportunities in the formal sector. Instead, the informal sector is a necessary, voluntary cost-saving strategy for small business to flourish in the absence of high government regulations. According to this theory, the informal sector allows entrepreneurs to innovate and start new businesses. Entrepreneurship happens when cost to start a business is low and there are minimum entry-barriers and government regulations.

2.3.3. Structural Articulation Theory

Chen (2012) describes the structural articulation theory as a micro-economic entity that consists of subordinating economic units and workers. The purpose of the informal sector, according to the structural articulation theory is to reduce input and labour costs for formal capitalist firms so that they can achieve the level of competitiveness they want. High profitability in the formal economy partly depends on the informal sector; this implies that, the larger the size of the informal sector, the more profitable the formal sector becomes (Devey *et al.*, 2006, p. 5). The structural articulation is a permanent feature of the modern economy and mimics tendencies similar to the forward linkages where the informal sector is subcontracted to undertake some labour-intensive projects (Arvin-Rad *et al.*, 2010, p. 1). The formal sector and the informal sector relationship are mutually beneficial in this case.

Chen (2012) articulates a point that the informal sector arises because of the nature of capitalism; what drives informality is the capitalists' need to reduce labour costs, increase competitiveness, and reduce the effect of state regulations such as high taxes and social legislation. According to the model designed by Portes and Schauffler (1993), the informal sector is neither dualist nor subsistence in nature; it is heterogeneous but not isolated from the

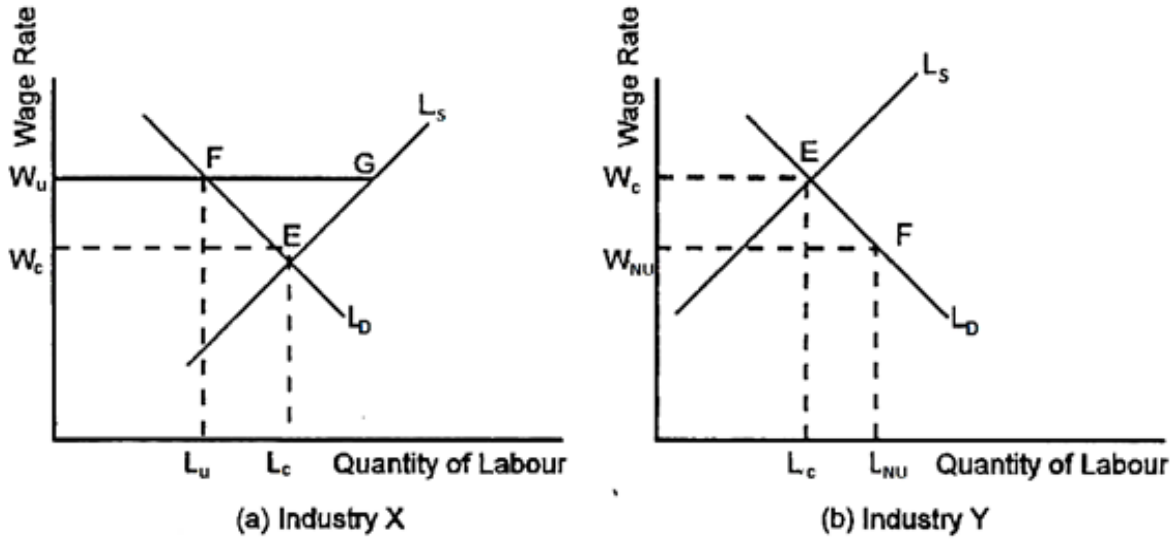
formal sector. Low regulation and low labour costs are important to the success of the formal sector firms, which is why they hire informal sector workers in contract and sub-contract basis (Hart, 1973).

2.3.4. Trade Unions and the Informal Economy

Autonomous organizing in the informal sector is a relatively new concept. In recent history, there has been a rise in the number of organizations referred to as Members-Based Organizations of the very Poor (MBOPS) that represent the working class in the labour market. These organizations connect street vendors, homemade workers, domestic workers, agricultural and informal transport workers such as taxi drivers through internal networks (Gumbrell-McCormick and Hyman, 2019, p. 104 - 105). Cooperative organizations and trade unions are very much a product of the industrial revolution, which radically changed the terms of employment in the labour market. In the past, most formal trade unions' natural move was to limit the growth of the informal sector, they considered the informal sector a threat and illegitimate. In recent years, this attitude has changed, and trade unions are opening arms and welcoming informal workers. They are beginning to represent them in some cases (Gumbrell-McCormick and Hyman, 2019, p. 104 - 105).

In general, the labour force participation-rate account for formal sector workers only. Those who cannot find work in the formal sector find work in the informal sector. In some cases, trade unions can trigger employment migration from the formal sector to the informal sector. When trade unions bid for higher wages on behalf of their members, it can lead to downsizing of the workforce in the formal sector and oversupply of labour in the informal sector. When this occurs, the wage differential between the unionized and non-unionized sector increases. Unionized sectors tend to earn more wages compared to sectors that are not unionized, but at the expense of job losses.

Figure 2.1: The influence of unions on wages and employment



Source: Nipun (2021)

Figure 2.1 explains the economic effects of trade union's efforts to obtain above equilibrium wages. Initially, industry X and industry Y workers receive the same wage of wage Wc. When unions bargain for higher wages in industry X, minimum wages increase from Wc to Wu. The result in industry X is higher wages of Wu and lower employment to Lu. Individuals who lose jobs in industry X move to the non-unionized industry Y, employment in this industry increases to Lnu. The oversupply of labour in the non-unionized industry drives wages to even lower proportions through the spill over effect. The oversupply of labour in the informal sector also overstates the effect of unions in the sense that the wage gap gets even larger. In order to discourage non-unionized workers to join unions, employers increase workers' wages by a margin lower than the one trade unions demand, but reasonably comparable in proportions through the threat effect.[2]

[2] With respect to the trade-union and the spill-over effect model used above, it should be noted that not all non-unionised sectors are informal. Non-unionised sectors can be found in the formal sector as well.

2.4 Review of Past Studies

The world has seen an increase in the size of the informal sector over the years. Fundamentally, the motivations to participate in the informal sector are both economic and non-economic. For example, economic reasons would include unemployment, decreasing real price of capital and high operating or production costs in the formal sector (Charmes, 1990). Non-economic reasons may include flexible hours and greater satisfaction in work (Charmes, 1990). From the perspective of behavioural economics, Renooy (1990) argues that there are two groups of factors, which determine the decision to become active in the informal sector. These factors are the 'structural' and 'opportunity' factors. The structural factors include financial pressure, socio-psychological pressure, and institutional constraints (Renooy, 1990). Whilst the opportunity factors include skills, education, environment, cultural tradition, values and standards, and geographical factors (Renooy, 1990). He proposes that the above-mentioned different opportunity factors result in the creation of different types of informal economies around the world. Section 2.4 reviews different research studies on the informal sector in South Africa and in the world.

2.4.1. Size of the Informal Sector in South Africa.

Different studies measure the size of the informal sector in different ways. Some studies measure the informal sector by the number of people it employs or total value it contributes towards the entire economy. Meanwhile other studies employ inventive ways to measure the size of the informal sector. Saunders and Loots (2005) measured the informal economy in South Africa using the Currency Demand Approach (CDA). The study used the 1966/02 annual financial data obtained from the South African Reserve Bank (SARB). The study found that the informal sector contributed an average of 9.5% to the GDP between 1966 and 2002. The above findings were also echoed by Hartzenberg and Leimann (1992) using the same CDA method. By 2009 some studies found that there was a decline in the informal sector's total share of GDP contribution. According to Davis and Thurlow (2009, p. 14-15), the informal sector contributed a share of 7.1% of South Africa's total GDP and 22.3% of total employment in 2009. They used the 2002 South African Formal-Informal Social Accounting Matrix.

Since there are many different methodologies to measure the size of the informal sector, different studies tend to estimate different sizes of the informal sector. A study by Yu (2010) estimated the size of the informal sector using different methodologies from different studies and found different estimates. Yu (2010) estimated the size of the informal sector in South

Africa using StatsSA methodologies as well as approaches of Heintz and Posel (2008). At first, the study measured informal employment trends between 2001 and 2007 using the 2001/07 Labour Force Survey (LFS) data. The study found that the Heintz and Posel approach gave the highest estimate of informal employment in South Africa at 17-27% informal employees (between 1.6 and 2.0 million informal employees), while the Stats SA approach gave the lowest estimate of informality at 7.3%-10.6% (between 0.576 and 0.800 million informal employees) (Yu, 2010, p. 16-17). Yu (2010) then employed the 2008/09 Quarterly Labour Force Survey (QLFS) on the same approaches mentioned above to estimate informality trends after 2008. This time, StatsSA methodology estimated the highest percentage of informality at 66% (over 6 million employees). The second highest estimates were found using the Devey *et al*. approach which estimated about 25% of informality (between 2.5 and 3 million employees) (Yu, 2010, p. 20-23).

Rogan and Skinner (2017) recently published a paper that focused on the nature of South African informal sector based on the 2008/14 Quarterly Labour Force Survey (QLFS) data. The study showed that between 2008 and 2014, the size of the informal sector in terms of the non-agricultural workforce percentages remained constant at 18% informality (2017, p. 11-12). In addition, trade dominates the informal sector, which accounts for 42% of the informal sector employment. The smallest industry sector was manufacturing, which accounts for only 9% of the total informal sector (2017, p. 17-18). Furthermore, the study found that rural provinces such as Limpopo, Mpumalanga and Eastern Cape had comparatively larger informal sectors to developed provinces such as the Western Cape and Gauteng (Rogan and Skinner, 2017, p. 22-23).

The Sustainable Livelihood Foundation (SLF) has initiated the Formalising Informal Micro-Enterprises (FIME) project with the objective of developing an understanding of the obstacles that underpin growth and formalization of micro enterprises in the informal sector in order to influence the policies and encourage more support for the micro-enterprise industry. This summary focuses on understanding informal sector in the three major provinces in the country, namely, Gauteng, Western Cape, and KwaZulu-Natal. The survey consisted of all micro-enterprises representing over 300 000 people in the different provinces. The study conducted interviews between 2010 and 2011 in the Western Cape. It found that the scale of informal micro-enterprises was broader than expected. The six most prominent businesses in order of magnitude included liquor stores/shebeens, spaza (grocery) shops, house shorts, barbershops (SLF, 2011). The study also found that over 90% of the liquor stores in the area were

unregulated and operate illegally. The ripple effect created by these informal and illegal liquor stores is so great that it affects the formal businesses in the liquor supply chain (SLF, 2011, p. 9). The liquor stores in the townships had a greater multiplier effect on job creation and on other businesses such as recycling of glass bottles, cigarettes, cool drinks, and airtime than spaza shops (SLF, 2011). The above findings are a testimony of how most informal businesses are pillars of the township economy, and government must consider their impact when creating laws to govern it.

It is easy to dismiss the informal sector's ability to create jobs because the general impression of the informal sector is that of one-person street vendor traders or township spaza shops like the one described in the Western Cape townships in the 2011 SLF research. However, the reality is that the informal sector is far more organized. The growth in informality is an indication that it has come very far from when it was featured in the 'Lewis Turning Point' and was thought to be temporary solution to employment problems (Lewis, 1954). The study by Fourie and Kerr (2017) used the multivariate regression analysis on the Survey of Employers and Self-Employed (SESE) 2009 data to investigate these characteristics of firms and the firm owners in informal sector. There are one-person firms and multi-person firms. The number of people employed in the informal sector is not the same as the number of people who own informal businesses. One is an employing informal sector and the other is not, and one is a growing sector and the other is a stagnant type of informal sector. (Fourie and Kerr, 2017, p. 32-34). The paper found that in 2013, the informal sector employed over 850 000 paid employees in the informal sector, and 211 000 paid workers (Fourie and Kerr, 2017, p. 32-34). These findings make an interesting case for economic policies to change in favour of the informal sector. This shows that the informal sector is an integral part of the economy and it contributes to the overall economic growth of countries. As a result, there should be polices, regulatory laws and compliance laws that are designed to protect those who operate within this sector.

2.4.2. The Size of the Informal Sector in Africa

Internationally, the informal sector has been expanding since the 1970s. Over 2 billion of all employed people over the age of 15 work in the informal sector, or about 61.2% of the total employment force in the world (OLS, 2018). Vanek *et al*. (2014, p. 7-8) reported that 65% of the sub-Saharan population is employed in the informal sector and made up 66% of non-agricultural informal employment in 2004-2010. The above findings are from the 2011

International Labour Organisation (ILO) data, where 40 countries were part of a study. Oil exporting countries in Africa were more likely to have higher degrees of informality, with an estimate of over 40% of the GDP from the informal economy (Medina *et al*., 2017, p. 13-14). Xaba *et al*. (2002) recorded similar findings in the study of informal sector in sub-Saharan Africa. Xaba *et al.* (2002) found stagnation in formal employment opportunities and a general increase in informal sector activities. Devey *et al.* (2006) indicates that sub-Saharan Africa has more people working in the informal than any developing region in the world.

Medina *et al*. (2017) investigated the size of the informal economy in sub-Saharan Africa over 24 years using the Multiple Indicators Multiple Causes (MIMC) approach and the Predictive Mean Matching (PMM) method. Instead of using GDP per capita growth as an indicator variable, this paper used the Night Lights approach to measure economic activity. It obtained the light intensity data from outer space and used it as a proxy for economic growth in a country. Henderson *et al.* (2012) first used the Night Lights approach to measure the size of informal sector around the world. The study shows that there is high degree of economic activities in the urban areas, compared to rural areas, suggesting that the dense urban areas is where investments and informal activities takes place the most (Henderson *et al.*, 2012, p. 1023-1024).

Using the 2005/06 Ghana Living Standard Survey data (GLSSV), Osei-Boateng and Ampratwum, (2011, p. 9) found that the informal sector employs 80% of the Ghanaian population. The Ghanaian informal sector has limited formal protection and recognition, despite being the highest employer.

Using the Bayesian Model Average method on the ILO informal employment data, Pham (2017, p. 209-210) investigated the impact of globalization on the informal sector of developing countries. The study examined 11 African countries. The empirical results of this study show the size of the informal sector in these countries depends not only on globalization, economic growth and government policies, but also on macro-economic factors such as working-age population (Pham, 2017, p. 212). The highest levels of informality are normally among young people, making up over 77.1%, followed by older persons at 77.9% in the world (ILO, 2018). Young people are more likely to enter the informal sector in the developing and emerging markets, while older people are more likely to enter the informal sector in developed markets (ILO, 2018).

2.4.3. Education, Geographical area and Income in the Informal Sector

This section reviews studies on the impact of education, geographical area and income in the informal sector in South Africa. Generally, education level has a negative relationship with the size of the informal sector. This means that the higher the education level, the lower the probability of working in the informal sector (Devey *et al*., 2003, p. 156). Rogan and Skinner (2017) found compelling results about changes in educational level of those in the formal sector and the informal sector in South Africa. One interesting result is that education attainment is increasing among those who are in the informal sector. For example, those who reported that they had no schooling has decreased from 7.65% in second quarter of 2008 to 4.3% in second quarter of 2014 (Rogan and Skinner, 2017, p. 9). The percentage of the informal sector workforce with a completed matric increased significantly from 19.5% to 25.3%. By way of comparison, those formally employed in the second quarter of 2008 34.3% had completed matric and this increased to 37.1 % for the same period in 2014 (Rogan and Skinner, 2017, p. 9).

Those who have completed secondary and tertiary education are less likely to participate in the informal economy whilst those who have not completed secondary education or those without education are more likely to enter the informal sector (OLS, 2018). Educated individuals could be enjoying more opportunities of employment in the formal sector. Poor people are more likely to work in the informal sector compared to those who are not poor (ILO, 2018). This means that the poor working class may enjoy decent benefits from decent work but still be under the poverty line, because they share their income amongst many dependents in the household. In developing countries, the number of household members is at an average of six, and informal employment ranges between 50% and 98% (ILO, 2018, p.48). In the developed market, however, informal employment is as low as 10%, and the number of household members is at an average of 2.6 (ILO, 2018, p. 48).

Another significant factor that determines the chances of individuals entering the informal sector is the geographical type. Individuals who live in rural areas are 80% more likely to enter the informal sector than those who live in urban areas (43.7%) (ILO, 2018). Furthermore, the statistics show that globally, the agricultural industry is 93.6% informal, while the services industry is 47% informal in its nature of business (ILO, 2018). Countries where the informal sector is the primary source of employment had high percentages of informality in all industries and sectors, most particularly in the region of Africa (ILO, 2018).

Using the 1995/2003 household survey data, Kingdon and Knight (2007) found that there has been an increase in informal settlement around the metropolitan areas since 1994, which is evidence of the rural-to-urban migration described by the dualistic system. Another study by Wills (2009, p. 13) showed that the size of informal sector in the metropolitan areas is smaller than in rural areas; 24.0% informal employment in metropolitan areas compared to 36.0% in non-metropolitan areas in 2007.

Rogan and Skinner used QLFS data between 2008 and 2014 to study the informal sector in South Africa. They found that informal workers earned subsistence-threshold income. However, they note that the mean and median income were different. The average worker in the formal sector earned 5000 p/m while the informal employee earnings earned on average, R1 733 p/m (Rogan and Skinner, 2017). Informal sector businesses owners earned on average, R4 600 p/m, whilst the median monthly earnings are R2 000 p/m, compared to the formal sector of over R8 000 p/m (Rogan and Skinner, 2017, p. 9). The median earnings value is a better indicator of earnings because it discounts outliers. When it comes to the geography of the South African informal sector, they show high levels of differentiation along spatial lines in provinces such as Limpopo, Mpumalanga and Eastern Cape. This means there are comparatively large informal sectors in these provinces relative to the richer provinces of Western Cape and Gauteng (Rogan and Skinner, 2017). The data also suggested a predominance of informal sector jobs amongst workers living in urban informal settlements as well as tribal settlement areas (Rogan and Skinner, 2017).

Informal economy participants enter the informal economy for different reasons. For example, entrepreneurs enter the informal economy because of low operating costs, making it easier for individuals to start businesses. Recommendation no.204 by the ILO states that most workers enter the informal economy not by choice but due to scarcity of employment opportunities in the formal sector (ILO, 2018, p. 52). Low economic growth, which characterises the trends in South Africa in the last 10 years are some of the main drivers of scarcity of employment opportunities in the formal sector (ILO, 2018, p. 52).

2.4.4. An Analysis on Linkages

Valodia and Devey (2010, p. 9) conducted an analysis on labour churning in South Africa using the 2002/04 LFS. They followed the same sample of 5 587 individuals in all five waves of the study. Their study shows that the labour market status of over 54% of individuals in the sample had changed over the five waves, whilst about 21% and 1.3% remained in the formal sector

and the informal sector respectively. In addition, 19% remained economically inactive and 1.3% remained unemployed. The above is evidence of higher degrees of churning taking place between the informal sector and the formal sector in South Africa.

Sub-Saharan countries, including South Africa are lagging behind when it comes to transforming and modernizing the informal sector. Backward linkages dominate the informal sector over the forward linkages (Ranis and Stewart, 1999). Ranis and Stewart (1999) found that the informal sector purchase inputs from the formal market at retail prices and sell output to low-income market at even lower prices. Arimah (2001), who found that backward linkages are three times more prevalent in the informal sector than any other linkage, supports Ranis and Stewart (1999) findings. Effectively, the above leads to weak markets and limited growth potential for the informal sector (Meagher, 2013, p. 5-7).

2.4.5. The informal economy as a catalyst for sustainability

The South African economy has been struggling to perform in the last 10 years. The informal sector can improve and sustain economic growth, since it can absorb a large amount of unskilled labour. With the necessary support, the informal sector could be suitable for sustainable future with sustainable development. According to Ruzek (2015, p. 25), the informal sector can provide jobs, social capital and improve local economies. The above three aspects of the informal sector can lead to sustainable economic growth in the future.

On October 4th, 2018, President Cyril Ramaphosa announced during the Jobs Summit a framework that included several solutions to the employment crisis in South Africa. Ramaphosa made this presentation after a meeting with social partners at the National Economic Development and Labour Council (NEDLAC). These social partners included stakeholders from business, government, labour and community members. In the summit, the president vowed to create 275 000 jobs a year (Ramaphosa, 2019). They were able to raise 294 billion rand, bringing the amount closer to the government's goal to secure $1.2 trillion in investment in the next five years (Ramaphosa, 2019). The informal sector seems to be an attractive medium to fast track its goal of creating 275 000 jobs a year. The government should consider investing a portion of this financial resource to modifying the infrastructure in cities to be more accommodative to informal trade. This would create a fair number of jobs.

Government policy around the informal sector is of the utmost importance if the country is serious about local development and unlocking its full potential. The informal economy has

been on the policy agenda since 1994 as the lowest tier of the small, medium and micro-enterprise (SMME) economy. Through the National Small Development Act of 1996, the government made a commitment to create an environment in which small enterprises could participate and contribute to the national economy. Under this act, the strategy would target small enterprises such as the so-called 'survivalists' and micro-businesses, which are called Small, Medium and Micro Enterprises (SMME) (Rogerson, 2015, p. 174). In 2006, another policy, the Integrated Small Enterprise Development Strategy, was launched (Department of Trade and Industry, 2006). The aim of this policy was to build three strategic pillars of support for the SMME economy. This would allow SMME to access credit/finance, broaden market size and allow government to start conversations around legal regulation (DTI, 2006). The Small Enterprise Development Agency (SEDA) would facilitate firms transition from the informal segment to the formal sector and their growth into small enterprises (DTI, 2006, p. 19). SEDA's notable successes include the improvement of the infrastructures neglected during the apartheid era. Notable failures include the fact that most programme-support funding for SMMEs did not reach most struggling communities of black-owned enterprises where previously disadvantaged entrepreneurs operated (Rogerson, 2004, p. 788; 2015, p. 174).

2.4.6. Barriers to entry and the government intervention in the informal sector

Despite their objective claim that the informal sector is merely a temporary substitute for the formal sector, Kingdon and Knight (2007) have found that workers in the urban informal sector earn higher income and enjoy better livelihoods compared to their economically inactive counterparts. However, Kingdon and Knight (2007) could not find an empirical explanation as to why there is low participation in the informal sectors if it has some benefits. de Soto (1990) has argued that informal sector enterprises have expressed the desire for formalization, but history of corruption and government regulation make them doubt the success of the project. In different research, Chandra *et al*. (2002) has identified the lack of will, infrastructure access, and poor capital access as the reasons for small informal sector participation, particularly amongst the African race group. Infrastructural challenges include lack of well-maintained roads, electricity, clean water, communication facilities and information. Whilst other studies have found that lack of access to finance is the principal obstacle for the informal sector formalization. Lack of infrastructure and poor capital access are common deficiencies in developing countries. Additional explanatory factors that are unique to South Africa (i.e., apartheid) contribute to reasons why the informal sector is small compared to other sub-Saharan African countries. Furthermore, it is it not clear whether formalization of the informal

sector is the right thing to do, given the sensitivity of the informal sector. After all, the informal sector exists because regulatory structures allow it to be, which begs the question that if it is regulation, could mean a threat to the informal sector.

The South African government has decided in favour of a minimum wage policy in select industries. The minimum wage policy will likely cause production costs to increase and as a result, put pressure on small informal businesses. Small firms will not operate optimally under high production costs; they might choose to exit the market. According to Kingdon and Knight (2004, p.404), a minimum wage may lead to high unemployment and oversupply of labour. The evidence found using the 2000/03 Labour Force Survey (LFS) which was published in the South African Government Gazette shows that minimum wage implementation may result in a 10-21% wage increase, coupled with 16% decrease in overall employment (Magruder, 2012, p. 26).

Bureaucratic procedures and red tape involved with the registration of a business in South Africa make it an undesirable task. Registration of a business in South Africa requires large sums of capital and it can take up to 46 days, on average, to complete the entire process (World Bank Group, 2016, p. 17). Moreover, if a firm happens to find itself in a legal dispute, it might take 600 days, on average, to settle the matter. During the apartheid era, the labour force enjoyed very little legal protection. In an effort to correct this iniquity, the South African government has implemented restrictive labour laws that make it hard to hire and fire employees (World Bank Group, 2016, p. 82). It is clear that operating a formal business in South Africa is time-consuming and costly compared to other developing countries: as a result, most firms choose to remain informal and not formalize.

A study by Arvin-Rad *et al.* (2010, p. 666) describes the sensitivity of the informal sector to regulation. They explain that if informal sector regulation is government's interest, then the government must impose rules in a manner that tax and other regulations do not hurt the growth of the informal sector. The study also found that the informal-formal equation is economically pro-cyclical; therefore, they doubt the benefits of intervention in the informal sector (Arvin-Rad *et al.*, 2010, p. 667). Mobilisation and efficient collection of domestic resources in developing countries, through mechanisms such as efficient tax systems, could contribute towards the implementation of sustainable development goals of countries. Generally, taxation is a key ingredient of formalisation. Developing countries may benefit the most from increased revenues and growth in productivity of the state. Government must achieve this through

fostering good and healthy relationship with taxpayers. However, this is a complex situation and it is not particularly easy to make conclusions on whether taxing the informal sector can improve the overall wellbeing of the state.

Kundt (2017) conducted research focusing on exploring the opportunities and challenges for taxing the informal sector and the subnational taxations. In the study, Kundt found that taxation across the informal sector can have some negative impact for most developing countries (2017, p. 5). This can be a matter of how efficient the state is in collecting taxation from the informal sector businesses and this could pose a threat to the goal of financing sustainable development. One important factor in the study by Kundt was that tax collection could become a matter of cost and benefit. Most of the informal sector business are too small and often operate in rural and urban arears and their income is minimal, and so the taxable income would be minimal (Kundt, 2017). Given that the benefits from informal sector taxation can only be modest at best, it becomes the case that the huge economic benefits may mostly be indirect. Even though the informal sector does not directly pay taxation, they still do indirectly pay tax through some standard tax laws such as VAT. This is most important because most of the informal sector is characterised by end-user purchasers (Kundt, 2017, p. 17). In addition, informal taxation can help build a culture of tax compliance.

The implication of the so-called fiscal contract between the taxpayers and the state is in the centre here. Naturally, this relationship relies on the principle of accountability and mutual trust between the two parties. For example, taxing of the informal sector would mean that the informal sector could hold the state accountable on how to spend the public purse. In a reciprocal response, the state shows its accountability to the informal sector by setting examples on how to spend and allocate the funds (Kundt, 2017). In so doing, it is moulding and fostering the continuation of voluntary tax compliance (Kundt, 2017). Even though taxing the informal sector can help build morale in society and make some small entities have protection and a degree of predictability, this can have an opposite effect on the smaller firms that are vulnerable to unequal treatment and harassment by the authorities. This may defeat the whole purpose of operating in a low-regulated, cost-effective market such as the informal sector and disrupts the livelihood of most firms in the informal sector,

The above potential benefit suggests that, if pursued in a ‘contractual’ manner, taxation of the informal economy could become an important stimulus for expanding political voice among relatively marginalised groups of employers and employees in the informal sector (Moore,

2008). However, while that may be a possibility, there are also grounds for scepticism: informal sector firms are frequently poorly organised, face collective action problems, generally lack political power, and may be averse to the state enforcing regulations in response to expanded demands (Moore, 2008, p. 9). Given these challenges, Meagher and Lindell (2013, p. 67) asked: 'Does taxing informal traders strengthen public accountability, or just create new avenues of predation?' There is some available evidence that shows taxation of the informal sector may improve tax morale and accountability on the part of the state. For example, the taxation of the informal sector in Ghana gave the informal sector in the region some bargaining power when making demands on how the government can protect them. The potential for further marginalisation of the informal sector by the authorities is still big. Different studies discussed above on the contexts of conflict and fragility emphasise the weakness of informal sector organisations and the fundamental power imbalance characterising their relationship with the. This type of imbalance does not exist only between the state and the informal sector, as discussed in this very chapter in the backwards linkages section.

In conclusion, while the evidence suggests that governance gains could be a potentially powerful argument for expanding taxation of the informal economy, more research is required, research that can specify the conditions under which these benefits are likely to be realised. The next section highlights different ways in which the state can intervene and formalize the informal sector in a beneficial and non-disruptive manner.

2.4.7. Formalization of the informal sector

Research conducted in the last 20 years has shown that high levels of informality in the world may pose a threat to global sustainable development (ILO, 2018). Informality sometimes does have harmful effects on the environment and violates workers' rights of decent working conditions (ILO, 2018). The informal sector does not adhere to the fundamental principles of trade (ILO, 2018). This may call for some level of government intervention to help reorganise the informal sector for the benefit of workers, and the economy at large.

Informal sector statistics would provide quantifiable evidence to guide policy makers where the informal sector is concerned. The ILO has played an integral part in promoting the informal sector by advocating for its recognition on the international policy agenda in the last 40 years. The ILO has also produced and collated ample data on issues that relates to the informal sector, such as social protection, workers' rights, drivers of the informal sector and innovative polices to facilitate the transition of informal to formal economy (ILO, 2018).

In 2015, the ILO adopted Recommendation No. 204 to fast track the formalization of the informal sector (ILO, 2018, p. 4). Recommendation No. 204 is the first international labour standard that focuses on the informal economy and provides practical guidelines to address priority issues in the sector. Specifically, Recommendation No. 204 addresses the need to facilitate the transition of workers and economic units to the formal sector, while respecting workers' fundamental rights and ensuring the opportunity for income security and entrepreneurship, advance the creation of decent jobs and prevent informalisation of formal economy's jobs. The sustainable developmental goal no. 8, in the 2030 Agenda for Sustainable Development aims to support inclusive and sustainable economic growth, full and productive employment and decent work for all (ILO, 2018, p. 5). The transition of the informal sector to the formal sector may be essential to achieving this developmental goal.

The ILO developed an Intervention model that illustrates how Recommendation No. 204 proposes the formalization and implementation process in countries that have agreed to it. The process begins with informal sector diagnosis to understand the factors, characteristics, and causes of informality within the context of a particular nation. The second stage in the process is to use the diagnostic findings to inform policy, laws and regulations that will spearhead the transformation of the informal sector into the formal sector. The final stage of the transitional process of the informal sector is to implement the interventions and monitor their progress or failure.

Nackerdien and Yu (2019) published a study that analysed the informal-formal sector labour market linkages in South Africa. The study focussed on churning of employees between the formal sector and the informal sector, given certain conditions. The study found that 27% of informal sector workers in wave 1 of NIDS transitioned to the formal sector in wave 4; 38% remained in the informal sector while 33% had their status changed to either inactive or unemployed. This research adds to the study of Nackerdien and Yu (2019). However, this paper builds on this by adding the fifth wave that was not available for Nackerdien and Yu (2019 and it explores the relationship between the formal sector and informal sector in a more expansive manner. It investigates how characteristics of individuals affect their income prospects. Furthermore, this study explores linkages between the formal sector and the informal sector. The next chapter discusses in detail, types of methodologies and data used to achieve the objectives of the study.

2.5 Conclusion

Chapter 2 discussed the definition of the formal sector and the informal sector. The informal sector differs in definition depending on the country. It is for this reason that the chapter defines the informal sector based on the work done by the ILO and StatsSA. Theoretical frameworks such as the dualistic labour market theory, the alternative theory and the structural articulation theory describe the informal sector from scientific perspective. Most studies have found that the informal sector has low entry barriers, meaning that most individuals without skills can enter the market easily. Government intervention is important. However, too much red tape can restrict the growth of the informal sector. This study explores these concepts in more depth in chapter 4. However, chapter 3 describes methodologies and data used to gain more insights on the informal sector.

CHAPTER 3: METHODOLOGY AND DATA

3.1 Introduction

This paper employs scientific techniques to study the phenomenon of the informal sector in South Africa. In this process, the importance of quality data and appropriate utilization of statistical procedure cannot be understated. This chapter explains in detail the application of statistical models to find solutions to the objectives of the study. The chapter opens with section 3.2, which discusses the strategies and techniques applied in the analysis. These techniques include the use of descriptive statistics to profile the working population, and as well as the application of transitional matrices to understand labour market movements. The study uses probit regression models and fixed effects models to investigate significant estimators of informality and income, respectively. Section 3.3 discusses the data used in the study: the NIDS dataset and the eThekwini Large and Medium Manufacturing Firm Survey dataset.

3.2 Methodology

3.2.1. Measuring the formal/informal sectors

The study uses the National Income Dynamics Study (NIDS) data to measure the size of the informal sector and eThekwini Large and Medium Manufacturing Firm Survey (ELMMFS) data to conduct analysis on the linkages between the formal sector and the informal sector. The NIDS data does not describe the labour force status of the employed in terms of formal or informal. The study makes use of the enterprise approach or the labour approach as proposed by the ILO (2003) to split the labour force into a dichotomy of formal sector and informal sector. StatsSA also uses the enterprise approach and labour approach definitions to measure informal employment in their annual Quarterly Labour Force Survey (QLFS) reports. The study also incorporates contributions to the definitions made by Heintz and Posel (2008) and Devey *et al.* (2006). For example, the enterprise approach recognises self-employment and other employment categories such as domestic workers and casual workers.

3.2.1.1. Enterprise Registration Approach

The study uses the enterprise approach to define employees in terms of informal or formal depending on the characteristics of the firm, as per Heintz and Posel (2008) and Devey *et al.* (2006). The legislative status of the firm guides the framing of the definition of enterprise approach, that is, if the enterprise that employs workers is registered for Income Tax and Value Added Tax (VAT), and then the employees are classified as formal employees. If the enterprise

in which the employees work is not registered for Income Tax and VAT, then the employees are classified as informal employee.

$$Condition\ I: Enterprise\ is\ registered\ for\ Income\ Tax$$
$$Condition\ II: Enterprise\ is\ registered\ for\ Value\ Added\ Tax(VAT)$$

Condition one is a prime condition. If an enterprise is not registered for Income Tax, it is unlikely that it could be registered for VAT. Therefore, it is assumed that the firm is also not registered for VAT. However, the opposite is not true. It is optional for enterprises to register as VAT vendors. An enterprise can be registered for Income Tax, but not be registered for VAT. in that logic, if an enterprise is registered for Income Tax, but not for VAT, the employees of said company are regarded formal sector employees.

Self-employed individuals are also categorized as formal or informal workers based on the characteristics of their enterprise.[3] In this study, all casual workers who do not have a main job are classified as other. Employees who were unable to be classified as either of the categories above are disregarded.

3.2.1.2. Labour Characteristics Approach

The job-related characteristics approach allows for a smoother way to categorically classify the individuals as informal sector employees or formal sector employees because there is more information in the NIDS data about employee characteristics. The labour approach uses worker-based characteristics criteria to define employees in terms of formal or informal regardless of whether they indeed work in the informal sector or in the formal sector, as per Heintz and Posel (2008) and Devey *et al.* (2006). Formal employees are distinguished as employees who enjoy employment benefits such as pension funds, medical insurance, paid leave and Unemployment Insurance Fund (UIF).[4] Furthermore, formal employees have employment contracts and benefit from worker protective rights such as rights to trade union representation. It is worth noting that formal employees' fringe benefits are not limited to those

[3] The NIDS questionnaire enquires about the details of the self-employed in Section E28 to E39. For example, Section E37 asks if the self-owned business is registered for Income Tax and/or VAT. If their answer to this question is yes, then the self-employed individuals are categorized as formal. If their answer is no, they are classified as informal employees. Section E40 to E51 contains questions directed towards casual workers.

[4] In the Adult Questionnaire, Section E1 to E27 contains questions relating to the labour characteristics of the employed. For example, E12.5 asks if there are any deductions from the employees' salary for medical aid and E14 asks if they belong to a trade union. Furthermore, E12.6 and E12.7 enquires about salary deductions for pension/provident fund contributions and Unemployment Insurance Fund (UIF).

mentioned above. They are mentioned or used in this study because they are considered universal, cardinal characteristics.

$$Condition\ I: Paid\ Leave$$
$$Condition\ II: Provident\ Fund\ Deduction$$
$$Condition\ III: Unemployment\ Insurance\ Fund\ (UIF)\ Deduction$$
$$Condition\ IV: Medical\ Aid\ Deduction$$
$$Condition\ V: Employement\ Contract$$

If employees meet at least one of the above characteristics, they are classified as formal employees. For example, a worker may have pension funds but not be a member of any trade unions and does not contribute to the UIF. The definition of informal employee still extends to such a worker. They are classified as a formal sector employees.

3.2.2. Sampling for NIDS data

The computation of the sample size is a crucial step. The NIDS study was conducted in 2008, with a sample of 28,000 individuals in 7,000 households across the country. The sample was carefully selected to be representative of the South African population. Only individuals who were part of the original sample were eligible to be part of this study. This study is interested in following the same individuals from wave 1 through to wave 5.[5] It is understood that with time, and due to attrition, participants opt out of the study. It is for this reason that the sample size used in this study is significantly less than 28,000 participants. Wave 1 sample data consists of individuals who can be identified by a Personal Identification key (PID). Furthermore, the PID is used to identify and link all the individuals across all waves. The PID key is also used to merge all the datasets from other waves. Individuals who were available to take part in some surveys and not others, were dropped.

[5] It must be noted that in order to profile the South African population group, the study does not focus only on individuals who have been part of all waves. This effectively mean that gender, race, and age cohort values in table 4.1 are not based on Personal Identification Keys that appear on all waves. This is important to gauge how the population size has grown between wave 1 and wave 5. In other tables, where gender, race or age cohort is referred to, it must be assumed that those numbers are based on the 6778-sample size or on PIDs that appear on all waves only. Furthermore, these estimates in table 4.1 may vary from the estimates of StatsSA in the same periods. This could be due to differences in sampling, assumptions and methodologies used to compute these numbers. In this study, these numbers were obtained by controlling for age group only. For example, *"tabulate age-cohort/gender/race if age is between 15 and 64 [apply weights]".* This exception, however, applies on table 4.1 only.

The NIDS study took place once every two years, over a period of 10 years. Naturally, attritions were expected, and the data has been reloaded and adjusted accordingly each time in order to uphold its integrity and reliability.

$$Sample\ size = 6778$$

3.2.3. Sampling for ELMMFS data

The ELMMFS data contains both the cross-section component and the panel component. The first survey was conducted in 2002. The data contains information about the large and medium firms in eThekwini municipality, in Kwa-Zulu Natal. In 2002, when the project was first undertaken, a manufacturing firm was defined as an organization that hires at least 50 full-time employees. In 2013, this threshold was reduced from 50 to 46 full-time employees. The survey does not define what is considered informal firm. This could be because the survey focuses primarily on formal sector firms. For this reason, this study assumes that every time the informal sector firm is mentioned, the enterprise approach applies. This would not only limit confusion in terms of having multiple definitions of informal firm, but it is also consistent with the definitions of NIDS and StatsSA. 132 firms were part of the survey, each firm has an Identification code (ID). In order for the firms to qualify to be part of the study, they must be able to be classified as either cross-section or panel. In this way, firms that cannot be classified in this manner were removed from the sample size. More firms were dropped from the sample size because they did not meet other requirements.[6] This data is used in this study to investigate any type of linkage that may be prevalent between the formal sector and the informal sector. The data is also used to understand the profile of manufacturing firms in the study.

3.2.4. Descriptive Analysis

The study analyses the descriptive statistics of the South African working-age population using summary statistics commands in STATA. The purpose of this is to reveal a profile of individuals who are eligible for employment in South Africa. The summary statistics show demographic characteristics of individuals in the labour market. These statistics help in

[6] Manufacturing firm with identification code of 680 was dropped because it does not qualify as either cross-section or panel. Firm with code of 357 contained incomplete information, and therefore was dropped from the sample. Only firms that were part of panel survey (panel ==2), were considered for this study. this means that if the firm was only interviewed once, they are part of the cross-section only (cs2 == 0). If the firm was interviewed in both cases of the study, i.e., 2003 and 2013, they are part of panel data and therefore are considered. Furthermore, this meant that if the firm was not part of the original sample size (pilot == 2), it does not qualify to be part of the study, and therefore removed from the sample size.

diagnosing how individual characteristics, i.e., education or age, affect labour market outcomes.

Over time, individuals transition from one type of employment to the other. At the same time, some remain in the same employment type. This is called transitional mobility. The study presents data in the form of a 4×4 matrix table, representing four categories in a two-dimensional matrix. The matrix is composed of the following categories: Inactive, Unemployed, Employed and Self-Employed. The study classifies all workers employed in the formal sector and in the informal sector as employed. All self-employed workers separately, regardless of whether they are formally self-employed or informally self-employed. Finally, the study categorises all workers who are Inactive as such, inactive.

Different types of characteristics inform labour market outcomes. These characteristics affect the size of the formal sector and the informal sector, as explained in section 2.4.3 in chapter 2. The study pivots on such characteristics. Education interacts with the labour market in a different way from how geography interacts with it. The study analyses how these characteristics signal in the labour market and ultimately affect informality. The study presents the analysis as analytical graphics. Industries that employ a large number of individuals change over time, the study conducts an in-depth analysis of the transitional matrix in the labour market as affect by type of industries and skill levels of individuals. Furthermore, the study tracks the behaviour of the informal sector against the formal sector over time.

The formal sector and the informal sector in South Africa consist largely of manufacturing companies. The study uses the ELMMFS to conduct descriptive analysis on these firms. All firms in the ELMMFS are in the formal sector. The study analyses different types of products produced in the manufacturing industry, as well as the production sectors within the manufacturing industry. Government regulations and red tape often hinder smooth operations for some companies, particularly the medium firms. An analysis reveals the severity of problems posed by strict regulations. The linkages between the formal sector and the informal sector involve the trade of raw materials, amongst other things, for economic purposes. The study conducts an analysis to understand the percentage of raw material purchased from the informal sector and vice versa.

3.2.5. Statistical Models

The study builds several statistical models to complete this section of the study. The first models are three predictive probit models, followed by two fixed effects models. Probit models are used to estimate probability likelihood of employability, labour market transition and informality. Whilst fixed effects models are used to evaluate the impact of certain factors on income in the labour market. The study employs the NIDS data for modelling of both probit income regressions.[7]

3.2.5.1. Probit Regression Modelling

The study make use of probit model regressions to estimate the probability of a conditional outcome. Probit model discussion below can be found in detail in chapter 13 of Wooldridge's *Introduction to Econometrics* (Wooldridge, 2012, p. 448 - 474). In probit modelling, dependent variables are categorised using a binary classification method. This is a binomial regression technique, where the response has a binomial distribution, i.e., the number of successes in a series of *n* independent Bernoulli trials, where each trial has probability of success *p*.

$$f(x) = \sum_{x=0}^{n} \binom{n}{x} \theta^{x}(1-\theta)^{n-x}, \quad x = 0,1,2,\dots,n \qquad (i)$$

Where...

$$\binom{n}{x}^{n} = 1 + \frac{nx}{1!} + \frac{n(n-1)x^{2}}{2!} + \cdots 1$$

In a case where a random variable *X*, has a probability density function (PDF) such as the one in equation *(i)*, then $X \sim Binomial\ (n, \theta)$. This binary modelling is applied when a response has two possible outcomes; yes or no, true or false, 0 or 1. The case of having two possible outcomes is considered to be binomial distribution with $n = 1$, where *n*, the number of trials, is equal to 1. In other words, success occurs 1 time out of 1 trial, and failure occurs 1 time out 1 trial. Theoretically, binomial modelling is essentially a binary classification model.

Probit model is the technique of choice in studying the question of informality because a regular Multiple Linear Probability (MLP) model is rudimentary and does not capture the full effect of the dependent variables in the model to a satisfactory level. Furthermore, (MLP) has

[7] The NIDS dataset is set up a wide format. This format is not suitable for statistical analysis (Wooldridge, 2012, p. 680-681). The study reshaped and converted the data from wide to long before any statistical modelling takes place. In this process, the study introduces the time variable, and then declare data is as panel data in STATA. The NIDS data is strongly balanced data. The dataset contains 6778 observations. After the process of reshaping the data, the number of observations increase from 6778 to 33890 and the number variables reduce from 84 to 25. This result is logical because now every PID appears five times in the dataset. This is an indication that each individual was a participant in every wave of the survey.

independent variable disadvantage. It is incapable of measuring a binary variable. The study opts for a more sophisticated binary response to measure the marginal effect of independent factors on informality and employability. Consider the binary response model below, where the dependent variable *y* and the independent variables β_i take on two outcomes: 0 or 1.

$$E(Y|X) = \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k + u \qquad (ii)$$

If the conditional mean (MLR.4) holds, and *Y* is a binary variable, that is, it can take either *Y = 0* or *Y = 1*, then it is always the case that the probability of success (*Y = 1*) is the same as the probability of the expected value of *Y:*

$$P(Y = 1|X) = \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k \qquad (iii)$$

The above equation shows that the probability of outcome *Y = 1,* is linear in its dependent variables. (MLP) with binary dependent variable is called Linear Probability Model (LPM). This is because it measures the change in probability of success when an independent factor changes, *ceterus peribus.* As such, making it possible to estimate the effect of different variables.

The study fits the following variables in the probit model: age, age-squared, education level, race, gender, trade union membership and skills level. This study employs the skill definition used by StatsSA.[8] The study used the Maximum likelihood Estimation (MLE) process to choose the above variables. Wooldridge (2012) states that one cannot use Ordinary Least Squares (OLS) and Weighted Least Squares (WLS) estimations to estimate nonlinear binary response model. They are used in the LPM model for formal-informal sector linkages. The study measures the MLE estimation on the distribution of Y, given X (*Y\X).* This accounts for heteroscedasticity is automatically. The functions; $f\ (1|x,\beta) = P(y_i = 1|x_i) = G(x_i\beta)$ and $(0|x,\beta) = P(y_i = 0|x_i) = 1 - G(x_i\beta)$ represent the density function for y_i value drawn randomly from the population, where *G* is strictly between 1 and 0. In this function, the MLE attempts to maximise the log-likelihood below *(iv)*. The study achieves MLE by means of iteration of the log function and it is consistent, asymptotically efficient and assumes normally distribution curve.

[8] StatsSA define skill level in terms of occupation types. Individuals who occupy the following positions are considered skilled individuals: Manager, Professional and Technician (StatsSA, 2014, p.1). Individuals who occupy the following positions are considered semi-skilled individuals: Clerk, Sales and services, skilled agriculture, Craft and related trade, Plant and Machine operator (StatsSA, 2014, p.1). Lastly, low-skilled individuals are those who occupy positions such as Elementary and domestic worker (StatsSA, 2014, p.1).

$$\max_{b} \sum_{i=1}^{n} \{(1 - y_i) \log[1 - G(x_i b)] + y_i \log[G(x_i b)]\} \quad (iv)$$

Estimates in probit models represent marginal effects of regressors. The effect of each regressor depends on the values of all other regressors. This is unlike linear regression models, which measure the effect of each regressor individually, while holding other regressors *ceterus peribus*.

The study builds probit models to understand how individual characteristics affect labour market. For the purposes of this study, which to fulfil the objectives of this study, the study selects a set of variables. The study chooses these variables because they represent the characteristics of individuals. This study has taken an executive decision not to include the Indian population group in the probit models.[9] The characteristics that we will focus on are:

$Age\ in\ years$
$Age\ in\ years\ squared$
$Female\ (dummy\ gender\ variable)$
$African\ (dummy\ race\ variable)$
$Coloured\ (dummy\ race\ variable)$
$White\ (dummy\ race\ variable)$
$Education\ years\ (education\ level\ dummy\ variable)$
$Education\ years\ squared\ (education\ level\ dummy\ variable)$
$High\ skilled\ (dummy\ skills\ variable)$
$Trade\ union\ member\ (dummy\ trade\ union\ variable)$

It is important to note that, some variables are relevant for some models, and not relevant for others. In the models below, all independent variables are the same, however, the dependent variables are different.

Probit Model 1: The probability of finding employment in wave 5, if not employed in wave 1.

[9] The NIDS user manual states that there was a low turnout for the individual population group in wave 1 survey. So much so, that the weights had to be calibrated to account for this in every subsequent waves. There has been high attrition rate in this group over the years, as well as in the white sub-samples. The user manual warns that great caution must be exercised when dealing with this subpopulation (Brophy, 2018, p. 71). Even though weight calibration fixes some surpluses and deficits, the numbers have been heavily adjusted that there could be unexpected effects in the analysis.

$$(employment = 1|unemployed)$$
$$= \beta_1 age + \beta_2\, age_{squared} + \beta_3\, female + \beta_4 african + \beta_5\, coloured$$
$$+ \beta_6\, white + \beta_7 educationyears + \beta_8 educationyearssquared$$
$$+ \beta_9\, highskilled + \beta_{11}\, trade + u_1 \quad (v)$$

Where… β_i represents marginal effect estimates.

Probit Model 2: The probability of transitioning from the formal sector to the informal sector, if employed in the formal sector in wave 1.

$$(informal = 1|formal)$$
$$= \beta_1 age + \beta_2\, age_{squared} + \beta_3\, female + \beta_4 african + \beta_5\, coloured$$
$$+ \beta_6\, white + \beta_7 educationyears + \beta_8 educationyearssquared$$
$$+ \beta_9\, highskilled + \beta_{11}\, trade + u_1 \quad (vi)$$

Where… β_i represents marginal effect estimates.

Probit Model 3: The probability of transitioning from the informal sector to the formal sector, if employed in the informal sector in wave 1.

$$(formal = 1|informal)$$
$$= \beta_1 age + \beta_2\, age_{squared} + \beta_3\, female + \beta_4 african + \beta_5\, coloured$$
$$+ \beta_6\, white + \beta_7 educationyears + \beta_8 educationyearssquared$$
$$+ \beta_9\, highskilled + \beta_{11}\, trade + u_1 \quad (vii)$$

where β_i represents marginal effect estimates.

Three probit regression analysis are conducted in this study. The first model measures the marginal effect of employability. That is, the probability of finding a job in the labour market, provided that one was previously unemployed.[10] The second probit regression analyses probability of transitioning between the formal and informal sector. It investigates the probability of finding a job in the informal sector, provided that one was employed in the formal sector in the previous period.[11] The third and last probit model investigates the probability of

[10] In Probit 1, individuals who remain unemployed between wave 1 and wave 5, are assigned a binary code of 0. Individuals who are unemployed in wave 1 but become employed in wave 5, are assigned a binary code of 1. 0 means failure and 1 means success.

[11] In Probit 2, individuals who are employed in the formal sector in wave 1 and remain employed in the formal sector in wave 5 are assigned a code of 0. Whilst individuals who are employed in the formal sector in wave 1 and become employed in the informal sector in wave 5 are assigned a code of 1.

finding a job in the formal sector, provided that one was employed in the informal sector in the previous period.[12] In this study, probit models are not weighted.[13]

3.2.5.2. Fixed effects estimation vs. Random effects estimation

Income is one of the driving factors in the formal and informal sector. Many individuals are attracted to the formal sector or informal sector because of the potential income they may earn. Income in the labour market is not only determined by the sectors. For example, an individual's education level may contribute to how much he or she earns.

Fixed effects and Random effects models are used in this study to investigate the relationship between income and selected set of varying factors, over time. The fixed effects and random effects models discussion below can be found in detail in chapter 14 of Wooldridge's Introduction to Econometrics (Wooldridge, 2012, p. 484 - 500). In the fixed effects model, explanatory variables are fixed quantities, whilst in the random effect model, variables are dynamic. In other words, in fixed effects model, the dependent variable is affected by change in variables within a particular entity over time. Whilst in random effect models, the dependent variable is explained by difference in variables between entities over time. Even though both fixed effects and random effects models are applied, only the results of one model are adopted as findings. The Hausman test is applied to decide which model between fixed effects and random effects is used. Under the Hausman test, the null hypothesis says that random effects are always an appropriate model to use. The alternative hypothesis says that fixed effects model is an appropriate model. If the null hypothesis is rejected, then random effects results or fixed model results will be used in this study. Failure to reject the null hypothesis would mean that random results will be used in this study.

3.2.5.3. Fixed effects estimation

Individuals have characteristics that may or may not influence predictor variables. These characteristics are unique to the individual and are not correlated with characteristics of another individual. Fixed effects model attempts to isolate and control for these time-invariant

[12]In Probit 3, individuals who are employed in the informal sector in wave 1 and remain employed in the informal sector in wave 5 are assigned a code of 0. Whilst individuals who are employed in the formal sector in wave 1 and become employed in the informal sector in wave 5 are assigned a code of 1.

[13] The NIDS user manual advice that it would be inappropriate to do unweighted analysis and therefore users must apply weights on the data. While the NIDS user manual acquiesce that one tends to get 'good looking' results on unweighted data, doing an analysis on a sample size that is too small is troublesome (Branson, 2018, p. 73). However, for the purposes of this study, weights are not applied.

characteristics, so that only net impact of predictor variables on the dependent variable is measured. This process is fixed effects transformation. In the model below.

$$y_{it} = \beta_1 x_{it} + a_i + u_{it}, \quad t = 1, 2, \dots, T \qquad (viii)$$

For each *i*, overtime, we take average of both *y* and *x*, we get;

$$\bar{y}_i = \beta_1 \bar{x}_i + a_i + \bar{u}_i \qquad (ix)$$

Where $\bar{y}_i = T^{-1} \sum_{t=1}^{T} \bar{y}_i$, and *a* is fixed over time because it appears on both equation *(viii)* and *(ix)*. If we subtract equation *(ix)* from equation *(viii)*, we get the following:

$$y_{it} - \bar{y}_i = \beta_1 (x_{it} - \bar{x}_i) + u_{it} - \bar{u}_i, \quad t = 1, 2, \dots, T \qquad (x)$$

Where $y_{it} - \bar{y}_i$ represents change in the dependent variable over time, same for $x_{it} - \bar{x}_i$ and $u_{it} - \bar{u}_i$, they are time-bound changes. The objective in transforming equation *(viii)* to equation *(ix)*, is that unobserved effect *a* is now disappeared from the model, notice that the intercept is excluded in this model. Now it would be possible to employ pooled OLS to investigate the effect of explanatory variable without the noise of unobserved variables. A pooled OLS estimator with constant variables that is affected only by time is called a fixed effect estimator (or within estimator), which is used in this study because time variable is more than 2 periods (5 periods/waves). Within each cross-sectional observation, only time variation affects the dependent variable and the independent variable.

The above equations are merely dealing with one variable, however, adding more variables in the model as it is applied in this study does not change the mechanics of removing the noise of unobserved variables. Fixed effect estimator allows for correlation between a_i and an explanatory variable in any period. Therefore, this allows for a complete removal of all explanatory variables that are constant over time and is why categorical variables that are time constant such as gender or province are not fit for this type of model. However, these variables can be included in the model as dummy variables that interact with variables that change over time.

The study uses a Fixed effects model to investigate how income is affected by different individual characteristics. Wages in the formal sector and the informal sector differ drastically because of the difference of the two sectors. The degree of how each variable affect an individual differs depending on whether the person work in a primary or secondary employment in the formal sector or informal sector. Self-employed is modelled separately because self-employed individuals can also be in formal or informal sector. Therefore, two

fixed-income models are built. One for income for individuals in primary and secondary employment and another for income for self-employed individuals.[14]

3.2.5.4. Random effects estimation

Unlike the fixed effects model, in the random effects model, the variation across entities is random and uncorrelated with the dependent variables or independent variables. Consider the model below, which is the same as in *(viii)*.

$$y_{it} = \beta_0 + \beta_1 x_{it} + a_i + u_{it}, \quad t = 1, 2, \dots, T \qquad (xi)$$

The only difference in this model is that it includes an intercept because an assumption that an unobserved effect a_i, has a zero mean. In fixed effects model, the objective was to remove a_i, from the model because it was thought to be correlated with the predictors. However, in this model, it is only assumed that a_i, is uncorrelated with the explanatory in all the periods:

$$Cov(x_{itj}, a_i) = 0, \quad t = 1, 2, \dots, T; j = 1, 2, \dots, k \qquad (xii)$$

Random effects model incorporates all the fixed effect model, plus an additional assumption, that a_i is uncorrelated with the independent variables. Fixed effects remove the time averages from the corresponding variables. Random effects transformations remove a fraction of that time average. The transformation allows for random independent variables that are constant over time. in this case, random effects have an advantage over the fixed effects.

For random effect, the study builds the same models as the ones built for fixed effects are estimated. After they are estimated, a Hausman test is run in order to identify which model fits the explanatory variables better.

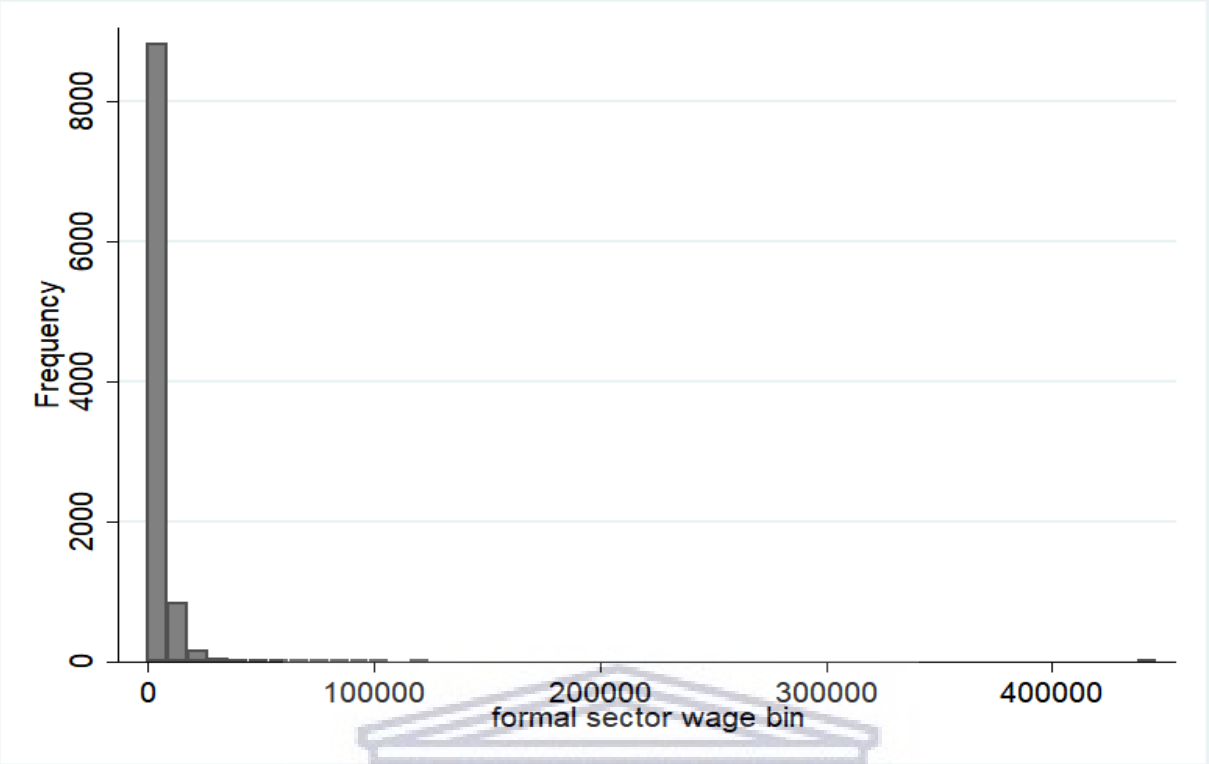
3.2.5.5. Fixed effects and Random effects models

Dependent variables used in the study:

Wages variable in primary and secondary occupation

Figure 3.1: Histogram showing wave distribution for wage before log transformation.

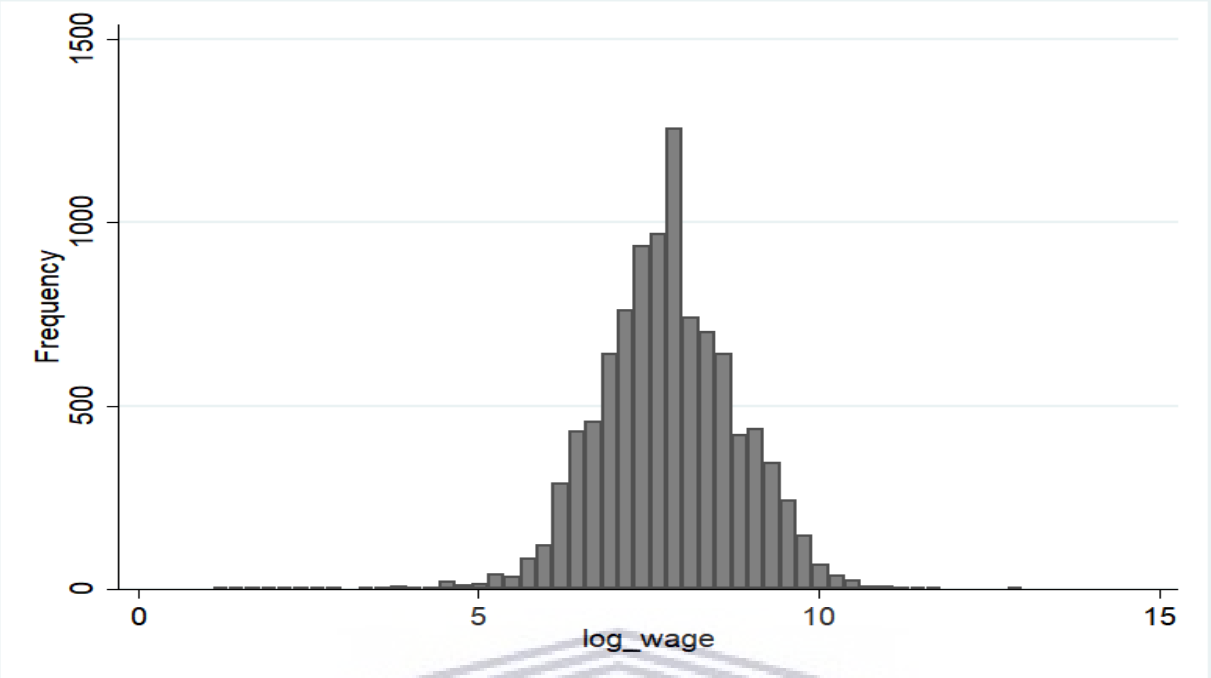
[14] Primary income is income obtained from the main occupation. Secondary income refers to income obtained from the second occupation if individual has more than one job. Section E, questions eb1 to eb15 in the NIDS questionnaire ask about individuals' income sources. The question enquires if they receive salary or wages at a regular basis, regardless of whether the job is full time or part-time. The questionnaire also clarifies that the income in question should be from the main job or primary occupation. In questions eb16 to eb25, the questionnaire asks about income from secondary employment. In questions Ec1 to Ec15.3, the questionnaire enquires about income from self-employment, primary or secondary. If the individual has incomes from a third or more occupations, the questionnaire asks about them in the casual employment questions, questions ed1 to ee6.



Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU.

As evident in the graph above, wages are skewed to the right. The graph does not assume normality. This could be due to some extreme outliers that influence the shape in that manner. The study applies Logs transformation process to correct the deviation from normality and uneven variance. This allows for the use of parametric statistics. After applying the log transformation for the wage dependent variable, it mimics the bell shape curve, meaning that it is normally distributed.

Figure 3.2: Histogram showing wave distribution for wage after log transformation.



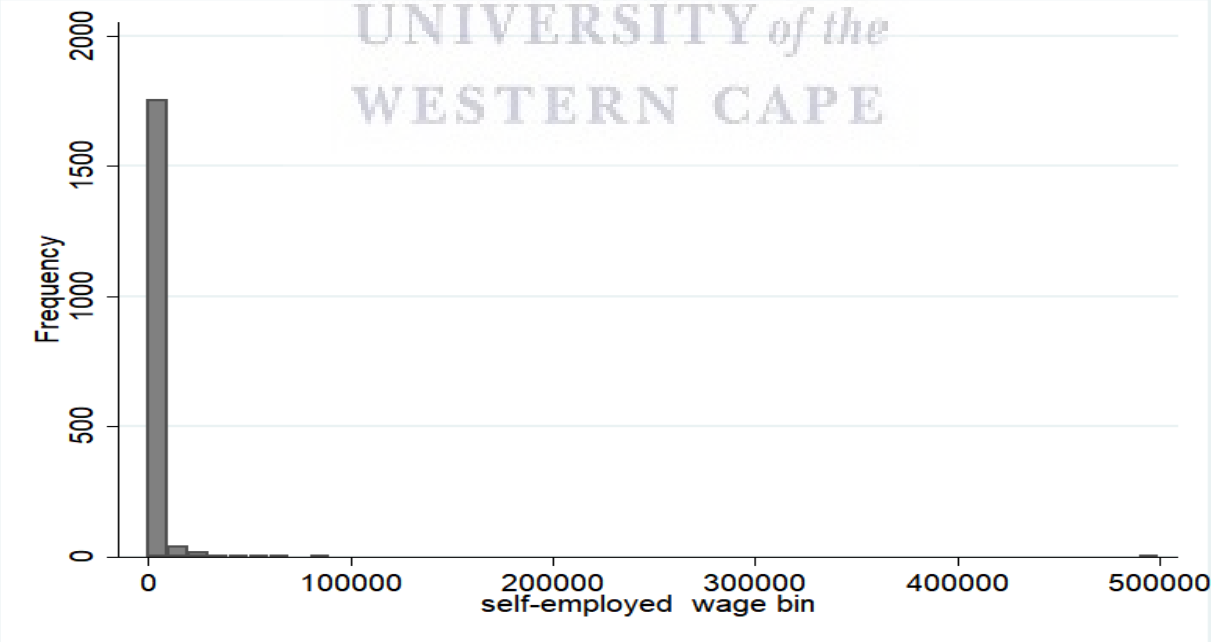
Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset,

Collected and compiled by SALDRU.

Wages variable for self-employed variable

Similarly, the wages variable in the informal sector is skews to the right.

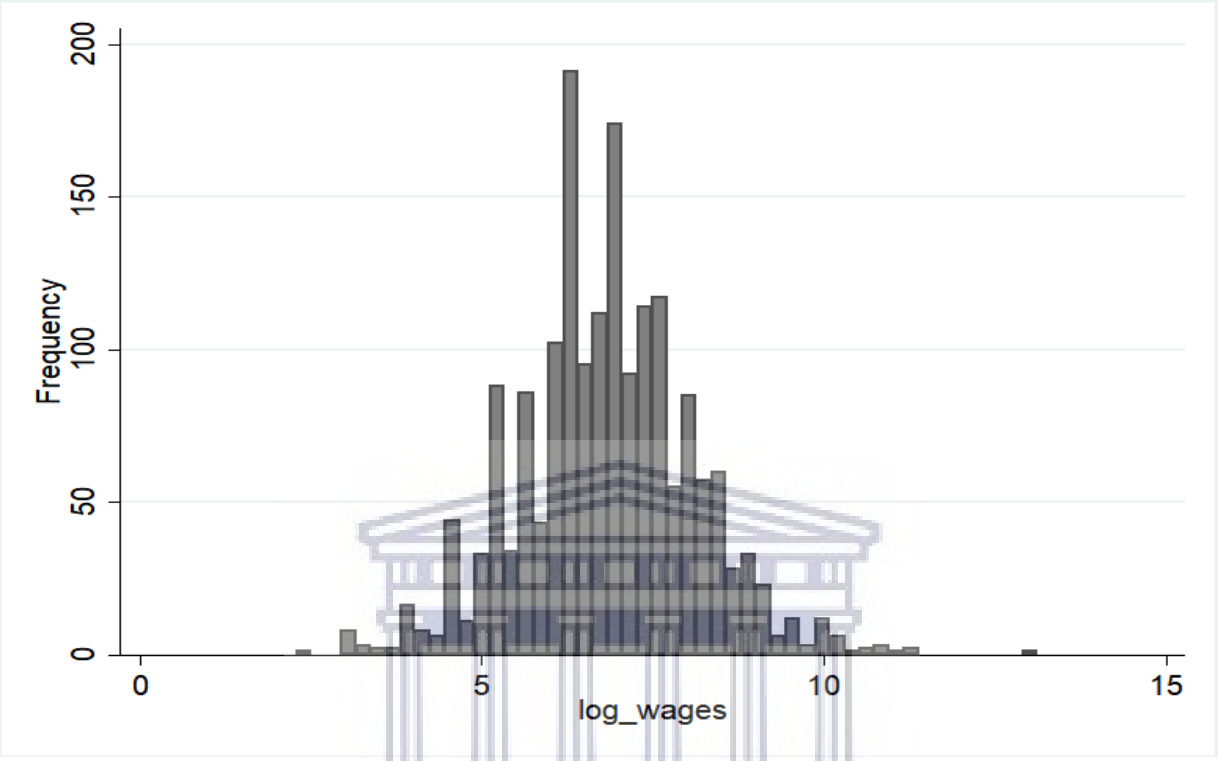
Figure 3.3: Histogram showing wave distribution for self-employed wage before log transformation.



Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset,
Collected and compiled by SALDRU.

Log transformation on the self-employed wage variable transform it to a normally distributed variable as evident in the graph below.

Figure 3.4: Histogram showing wave distribution for self-employed wage after log transformation.



Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU.

Explanatory Variables

$Age\ in\ years$

$Age\ in\ years\ squared$

$Education\ in\ years$

$Education\ in\ years\ squared$

$Hours\ worked\ (formal\ work)$

$Informality$

$Informal\ sector * African\ (interaction\ variable)$

$Trade\ union\ member$

Age and age-squared are important explanatory variable, the two variables work differently. Age-squared variable accounts for the idea that as age increase, income will have diminishing returns, meaning it will increase at a decreasing rate after it reached its peak effect. The same

goes for education and education squared. The number of hours does affect how much one earns. Rationally, the logic is that the more hours worked, the higher the income one earned. Primary and secondary income made from the formal sector and one made from the informal sector differ, the informality dummy variable test for formal sector income. The model is complex because an interaction variable is included. The variable investigates how much African blacks in the informal sector earn compared to other races. The study focuses on the African population because previous research has found that they comprise the majority of the informal sector. Finally, yet importantly, trade union members tend to earn more income compared to non-unionised employees. The trade union variable investigates the impact of being a trade union member on income.

Fixed effects/Random effects estimation model 1 (primary/secondary income estimator)

$$PrimSecIncome = \beta_1 age + \beta_2\, age_{squared} + \beta_3 education + \beta_4 education_{squared} + \beta_5\, hours + \beta_6\, informality + \beta_7 secafric + \beta_8\, tradeunion + u_1$$

Fixed effects/Random effects estimation model 2 (self-employment income estimator)

$$SelfEmployedIncome = \beta_1 age + \beta_2\, age_{squared} + \beta_3 education + \beta_4 education_{squared} + \beta_5\, hours + \beta_6\, informality + \beta_7 secafric + \beta_8\, tradeunion + u_1$$

The Hausman Test: Primary/Secondary Income model

Wooldridge (2012) recommends the use of fixed effects model over the random effects model because it is more reliable tool for estimating *ceterus peribus* effects. Unless the dependant variable is constant over time, one should use fixed effects model. This study applies both fixed effects and random effects, and then uses a test to decide which one fits better. It is important to formally test for statistical significance differences in the coefficients over time, and then apply the Hausman test. The Hausman test assumes that random effect is a better model unless the Hausman test rejects it. Failure to reject the null hypothesis means that both fixed effects and random effects are both reliable and it is irrelevant which model is used. A rejection of Null hypothesis means that we use fixed effects.

The Hausman Test: Primary/Secondary-Employed Income model

Null hypothesis: Random effect is appropriate

Alternative hypothesis: Fixed effect model is appropriate

Results:

Table 3.1: Hausman test results for Fixed effects model vs Random effects model (primary/secondary income)

	Fixed Effects Model	**Random effect Model**
Chi2(8)	2180.43	
Probability> Chi-squared	0.0000	0.0000
Number of PID (groups)	3,615	3,615
R-Squared (within)	0.3201	0.1502
R-Squared (between)	0.0001	0.4610
R-Squared (overall)	0.0280	0.4269

Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU

Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Conclusion: Prob > Chibar2 = 0.000, which is less than p-value of 0.05. Therefore, reject the null hypothesis and conclusion that fixed effects model is appropriate for estimating income. In Chapter 4, the study presents and interprets the results of fixed estimators for primary/secondary income model.

The Hausman Test: Self-Employed Income model

Null hypothesis: Random effect is appropriate

Alternative hypothesis: Fixed effect model is appropriate

Results:

Table 3.2: Hausman test results for Fixed effects model vs Random effects model (self-employed income)

	Fixed Effects Model	**Random effect Model**
Chi2(8)	48.03	
Probability> Chi-squared	0.0000	0.0000
Number of PID (groups)	973	973
R-Squared (within)	0.1176	0.0455
R-Squared (between)	0.0028	0.2241
R-Squared (overall)	0.0000	0.2459

Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU

Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Conclusion: Prob > Chibar2 = 0.000, which is less than p-value of 0.05. Therefore, reject the null hypothesis and conclusion that fixed effects model is appropriate. In Chapter 4, the study presents and interprets the results of fixed estimators for self-employed income model.

3.3 Data

3.3.1. National Income Dynamics Study (NIDS) data

This study makes use of waves 1, 2, 3, 4 and 5 datasets of the National Income Dynamics Study (NIDS). The National Income Dynamics Study is a panel data survey that tracks the changes and well-being of individuals and households in South Africa over time. The Department of Planning, Monitoring and Evaluation (DPME) initiative instituted and funded the NIDS under the instructions of the South African Presidency. The aim of the programme is trace, record and evaluate the changes of livelihood of South Africans of all age groups and economic classes. The Southern Africa Labour and Development Research unit (SALDRU) spearhead and manage this project, from the School of Economics, University of Cape Town.

The NIDS datasets records information of individuals and households as they interact with the cyclical nature of the economy and its ever-changing landscape. Amongst others, the study explores themes such as individual employment status and how it affects households, poverty levels of a household, migration, labour market participation, economic activity, human capital investment, changes in education and social capital (Brophy *et al.* 2018:14). NIDS used four types of questionnaires; the household questionnaire, the adult questionnaire, proxy questionnaire and the child questionnaire, in each wave to collect and compile data (Brophy *et al.* 2018:28). SALDRU conducts the NIDS study once every two years and it follows the same individuals and households in all waves. The sample comprises two types of subjects: the Continuing Sample Members (CSM) and the Temporary Sample Members (TSM). The CSM consists of individuals who have been part of the study since wave 1, whilst the TSM consists of individuals who join the sample households at any stage after the first wave 1 (Brophy *et al.* 2018:10).

The NIDS data suffers from attrition, particularly the wave 2 and wave 3 datasets. Comparing the number of successfully conducted interviews in each wave to the same individuals in the previous wave allows for identifying attrition in the data. Attrition could be due to factors such as refusal, no contacted, or deceased (Brophy *et al.* 2018:14). Due to higher attrition among White, Indian/Asian population groups and high-income respondents, NIDS increased the sample size in wave 3 in order to maintain the reliability of the sample. In order to fix any

biases in the data that may have occurred because of attrition, balanced panel surveys are used. The study only focuses on individuals who have been part of wave 1 to wave 5.

The first wave, Wave 1 was conducted in 2008 where 28 226 individuals in 7296 households were sampled. The sample size grew to 34 291 in wave 2 (2010), 37 553 in wave 3 (2012), 42 372 in wave 4 (2014) and finally, to 47 055 in wave 5 (2016). The study only focuses on individuals who were in all interviews from Wave 1 through to Wave 5. The focus is on individuals between the ages 15 to 64, with a specific labour market status and/or has some employment history. Across wave 1 and wave 4, there are 6 778 individuals who meet the above criteria, this number may increase when wave 5 is added to the sample size.

The study uses the panel data weights as presented by SALDRU, except on the probit model, and fixed effects models. NIDS recalculated weights to account for the changes because of improvement of data collection in each wave, over the years. However, the main algorithms and formulas of calculating these weights have not changed. The NIDS dataset has three weights: design weights, calibrated weights and panel weights. Panel weights are weights for individuals who have been part of the interviews and re-interviews in waves 1 through to wave 5. NIDS has rescaled the panel weights so that they add up to the StatsSA population estimates. Panel weights are individual level weights.

3.3.2. eThekwini Large and Medium Manufacturing Firm Survey (ELMMFS)

To investigate the linkages between the informal sector and the formal sector, the study relies on the 2013-2014 Large and Medium Manufacturing Firm Survey which was undertaken by the School of Built Environment and Development Studies (BEDS) at the University of KwaZulu-Natal. The first survey took place in 2002/2003. The survey focuses on collecting general business data on manufacturing firms, data on production, finances, purchasing of raw material and other things, sales and marketing, business relations, human resources (HR), and administrative and legal matters. The survey focused on large manufacturing firms in eThekwini. There is no indication in the dataset, questionnaire or user manual that informal sector entities were part of the survey.

The survey project was a partnership between the eThekwini Municipality, the Employment Promotion Programme (EPP), the National Research Foundation (NRF), the provincial Department of Economic Development and Tourism (DEDT) and the National Department of Economic Development (NDED). The above organisations also contributed financially to the project. The focus of this survey was the eThekwini Municipality. The study focussed only on

firms that were in the manufacturing sector. The Project Steering Committee included representatives of partner organisations and members of the eThekwini business community.

3.4 Limitations of the data

The eThekwini ELMMFS dataset contains mainly data about manufacturing firms in the municipality of eThekwini. Most of the above firms operate in the formal sector. Because of this, the paper missed an opportunity to study all firms in all other sectors, other than those in the manufacturing sector. Furthermore, the study is unable to conduct an expansive analysis on the firms in South Africa in its entirety, instead of only a municipality in Kwa-Zulu Natal. More organisations should consider undertaking the project of conducting surveys with quality data that contains similar information on South Africa. This will help in understanding the challenges and the landscape of all South African companies.

The NIDS data does not contain firm information. It only contains data at an individual level over time. The eThekwini ELMMFS contains largely formal firms. Therefore, only forward linkages are be studied in this paper. Other linkages such as backward linkages were not able to be studied because of data on informal manufacturing firms that may import raw inputs from the formal sector. Labour institutions and government should invest more funds in surveys that will enable the investigation of some of the questions that this study could not investigate.

3.5 Conclusion

The study uses both the Labour approach and the Enterprise approach to measure the size of informality in South Africa. These two approaches are complementary. For methods such as descriptive statistics, analysis and transitional matrix are used. Meanwhile, three types of probit models investigate the marginal probability of finding employment in the formal sector or the informal sector, as well as transition probabilities between the two sectors.

The study uses Fixed effects model and Random effects model to investigate how different variables explain the income variability in the primary/secondary employment and self-employment. The study uses the NIDS data and the eThekwini municipality data to perform modelling and descriptive statistics. Some of the limitations include the inability to investigate other sectors of firms, as opposed to only manufacturing firms only. Furthermore, linkages such as backward linkages were not possible due to the data. More data surveys needed in the future to complement the shortfalls of the current study. Chapter 4 details the findings made using the methods explained in this chapter.

CHAPTER 4: EMPIRICAL FINDINGS AND ANALYSIS

4.1 Introduction

Chapter 4 presents the findings made in this study through the application of various statistical methods detailed in Chapter 3. The study presents findings in the form of tables and data visualization. The descriptive statistics contain overall profiles of the individuals and firms that are part of this study. The statistical analysis breaks down the size of the formal sector and the informal sector, and the employment levels in each sector over time. The transitional matrices describe the patterns of employment churning between sectors. Meanwhile statistical modelling such as probit and fixed effects models are used to gauge the impact of certain variables on informal behaviour and income, in that respect. The results presented in tables 4.1-4.8 and figures 4.1-4.7 are from the NIDS data. The results on table 4.9 and figure 4.8-4.10 are from the ELMMFS data. The entire section 4.3 also discusses results obtained from the NIDS data.

4.2 Statistical Analysis

4.2.1. Descriptive Statistics

The following descriptive statistics provides a brief overview of the economic and social profile of the South African population. The findings in the descriptive statistics contextualizes the need of informality in South Africa. Table 4.1 presents weighted outputs of demographics of working-age population in South Africa, based on the NIDS dataset. The output was obtained through summary statistics commands in STATA program, as explained in chapter 3, section 3.2.4. According to table 4.1, South Africa's population make up consisting of 52% women and 48.2% men. Women make up the largest portion of the population. The African black population group made up the biggest share of the population group at 83.1%, followed by Coloured at 9.1%. The White and Asian/Indian population group represent the smallest proportion of the population at 5.6% and 2.1%.

The working-age population increased by 7.3 million between 2008 and 2016. Individuals between the age groups of 15-24 and 25-34 make up the largest portion of South Africa at 35.5% and 25.3%, accordingly. In the period 2008 to 2016, employment remained relatively the same at around 27%, as explained in the literature review. Young people below the age of 35 may constitute the largest portion of the unemployment rate. Having a larger population could have positive impact in the economic growth of South Africa. The younger population

size may mean that the country has massive human capital that could be exploited for economic benefits, particularly in the informal sector, although another argument about a poor quality of life due to large population size could also be plausible.

Table 4.1: Table showing demographics of working age population

	Percentage
Gender	
Male	48.2%
Female	51.8%
Total	100.0%
Population group in wave 5	
African black	83.1%
Coloured	9.1%
Asian/Indian	2.1%
White	5.8%
Total	100.0%
Age cohort in wave 1	
15-24 years	35.5%
25-34 years	25.3%
35-44 years	18.9%
45-54 years	12.8%
55-64 years	7.6%
Total	100.0%
Working age group in wave 5	
10-year increase	7 256 875

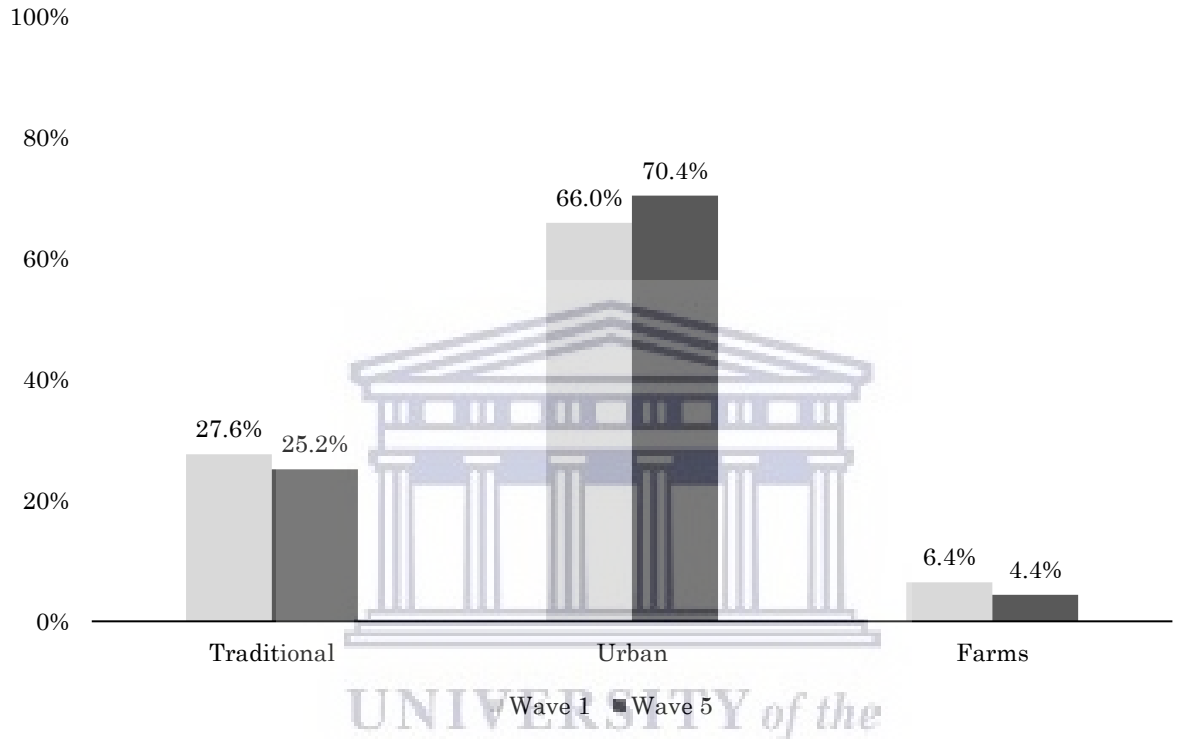
Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset, Collected and compiled by SALDRU

Figure 4.1 indicates the distribution of population size, by geographical type. The bar shows that more than 50% of South Africa's population lives in the urban areas, followed by traditional/rural areas. The population size in the rural areas decreased from 27.6% in 2008 to 25.2% in 2016, whilst the population size on farms decreased by 2% from 6.4% to 4.4% in the same period. More people are relocating from the rural areas and farms to the urban areas. This is evident in the rise of urban population size from 66.0% in 2008 to 70.4% in 2016.

Rural areas and farms are relatively less industrialized compared to urban areas. Thus, there is paucity of job opportunities in these areas. Urban provinces such as Gauteng and Western Cape are more industrialized and more economic activities take place in them. Therefore, this migration could be because people are looking for employment opportunities. Given that the urban population has increased by 4% in just 10 years, it could be said that the population size

must be expected by to increase by another 4% in the next 10 years, if this trend continues. Urban centres must change in order to accommodate this growth. This means that more job opportunities must be created, more business districts such as economic zones in the townships must be developed.

Figure 4.1: Bar graph showing geographical type population proportions in wave 1 and in wave 5.

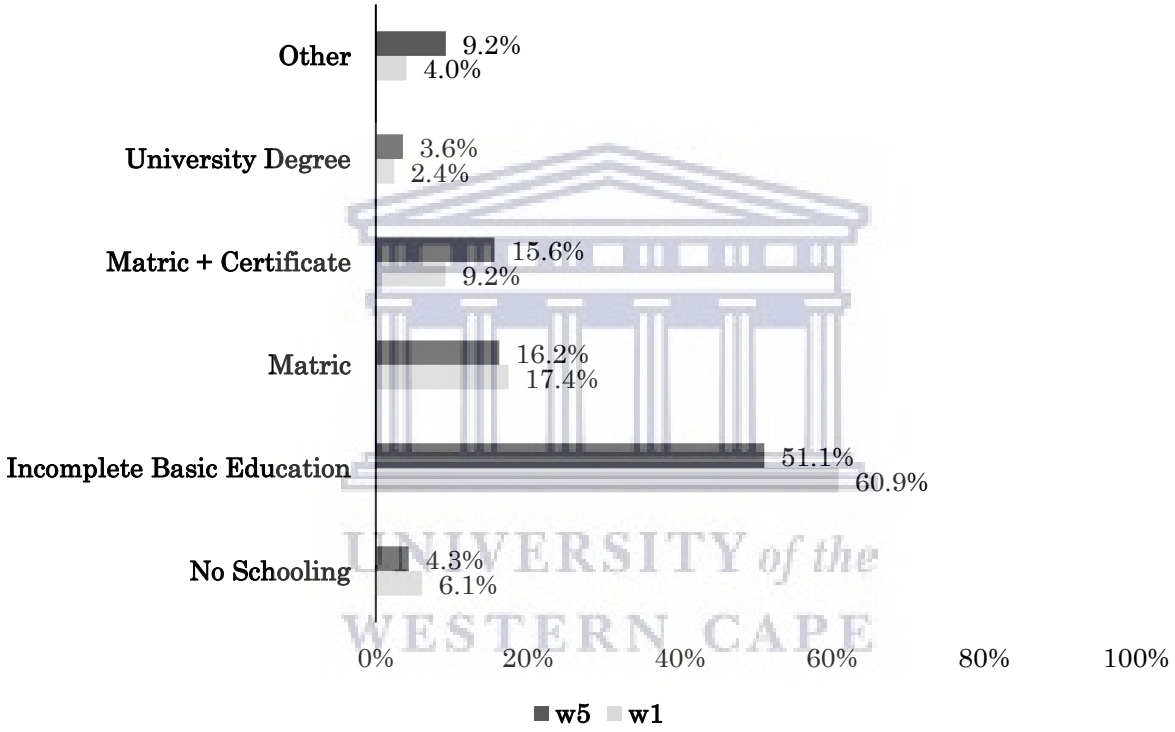


Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset.
Collected and compiled by SALDRU.

The future of a country's economic growth depends on the skills of its population. The higher the skills level of the workforce, the greater the productivity, the better the social welfare of that country. Formal education is a reliable measure of skills required for economic growth. Figure 4.2 shows the changes in level of education in South Africa between 2008 and 2016. The percentage of individuals with no schooling has decreased from 6.1% in 2008 to 4.3% in 2016. Meanwhile the percentage of those with less than matric equivalent education decreased from 60.9% to 51.1%. The above could mean that more people are getting education. South Africans may be realizing the importance of basic education, not only in their individual lives, but also for the economy of the country.

While the number of people with matric decreased from 17.4% to 16.2%, the number of people with matric and a certificate has increased from 9.2% to 15.6%. The above result make sense because as more people with matric certification further their education, the pool of those with only matric decreases. Most jobs in the 21st labour force require more than a matric because of the departure from labour-intensive work to capital-intensive operations in industry for greater productivity.

Figure 4.2: Bar graphs showing proportional changes in education attainment level from wave 1 to wave 5.



Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset.
Collected and compiled by SALDRU.

Figure 4.2 demonstrates that education levels have changed between 2008 and 2016. In the figure above, those who have a university degree as their highest level of education have also increased from 2.4% in 2008 to 3.6% in 2016. Tertiary education is associated with high-quality jobs. Individuals with tertiary education tend to work in executive positions. Those with other types of education has also increased to 9.2% in 2016. The no-schooling group could constitute the largest portion of the 9.2%. This is because most of them would not be able to

get education that requires matric as a prerequisite. Therefore, they settle for other types of certificates and training that do not require matric.

There has been an overall improvement in education attainment in South Africa. Higher education leads to better job opportunities. As discussed in the literature review, higher education leads to reduced participation rate in the informal sector. This could explain the lower growth rate of the informal sector in South Africa. This means that individuals who could only get employment offers in low-paying sectors such as the informal sector, are more likely to get better offers, probably in the formal sector. Those without employment would be more likely to find employment with increased education.

Table 4.2: Table showing Transitional Matrix in the Labour Market

		Labour Market Status in Wave 2			
		Inactive	Unemployed	Employed	Self-employed
Labour Market Status in Wave 1	Inactive	79,8	6,0	11,4	2,8
	Unemployed	54,5	12,4	25,7	7,4
	Employed	55,3	8,1	30,8	5,8
	Self-employed	46,9	4,0	12,9	36,2
		Labour Market Status in Wave 3			
		Inactive	Unemployed	Employed	Self-employed
Labour Market Status in Wave 2	Inactive	59,0	20,5	17,1	3,5
	Unemployed	48,6	20,1	28,0	3,3
	Employed	29,2	32,8	32,1	5,9
	Self-employed	27,4	11,4	20,5	40,8
		Labour Market Status in Wave 4			
		Inactive	Unemployed	Employed	Self-employed
Labour Market Status in Wave 3	Inactive	60,3	14,2	20,5	4,9
	Unemployed	30,7	25,4	34,8	9,1
	Employed	13,5	7,0	75,3	4,3
	Self-employed	23,6	8,7	27,8	39,9
		Labour Market Status in Wave 5			
		Inactive	Unemployed	Employed	Self-employed
Labour Market Status in Wave 4	Inactive	69,3	12,1	15,4	3,3
	Unemployed	32,9	26,4	34,5	6,2
	Employed	15,3	6,8	72,6	5,4
	Self-employed	28,0	10,6	23,7	37,6

Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU

It would be interesting to observe the actual impact of this education increase in the labour market. Table 4.2 presents transitional matrices for individuals in the labour market between

wave 1 and wave 5. The study found that 79.8% of individuals who were inactive in wave 1 remained inactive in wave 2. Over 50% of individuals who were unemployed in wave 1 became inactive in wave 2. This could be because they spent extended periods in the labour market looking for employment with no luck, and then they decide to exit the labour market outright. Similar trends are observed in the transitional matrix of wave 2 and wave 3.

There is a high percentage of individuals who were participants in the labour market in wave 1 and 2, but who became inactive in wave 2 and 3, respectively. This finding is consistent with the state of the economy during the period of wave 1, 2, and 3 which followed the 2008 economic crisis that originated in the United States of America and ultimately affected countries around the world, including South Africa.

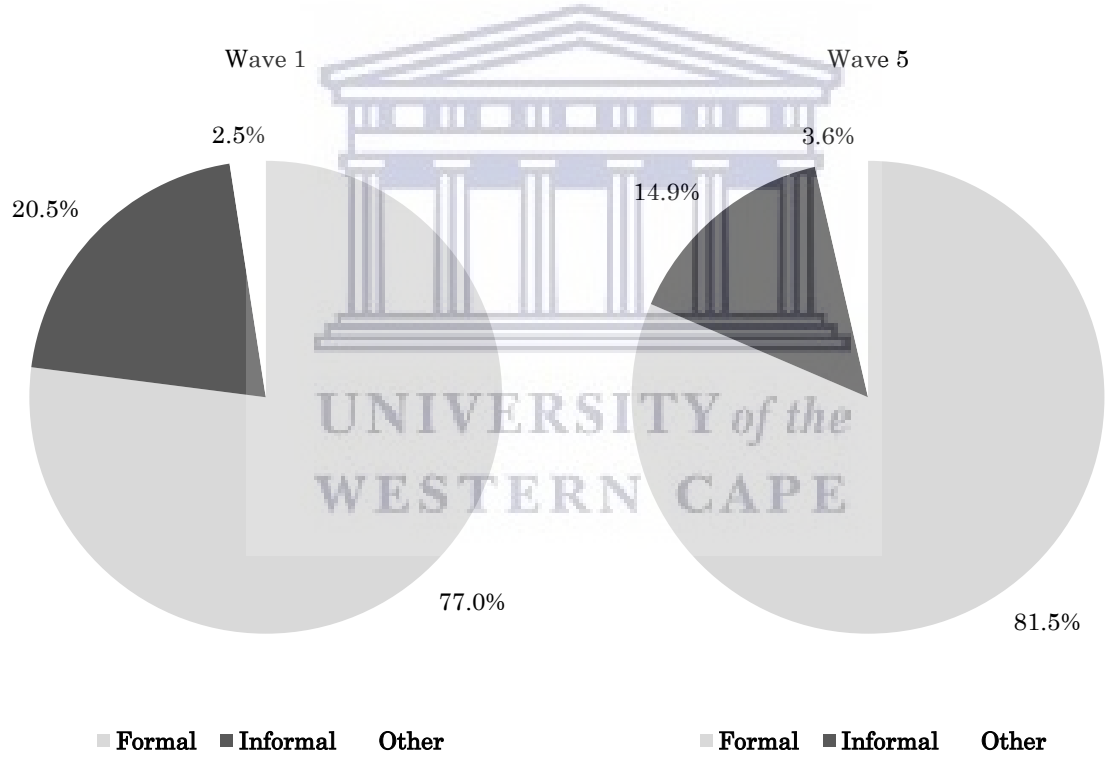
During the period of 2008 financial crisis, the economy of South Africa went under recession, where it experienced several consecutive business cycle contractions. This resulted in many individuals losing employment. In the labour market transition of wave 4 and 5, 69.3% of individuals who were inactive in wave 4 remained inactive in wave 5. 26.4% of those who were unemployed in wave 4 remained unemployed in wave 5. Most of those who were unemployed in wave 4 found employment in wave 5 (34.5%). A very small percentage of employed individuals in wave 4 lost their jobs in wave 5. Only 6.8% of those who were employed in wave 4 became unemployed in wave 5, whilst 72.8% retained their employment status. Similarly, 28.0% of individuals who were employed in self-employment became inactive in wave 4. There is a high employment retention rate in self-employment at 37.6%.

There are better employment rates in wave 4 and 5 compared to other waves in the transitional matrix. Even if some lose employment, they tend to remain in the labour market. For example, between wave 1 and 2, 11.4% of those who were inactive joined the labour market and found employment. This is compared to 15.4% of the inactive individuals who found employment in wave 5. Many factors could be contributing to the apparent relatively stable employment patterns in the labour market in wave 4 and 5. The economy of South Africa may have not been growing at appreciable rate, but it had recovered from the financial collapse of 2008. Furthermore, with the higher educational level of the population, it is not unexpected for more people to find jobs and keep them. People were more skilled in 2016 than they were in 2008. Therefore, the stability in the transitional matrix could also be attributed to this factor.

Education level does not only affect the labour market behaviour, but it also affects the share of formal and informal sector employment in the labour market. Studies discussed in Chapter

2 such as Rogan and Skinner (2017) have found that the higher the level of education, the lower the participation rate in the informal sector. Figure 4.3 indicates how the size of the formal sector and the informal sector have changed between 2008 and 2016. The size of formal sector increased between 2008 and 2016. It has increased in size from 77.0% in wave 1 to 81.5% in wave 5. The size of the formal sector has increased by almost 10% in 10 years. This increase could be due to the increase in the education level in the labour market as observed in figure 4.2. The formal sector employed more people in South Africa in wave 1 than the informal sector. Before 1994, the informal sector was a neglected sector that had no potential for significant impact on the national economy – unlike in other African countries, where the informal sector employs more people than the formal sector.

Figure 4.3: Pie chart showing proportional changes of employment by sector from wave 1 to wave 5.



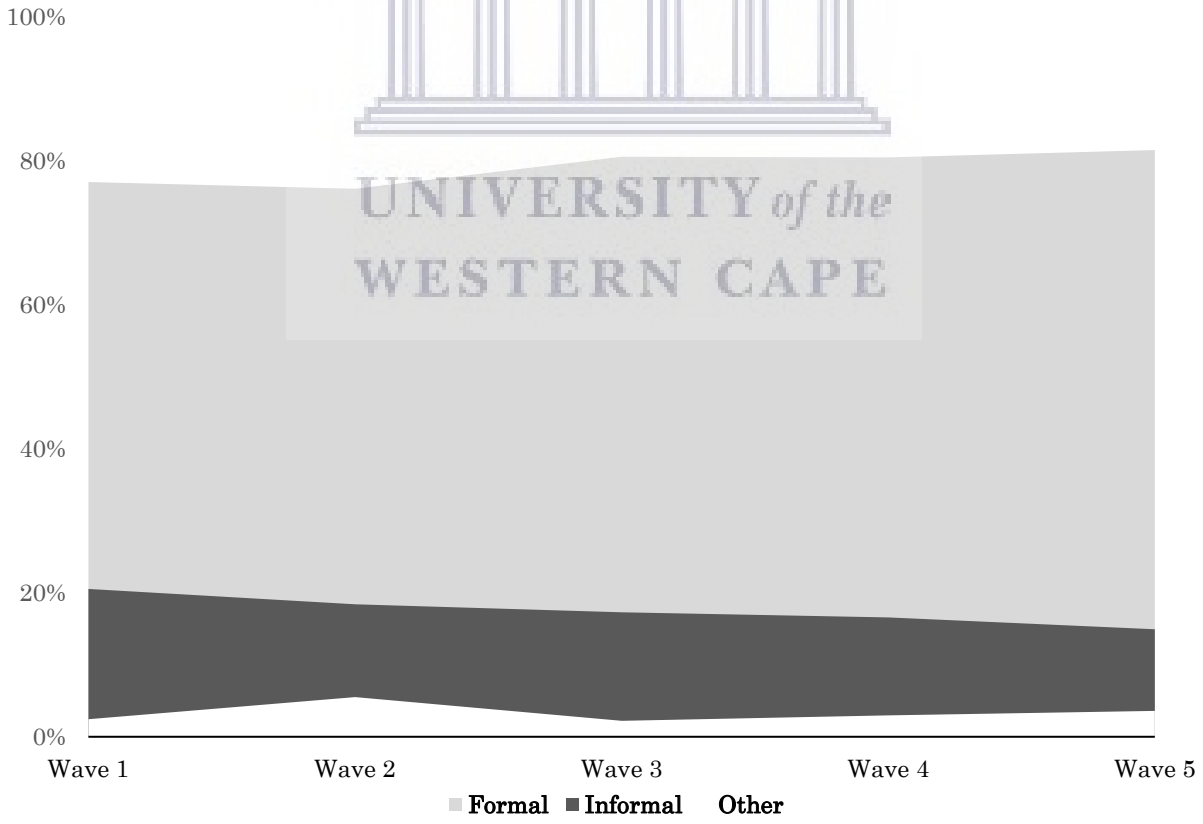
Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset,
Collected and compiled by SALDRU.

The formal sector has shrunk during the same period of 2008-2016. In wave 1, the size of informal sector employment was 20.5% as shown in the pie chart above. However, 10 years later, the size of the informal sector decreased by roughly 5% to 14.9% in wave 5. Again, this is correlated to the increase in education level of the labour force. The informal sector is inversely promotional to the level of education as found by Devey *et al*. (2003, p. 156),

explained in page 21. Even though education explains the reduction in the size of informal sector, this finding goes against what is expected. As the size of population increases, and the economy growing at slow pace, one would expect the informal sector to increase. The formal sector is unable to absorb a lot of people, especially young people. The informal sector is attractive because it has low entry barriers, therefore, more people would be able to enter the sector to find employment. However, as Kingdon and Knight (2004, p. 4) puts it, this may not be the case because the probability of securing a job in the informal sector is low, and the it is characterized by generally low and undesirable income for the unemployed..

Besides the formal sector and the informal sector, there are other individuals who work in a different sector described as other. This sector has seen an increase from 2.5% in wave 1 to 3.6% in wave 5. This category most likely consists of people working as domestic workers, seasonal workers and casual workers. These individuals do not fall in the formal or informal sector category and are grouped together.

Figure 4.4: Stacked Area graph showing trend of employment by sector from wave 1 to wave 5.

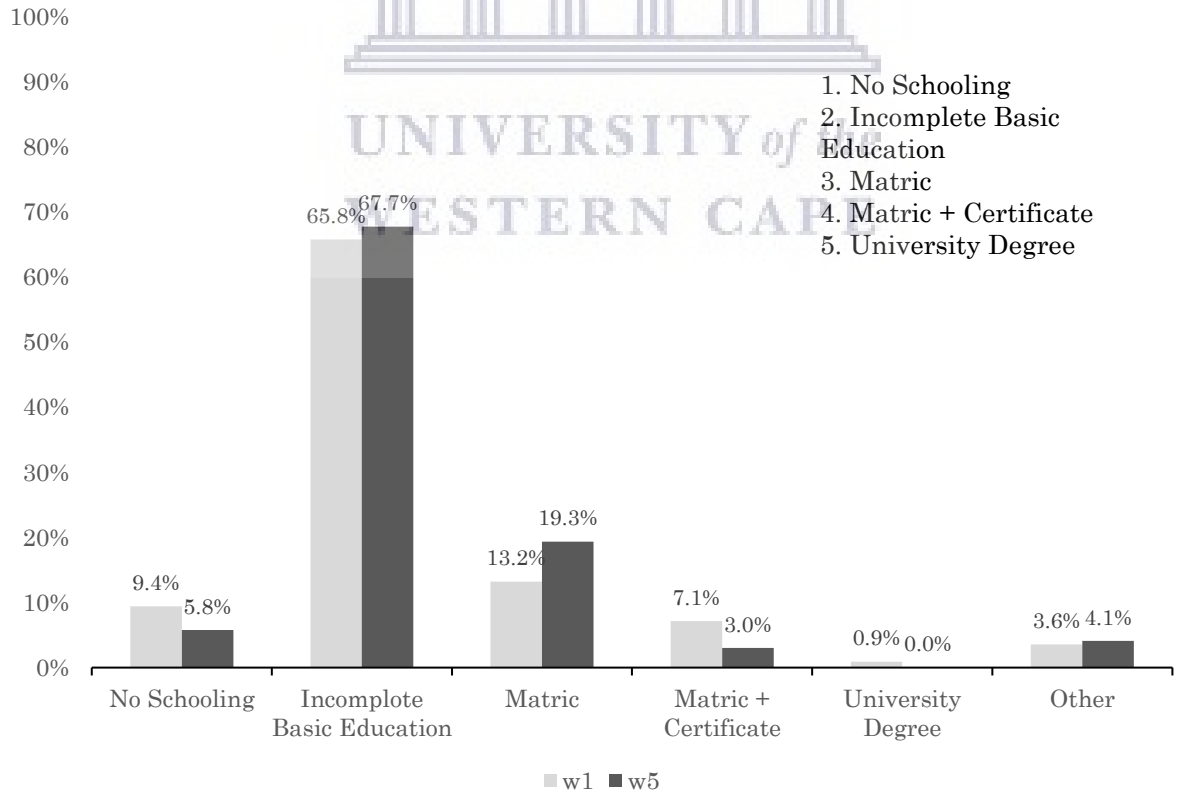


Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU.

The stacked area graph above displays the evolution of the formal sector and informal sector over time. The formal sector occupies the largest area of the area graph. This means that the formal sector has always been a dominant sector over the period of 10 years, from wave 1 to wave 5. The graph shows an obvious increasing trend of the formal sector throughout the waves. Wave 3 recorded the first peak of the formal sector size. However, the size increased even higher shortly after that peak to a higher percentage.

On the other hand, the relative size of informal sector has been on perpetual decline since wave 1. Moving from just over 20% in wave 1 to less than 15% in wave 5. The sector described as Other moves up and down from wave 1 to wave 5. However, it appears to pick up again in wave 5. This sector contributes a very minute percentage of the labour force. Yet, its importance cannot be emphasized enough. It could be deduced, based on the observation in the graph above, that the size of informal sector must be expected to decrease even further into the future. Similarly, the size of the formal sector must be expected to increase even further into the future.

Figure 4.5: Bar graph showing comparative differences of employment in each sector from wave 1 to wave 5, because of changes in education.



Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU.

Now that the study has found that different levels of education are a factor in the size of formal and informal sector employment size, as per figure 4.2 and figure 4.3, what would be more interesting is understanding how each specific education level affects the informal sector. The bubble chart above shows the percentage of informal sector employees with their level of education in wave 1 and in wave 5. Individuals with no schooling constituted 9% of the informal sector in wave 1, compared to 6% in wave 5. This finding is not unexpected. It makes more sense for individuals with no schooling to constitute a large portion of the informal sector. Nonetheless, over 68% of individuals in the informal sector have some level of education, but no matric. This percentage increased by 2% from 66% in wave 1.

As expected, individuals who hold matric and certificate or university degree make up a very small percentage of the informal sector. In fact, the number of those with matric and certificate in the informal sector has decreased by 4%, from 7% in wave 1 to only 3% in wave 5. Those with university degree hardly exist in the informal sector in both waves. This could be because they have better opportunities in the formal sector.

Table 4.3: Table showing Formal/Informal Sector Transitional Matrix

Formal/Informal Sector Status in Wave 2				
		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 1	Formal Sector	87,3	8,0	4,7
	Informal Sector	59,8	34,0	6,3
	Other	80,9	0,4	18,7
Formal/Informal Sector Status in Wave 3				
		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 2	Formal Sector	92,4	6,1	1,5
	Informal Sector	53,2	42,4	4,4
	Other	75,4	20,9	3,7
Formal/Informal Sector Status in Wave 4				
		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 3	Formal Sector	93,5	5,5	1,0
	Informal Sector	52,4	43,0	4,6
	Other	90,0	9,2	0,9
Formal/Informal Sector Status in Wave 5				
		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 4	Formal Sector	92,8	4,4	2,9
	Informal Sector	52,7	43,5	3,8
	Other	82,3	14,7	3,0

Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU

In table 4.2, the study discussed the transitional matrices within the labour market. Movements in the economy are not restricted to labour market status only. Table 4.3 outlines these movements in a matrix format. 87.3% of employees in the formal sector in wave 1 remained working in the formal sector in wave 2. While only 34% of those who were working in the informal sector remained in the informal sector in wave 2. Most of the informal sector employees moved to the formal sector. This could be due to better pay, better working conditions or job security. Some individuals work in the informal sector temporarily, while looking for employment in the formal sector. This was explained in the dualistic framework in chapter 1. The formal employment retention rate increased between wave 4 and wave 5. With 92.8% of formal employees staying in the formal sector. In the same way, the percentage of those who work in the informal sector increased too, with 43.5% remaining in the informal sector between wave 4 and 5. The percentage of individuals who move in and out of sectors is very small. For example, only 5.5% of formal employees moved to the informal sector between wave 3 and wave 5. This could mean that most employees like stability, if the sector that they work in provide employment security, they would rather stay.

Table 4.4: Table showing Industry that employs the most individuals in the formal and informal sector

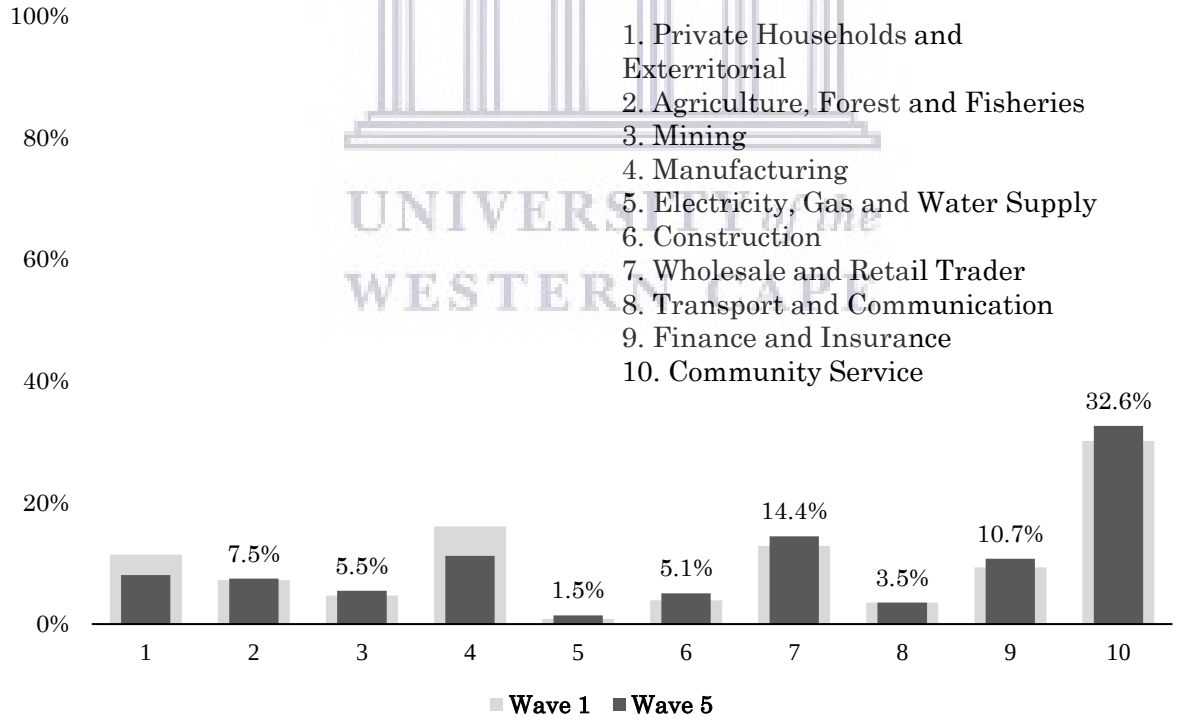
	Wave 1	**Wave 5**
	Percentage	**Percentage**
Private Households and Exterritorial	11.5%	8.1%
Agriculture, Hunting, Forestry	7.2%	7.5%
Mining and Quarrying	4.7%	5.5%
Manufacturing	16.1%	11.2%
Electricity, Gas and Water Supply	0.9%	1.5%
Construction	3.9%	5.1%
Wholesale and Retail Trader	12.8%	14.4%
Transport, Storage and Communication	3.5%	3.5%
Financial Intermediation, Insurance	9.3%	10.7%
Community, Social and Personal Service	30.1%	32.6%
Total	100.0%	100.0%

Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset,
Collected and compiled by SALDRU

The formal sector and the informal sector consist of various types of industries. The South African economy has had both contractions and expansions in economic growth. While some industries increase and employ more people, some industries shrink because players in those industries exit for different reasons.

In wave 1, the biggest employer was the community, social and personal service industry. This industry employed 30.1% individuals, followed by manufacturing, and wholesale and retail trader at 16.1% and 12.8% individuals, respectively. The manufacturing sector is an important sector because of its ability to employ many individuals with no skills or semi-skills. The manufacturing sector is discussed in detail later in this analysis in table 4.9 and table 4.10. The industry that employed the least number of individuals in wave 1 was electricity, gas and water supply followed by transport, storage and communications industry at 0.9% and 3.5% individuals, in that order. Community, social and personal service industry increased its share of employment to 32.6% individuals in wave 5. Meanwhile the manufacturing industry decreased to 11.2%. The community, social and personal industry is relatively easier to enter, as it requires very little skills. Whereas industries such as manufacturing are becoming less labour-intensive and more capital-intensive. This could explain the decrease in the share of employment for the manufacturing industry in South Africa.

Figure 4.6: Bar graphs showing industries that employ more individuals between wave 1 and wave 5.



Source: Own computation based on Wave 1 & 5:2008/16 NIDS dataset,
Collected and compiled by SALDRU.

Figure 4.6 represents the findings from table 4.4 in different format. This allows for gaining additional insights that otherwise would have been missed. Between wave 1 and wave 5, it is evident in the graph that most industries increased in size of employment. The industries that have decreased in employment size include private households and extra-territorial industry, manufacturing. Whilst all other industries have increased their share of employment.

Even though there has been an overall increase in the number of people employed in all industries combined, some individuals have lost jobs in industries that have shrunk. In the economic climate South Africa finds itself, it is difficult to find employment. Most employees join trade unions in order to protect themselves from possible retrenchment. The table below shows that between wave 1 and 5, over 30% of employees are members of trade union, whilst 60% are not members of any trade union. Most individuals who are members of trade unions tend to have menial jobs such as plant and machine operator or craft and trade workers. Whereas individuals in managerial positions are less likely to be members of any trade unions. This could be because low paying jobs have low security whilst high paying jobs such as managers or professionals have more job security because it may be difficult to replace them.

Table 4.5: Table showing Percentage of Trade Union Membership, by Profession

	Wave 1		**Wave 2**		**Wave 3**		**Wave 4**		**Wave 5**	
	Trade Union		**Trade Union**		**Trade Union**		**Trade Union**		**Trade Union**	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Armed Forces and Occupation	0,1%	0,3%	0,2%	0,1%	0,2%	0,3%	0,0%	0,2%	0,1%	0,0%
Managers	2,1%	3,2%	1,9%	2,9%	1,6%	3,5%	1,7%	2,7%	1,2%	3,0%
Professionals	7,9%	5,3%	5,4%	7,5%	6,8%	6,0%	5,6%	5,3%	6,9%	6,5%
Technicians	2,3%	3,0%	1,9%	2,7%	1,2%	4,1%	1,8%	3,0%	2,3%	4,0%
Clerical workers	2,7%	3,5%	2,1%	3,2%	2,5%	3,6%	3,5%	4,2%	2,1%	4,2%
Service and Sales Worker	5,5%	13,0%	5,4%	14,9%	5,7%	11,8%	5,9%	12,4%	5,6%	12,7%
Skilled Agriculture, Forestry and Fisheries	0,1%	0,9%	0,1%	0,6%	0,0%	0,3%	0,1%	0,2%	0,0%	0,3%
Craft and Trade Workers	4,6%	7,7%	3,5%	6,4%	3,3%	6,3%	3,4%	7,5%	2,6%	8,9%
Plant and Machine Operators	4,5%	4,3%	3,7%	5,9%	4,7%	5,5%	5,1%	6,2%	5,5%	5,0%
Elementary Occupation	6,7%	22,7%	7,0%	24,6%	7,6%	25,2%	5,3%	25,8%	4,6%	24,6%
Total	36,2%	63,8%	31,2%	68,8%	33,5%	66,5%	32,4%	67,6%	30,8%	69,2%

Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset,

Collected and compiled by SALDRU

Trade unions ensure that the rights of employees are respected. However, trade unions are normally reserved for employees in the formal sector. The informal sector lacks the capacity and resources to ensure that the rights of employees are protected all the time. Hence, informal employees are vulnerable to exploitation. Most formal employees sign contracts that outlines their rights, key performance indicators and the duration of the employment. Once the contract is signed, both parties who signed it must honour its obligations. Contracts can be written or verbal, either way, they are binding.

Table 4.6 shows the occupation types and the percentage of those that have a contract. In wave 1, the table shows that 62.7% of contracts in labour markets were written, while 37.3% were verbal contracts. In wave 5, the percentage of written contracts increased to 77.0% while the verbal contracts portion decreased to 23.0%. Verbal contracts are difficult to prove, and parties often have conflict on what they have agreed on in the past. Written contracts are better because whenever a conflict arises, both parties can always refer to the contract to ascertain facts. The decrease in the usage of verbal contracts could be because employees want the terms of employment to be written, so that is easy for them to refer to whenever any conflict arise, or when they are unsure about the deliverables they agreed on. The 23% of verbal contract possibly includes informal employees. Table 4.6 further indicate that through the waves, employment positions such as managers, professionals, technicians, service and sales workers tend to have written contracts while verbal contracts dominate in the lower hierarchy of employment, such as skilled agriculture, forestry and fisheries, craft and trade works, plant and machine operators and other elementary occupations. This lack of contracts in the informal sector may not be such a big problem if the individual is self-employed.

Self-employed individuals do not have to sign a contract with the business because they own the business, unless if the they own is a formal business. Formal businesses are described in this study as businesses that are registered for VAT or Income Tax. Self-employed individuals who work in industries such as private household, exterritorial, manufacturing, transport, storage and communication have been found to have registered for formalization. There is an increasing percentage in the number of self-employed businesses that are being registered for formalization. In wave 1, 89.3% of self-owned businesses were informal. However, in wave 5, this number has decreased to 60.8%. This finding is consistent with the findings made in figure 4.3, where the size of formal sector increased, while the size of informal sector decreased.

Table 4.6: Table showing percentage of individuals with employment contract

	Wave 1		**Wave 2**		**Wave 3**		**Wave 4**		**Wave 5**	
	Contract		**Contract**		**Contract**		**Contract**		**Contract**	
	Written	Verbal	Written	Verbal	Written	Verbal	Written	Verbal	Written	Verbal
Armed Forces and Occupation	0,4%	0,0%	0,2%	0,0%	0,1%	0,0%	0,2%	0,0%	0,1%	0,0%
Managers	5,4%	0,2%	4,2%	0,5%	0,3%	0,2%	4,2%	0,2%	3,9%	0,4%
Professionals	11,1%	1,9%	12,2%	0,9%	4,5%	0,6%	9,7%	1,2%	12,7%	0,9%
Technicians	3,7%	1,4%	4,0%	0,7%	11,9%	0,9%	4,4%	0,7%	4,7%	1,4%
Clerical workers	5,5%	1,1%	4,6%	0,7%	4,1%	1,2%	6,9%	0,8%	5,6%	0,6%
Service and Sales Worker	11,2%	7,1%	16,1%	4,4%	5,4%	0,4%	13,4%	5,2%	14,3%	4,1%
Skilled Agriculture, Forestry and Fisheries	0,4%	0,5%	0,3%	0,4%	13,3%	4,3%	0,2%	0,1%	0,1%	0,1%
Craft and Trade Workers	6,3%	5,9%	6,7%	3,4%	0,2%	0,0%	8,3%	2,4%	8,4%	2,9%
Plant and Machine Operators	5,9%	2,7%	7,3%	2,3%	7,0%	2,7%	9,2%	2,2%	8,4%	2,2%
Elementary Occupation	12,8%	16,5%	16,9%	14,4%	8,7%	1,5%	17,6%	13,0%	18,8%	10,5%
Total	62,7%	37,3%	72,5%	27,6%	19,4%	13,4%	74,1%	25,9%	77,0%	23,0%

Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset,

Collected and compiled by SALDRU

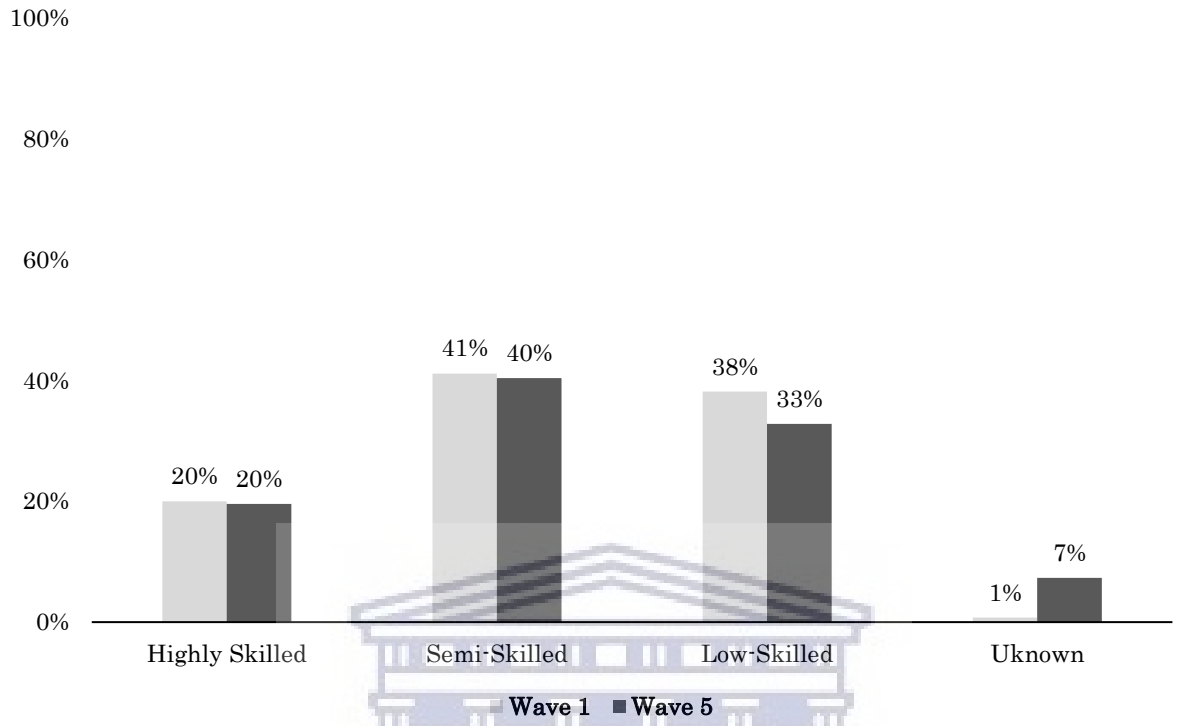
Table 4.7: Table showing Self-employed individuals with registered businesses

	Wave 1		Wave 5	
	Income Tax/VAT Registration		Income Tax/VAT Registration	
	Yes	No	Yes	No
Private Households and Exterritorial	4,9%	1,3%	n/a	n/a
Agriculture, Hunting, Forestry	0,0%	10,0%	n/a	n/a
Mining and Quarrying	n/a	n/a	0,0%	3,9%
Manufacturing	2,5%	10,5%	n/a	n/a
Electricity, Gas and Water Supply	n/a	n/a	0,0%	14,0%
Construction	0,0%	7,2%	1,9%	0,0%
Wholesale and Retail Trader	1,1%	13,0%	0,0%	7,8%
Transport, Storage and Communication	0,9%	4,7%	2,8%	0,0%
Financial Intermediation, Insurance	0,0%	27,1%	20,8%	17,8%
Community, Social and Personal Service	1,4%	15,5%	13,8%	17,4%
Total	10.7%	89,3%	39,2%	60,8%

Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset,

Collected and compiled by SALDRU

Figure 4.7: Bar graphs showing change in skills level in the labour market, between wave 1 and 5.



Source: Own computation based on Wave 1 & 5, 2008/16 NIDS dataset, Collected and compiled by SALDRU.

Figure 4.7 shows the level of skills in the labour market between 2008 and 2016. The percentage of highly skilled individuals has remained the same between wave 1 and wave 5. This could be because it takes time for individuals to develop such skills. Highly skilled individuals normally occupy executive positions in industry. For example, chairman, director, manager or technicians, as described in chapter 3, page 42. The percentage of semi-skilled and low-skilled individuals has also decreased between wave 1 and wave 5. Semi-skilled decreased by 1% from 41% in wave 1 to 40% in wave 5. Whereas the low-skilled individuals have decreased from 38% in wave 1 to 33% in wave 5.

Individuals with semi-skills and high-level skills behave differently compared to individuals with low level skills or no skills. Highly skilled individuals tend to stay working in one sector for a very long time, while low skilled individuals often move in between sectors due to low probabilities of long-term employment. High skilled workers have high job security. Table 4.8 focuses on understanding the churning between the formal sector and the informal sector, by skill level. The churning observed in this table is between wave 1 and wave 5.

Table 4.8: Table showing Formal/Informal Sector Transitional Matrix

	HIGHLY SKILLED				LOW SKILLED			
	Formal/Informal Sector Status in Wave 2				**Formal/Informal Sector Status in Wave 2**			
		Formal Sector	Informal Sector	Other		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 1	Formal Sector	91,5	1,9	6,6	Formal Sector	79,4	15,9	4,73
	Informal Sector	83,6	6,8	10,6	Informal Sector	33,7	57,9	8,42
	Other	100,0	0,0	0,0	Other	63,2	1,3	35,46
	Formal/Informal Sector Status in Wave 3				**Formal/Informal Sector Status in Wave 3**			
		Formal Sector	Informal Sector	Other		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 2	Formal Sector	97,9	0,9	1,3	Formal Sector	85,1	14,0	0,9
	Informal Sector	90,3	9,7	0,0	Informal Sector	51,9	46,3	1,8
	Other	85,9	9,2	4,9	Other	60,2	39,8	0,0
	Formal/Informal Sector Status in Wave 4				**Formal/Informal Sector Status in Wave 4**			
		Formal Sector	Informal Sector	Other		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 3	Formal Sector	98,7	0,5	0,8	Formal Sector	89,0	9,9	1,1
	Informal Sector	100,0	0,0	0,0	Informal Sector	41,9	47,7	10,4
	Other	100,0	0,0	0,0	Other	72,4	27,6	100,0
	Formal/Informal Sector Status in Wave 5				**Formal/Informal Sector Status in Wave 5**			
		Formal Sector	Informal Sector	Other		Formal Sector	Informal Sector	Other
Formal/Informal Sector Status in Wave 4	Formal Sector	94,5	1,5	4,0	Formal Sector	82,4	14,4	3,2
	Informal Sector	86,5	43,5	0,0	Informal Sector	34,8	60,9	4,34
	Other	100,0	0,0	0,0	Other	67,7	32,3	0

Source: Own computation based on Wave 1,2,3,4 & 5, 2008/10/12/14/16 NIDS dataset,

Collected and compiled by SALDRU

91.5% of high skilled individuals who worked in the formal sector in wave 1, remained in the formal sector. Whilst only 1.9% transitioned to work in the informal sector in wave 2. Similarly, the percentage of high skilled informal sector employees who did not change sector of employment is very low at 6.8%. This pattern of sector employment does not compare consistently with the low skilled employees. 79.4% of low skilled formal employees remained in the formal sector in wave 2, however, the percentage of those who transitioned to the informal sector is high compared to high skilled employees. 15.9% of low skilled formal sector employees moved to work in the informal sector in wave 2.

The percentage of high skilled individuals who worked in the formal sector in wave 2 and remained there in wave 3 is very high at 97.9%. High skilled employees who work in the informal sector have a 90.3% transition rate. Only 9.7% of high skilled employees who worked in the informal sector remained in the informal sector. This observation carries even through transitions between wave 3 and wave 4. Here, the study found that 100% of high skilled employees in the informal sector in wave 3 found employment in the formal sector in wave 4. This finding makes sense since there is high demand in the formal sector for highly skilled individuals. Their skills could be put to better use than in the informal sector. Furthermore, the informal sector is predominantly characterized by individuals with low skills or no skills. And it is attractive to them because of low levels of technical know-how. Highly skilled individuals who work in the informal sector could be self-employed individuals who just setup shop with the objective to eventually register their business in short period of time. This could explain the results of table 4.8.

Alternatively, low skilled individuals in the informal sector tend to stay in the informal sector from wave to wave. For example, 57.9% of low skilled employees in the informal sector remained working in the informal sector. Whilst 33.7% managed to find employment in the formal sector in wave 2. This percentages are higher in the transition between wave 4 and wave 5. 60.9% of low skilled informal sector employees remained in the formal sector in wave 5, whilst 34.8% of them moved to work in the formal sector. This is 3% and 2% increases for informal sector retention rate and formal sector transition rate, respectively. Low skilled individuals who are able to transition to the formal sector often move into job that pay very little and with low asset specificity. This why the transition probabilities are very low compared to the high skilled workers who can work in any sector of choice, although almost 100% of the time in the formal sector if they have the option.

Table 4.9: Table showing percentage of types of products produced by firms

Type of products produced	Percentage
Books, stationery, printing & publishing	10,3%
Clothing	5,2%
Foam products	6,9%
Footwear	13,8%
Furniture, home & office	10,3%
Metal castings	5,2%
Paper & paper products	5,2%
Plastic products	12,1%
Sweets & confectionery	10,3%
Vehicle components, accessories and	5,2%
Textile products	15,5%
Total	100,0%

Source: Own computation based on eThekwini LMM Firm Survey :2013/14,
Collected and compiled by UKZN

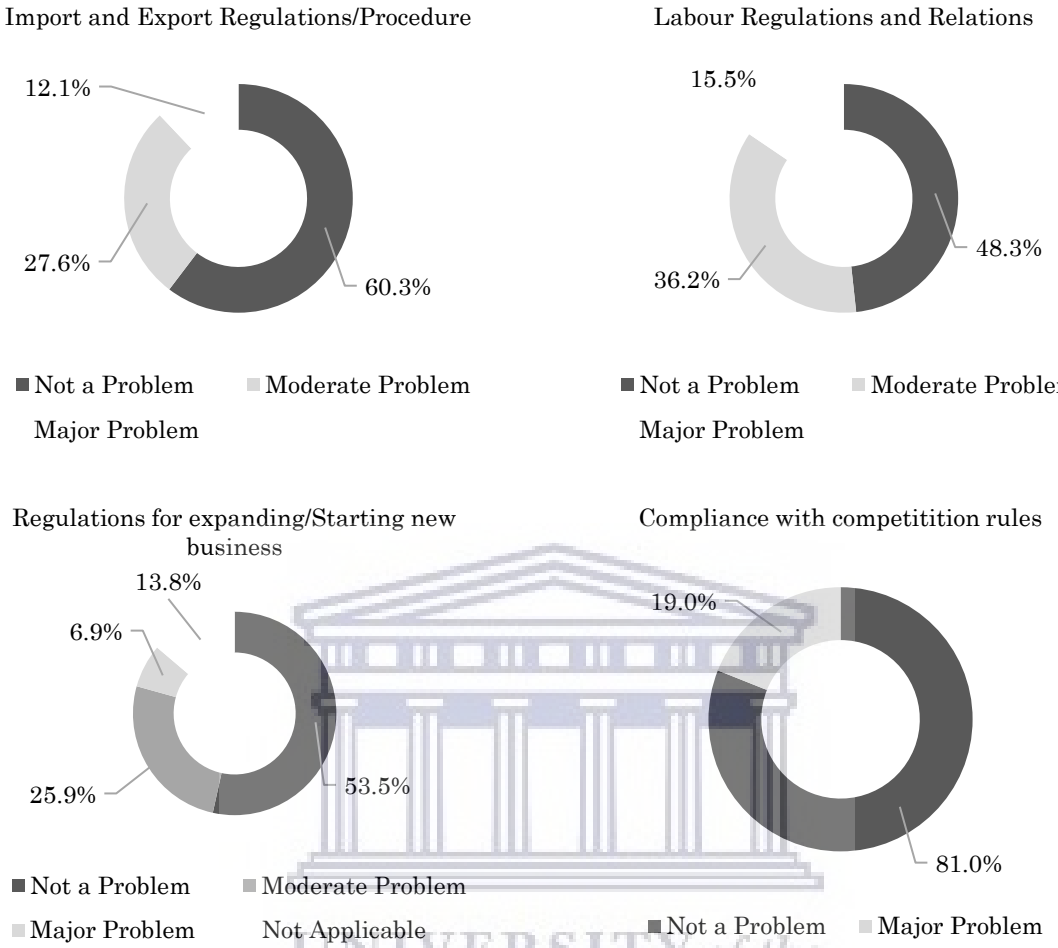
The manufacturing industry is a unique industry in the sense that it requires both high skilled, and semi-technical individuals to produce products. Table 4.9 shows the most popular products produced in the manufacturing industry in eThekwini municipality. Textile products are the most produced goods in the manufacturing sector at 15.5%, this could be because it is easier to produce, and there is high supply of low skilled individuals who can perform the job. This is followed by footwear and books, stationary, printing and publishing, which comprise 13.8% and 10.3% of all produced goods. This finding is not surprising since these products are in the top three sectors within the manufacturing industry. Table 4.10 shows that clothing and textiles, paper and furniture sector make up 18.8% each, of total sectors in the manufacturing industry. Iron and steel sector is the smallest sector within the manufacturing industry at 4.7%. This could be because of high levels of procedural difficulty to produce these goods.

Table 4.10: Table showing production sectors in large and medium manufacturing industry

Sector	Percentage
1. Food processing and beverages	18,8%
2. Clothing & Textiles	18,8%
3. Paper and furniture	18,8%
4. Chemical products	6,3%
5. Iron and steel	4,7%
6. Vehicles and automotive components	9,4%
7. Leather and footwear	12,5%
8. Non-metallic mineral & other products	10,9%
Total	100,0%

Source: Own computation based on eThekwini LMM Firm Survey :2013/14,
Collected and compiled by UKZN

Figure 4.8: Doughnut graphs showing procedural challenges faced by firms

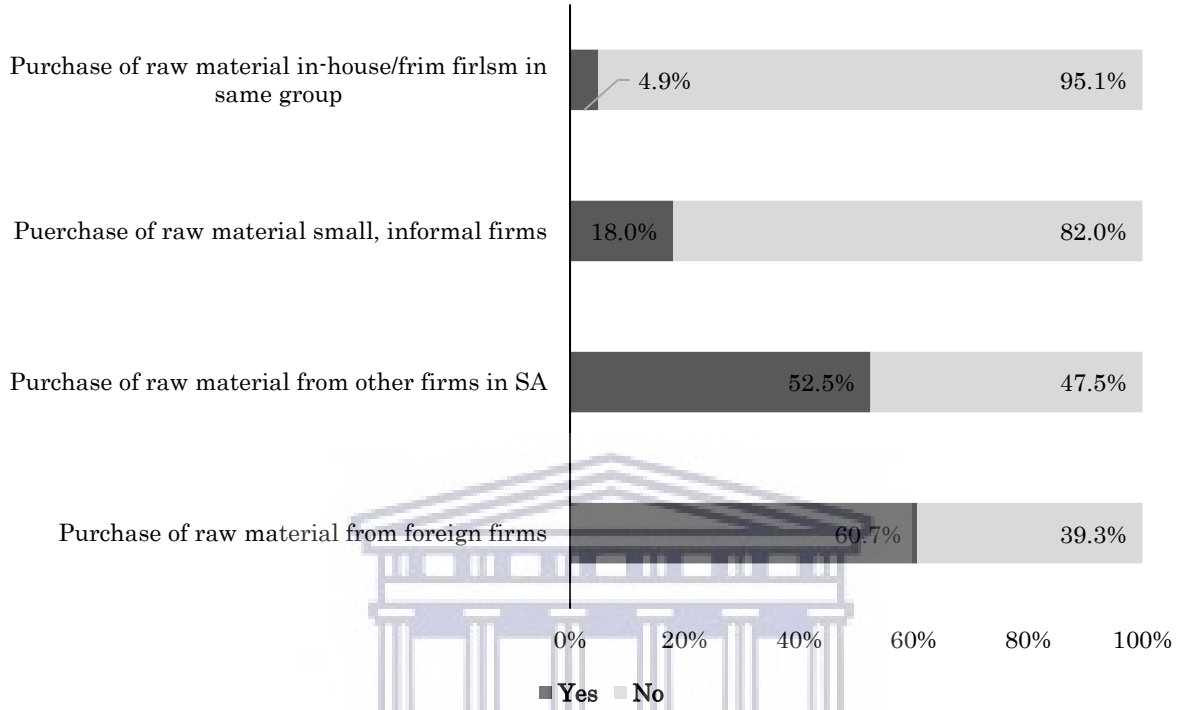


Source: Own computation based on eThekwini LMM Firm Survey :2013/14, Collected and compiled by UKZN

The study found that some firms in the manufacturing industry are constrained by government red tape and strict regulatory laws, making it difficult to conduct business. Firms are largely able to operate but a significant portion of them find it difficult to operate. 27.6% of manufacturing firms find that import and export laws limit them in conducting their business. This could mean that they are unable to import raw materials they need or export the quantity they want to. Over 50% of firms report that labour regulations and regulation laws are limiting. Meaning that they would prefer to hire or fire labour as they please, or even pay lower rates. This could result in higher operational costs, possibly even forcing some firms to close down. 6.9% of them are already reporting that regulations affect their plans to expand or even start new businesses. The government must consider revising some of these laws because they pose

a threat to job creation and the economy of the country. In other cases, this could lead to asset flight and even discourage direct foreign investment.

Figure 4.9: Stacked bar graph showing where formal sector inputs are insourced.

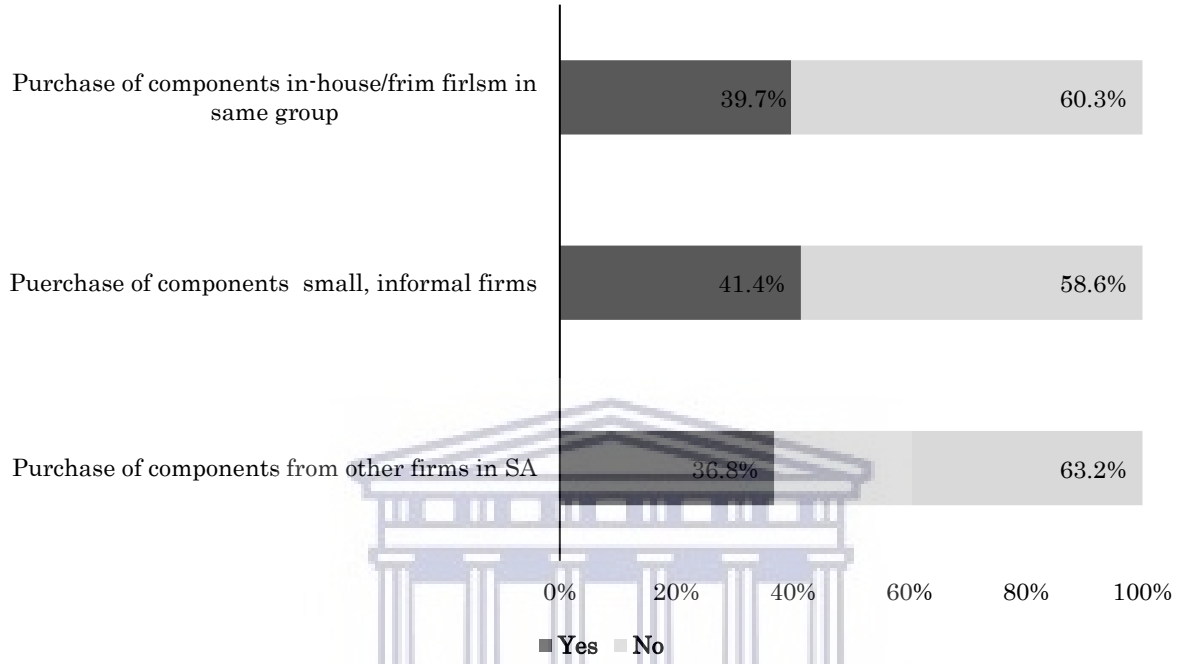


Source: Own computation based on eThekwini LMM Firm Survey :2013/14, Collected and compiled by UKZN

Manufacturing firms in the formal sector insource raw materials to use in the production of the goods discussed in table 4.9. The percentages in figure 4.9 are not mutually exclusive. Most raw materials are imported from firms outside South Africa. 60.7% of raw materials are purchased from foreign firms. This could mean that local firms do not provide such inputs or they are too expensive. The most interesting fact found in this study is that some 18% of certain raw materials are purchased from informal sector. This is evidence of a relationship between the formal sector and the informal sector. This type of linkage between the formal sector and the informal sector is called forward linkage. This could mean that the informal sector plays a critical role in the economy of South Africa. The formal sector may be purchasing raw materials in the informal sector for several reasons, i.e., it could be that the informal sector offers a highly competitive price for the raw material, or the raw materials are not easily available in the formal sector. The formal sector and the informal sector could be linked sectors that depend on each other for survival. The above finding is consistent with the study of Devey *et.al.* (2006) which

was discussed in the literature review, which also found the prevalence of forward linkage between the formal sector and the informal sector in the textile and clothing industry in Durban factories.

Figure 4.10: Stacked bar graph showing where formal sector components are insourced.



Source: Own computation based on eThekwini LMM Firm Survey :2013/14, Collected and compiled by UKZN

More evidence of formal-informal sector linkage is demonstrated in insourcing of components used in the production of goods in the manufacturing industry. Raw materials and components are different in the sense that raw materials are inputs in their basic form, whilst components are semi-processed intermediate inputs that are used in the completion of another product. Again, percentages in figure 4.10 are not mutually exclusive. The study finds that 41.4% of components used in the production line are purchased in the informal sector.

The input-output relationship between firms in the industry is crucial. This could speak to the significance of the informal sector in the context of unbalanced growth strategy for developing countries such as South Africa. Manufacturing firms in other regions, particularly in China, have bigger economies of scale and comparative advantage compared to those in South Africa. Formal firms may be purchasing some of their components in the informal sector because it would allow competitive edge on the final goods they place in the market. The world today is a global village, South African firms have to compete with local firms and international firms.

This emphasizes the fact that the South African government must put laws to protect the manufacturing industry from international competition because it creates job.

4.3 Advanced Statistical Analysis

In this section, the study presents the findings of the statistical models used to investigate informality. The study employed probit models to investigate the likelihood of employability in the informal sector or formal sector, as well as formal-informal transitions and churning. Fixed effects models are used to investigate the probability changes in income.

4.3.1. Probit Models

Table 4.11: Probit estimates of labour market transitions from wave 1 to wave 5

	Probit 1	**Probit 2**	**Probit 3**
	dF/dx	dF/dx	dF/dx
Age			
Age	0.007***	-0.002	0.032*
age2	-0.000***	0.000	-0.000**
Gender			
Female	-0.014***	0.000	0.004
Race			
African Black	-0.096***	0.303***	
Coloured	-0.490**	0.888***	0.218***
White	-0.869***		
Education Level			
Education years	0.000	-0.012***	0.001
Education years-squared	0.000	0.000**	0.001
Trade Union			
Union Member		-0.095***	0.265***
Skill Level			
Highly skilled	0.019***	-0.065***	0.339***
Observations	2,246	1,809	535
Observed Probability	.9746215	.1017137	.6130841
Predicted Probability (at x-bar)	.9870678	.0384981	.6644345
Likelihood Ratio Chi-squared	67.25	303.37	99.66
Probability> Chi-squared	0.0000	0.0000	0.0000
Pseudo R-squared	0.1266	0.2550	0.1396

Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset,
Collected and compiled by SALDRU
Significance levels: *** p<0.01, ** p<0.05, * p<0.1
The above is the average marginal effect based on panel binary probit regression

Table 4.11 presents the findings of the three probit models. Probit 1 investigates the probability of finding employment in the formal sector, if not employed in the previous period. Probit 2 investigates the probability of finding a job in the informal sector if one was employed in the formal sector in the previous period. Probit 3 investigates the probability of finding a job in the formal sector if one was employed in the informal sector in the previous period. No probit outputs are weighted. The results in table 4.11 are marginal effects, not coefficients of a probit model. Marginal effects measure how the dependent variable changes if the explanatory variable changes by an infinitesimal amount (Williams, 2021, p. 1). For binary variables such as race or gender, the marginal effects measure discrete changes (Williams, 2021, p. 1). Marginal effects for continuous variables measure instantaneous rate of change (Williams, 2021, p. 1).

All three models have variables that are significant at p-value of 0.01. The lower the p-value, the greater the statistical significance of the observed variable in the model. P-values are used to measure how significant variables are as determinants of an outcome in a model. In probit 1, age, gender, race, and skill have a p-value of 0.01. In probit 2, race, education level, trade union, and skill are highly significant at a p-value of 0.01. Lastly, in probit 3, race, trade union and skill level are significant at the same p-value of 0.01. The three probit models have a Likelihood Ratio Chi-squared of 67.25 for probit 1, 303.37 for probit 2 and 99.66 for probit 3. All these Likelihood Ratio Chi-squared values are greater than the Probability > Chi-squared of 0.000, as seen in the table. This means that the full model itself is significant compared to the null model and can conclude that at least one of the regression variables in the model is not equal to zero.

Probit 1 has a R-squared of 12.06%. This value represents the goodness-of-fit measure in the model. This means that 12.06% of variance in the dependent variable (employability) is explained by the independent variables in the model. Probit 2 has the highest pseudo r-squared of the 3 models, at 25.50%. probit 3 pseudo r-squared is 13.96%, which makes it the second highest. This means that 25.50% variance in the dependant variable of probit 2 is because of the explanatory variables in model 2. Similarly, 13.96% variance in the dependant variable of probit 3. Even though probit 1 has the lowest R-square value out of the 3 models, important conclusions can still be drawn about the relationships between the variables. High R-squared is not always good, because it means that the model suffers from the phenomena of overfitting. The overfitted model is too tailored to specific dependent variables and cannot be used to make general conclusions. Some degree of standard error in a model is important for generalization

because the model is based on a sample. Inferences could be made about the actual population whence the sample came.

In probit 1, age and age-squared are statistically significant determinants of employability in the informal sector. For additional year of age increase, individuals are 0.7% more likely to find employability in the formal sector if they were not employed in the previous period. As evident in table 4.11, age has a positive effect on probability of finding employment in the formal sector. However, age squared has a negative effect. This means that as people get older, the effect of age on the probability of finding employment begins to have a negative impact, as seen in the age-squared variable. In fact, this effect is not unexpected. It is easier for formal sector companies to invest capital on young people because they would spend years working for the organisation. Whereas on the other hand, even though older people have experience, they are not attractive to formal sector organisation because the formal sector will get limited return from them. Age age-squared variables in probit 3 is similar to probit 1. Age has a positive effect on finding employment in the formal sector if one was working in the formal sector, meanwhile, age-squared has a negative effect. However, the same cannot be said about age and age-squared variables in probit 2. The table shows that age has a negative effect on finding a job in the informal sector if one was employed in the formal sector. The Age-squared variable shows a positive effect on the probability of finding employment in the informal sector if one was employed in the formal sector in the previous period. This finding is also not surprising. The informal sector tends to be dominated by older people compared to young people.

While gender and province are significant determinants of employability in the informal sector or the formal sector, this study is less focused on these two variables and more on other variables such as age, race, education level, trade union and skill. There is no section in the literature review that deals with gender as a factor in informality. In the probit model, however, gender is featured as a determinant variable. Probit 1 indicates that women are 1.4% less likely to find employment in the formal sector compared to men if they were not employed in the previous period. On the other hand, probit 3 shows that women are 0.4% more likely to find employment in the formal sector compared to men if they were employed in the informal sector in the previous period. Geographical type in the case of South Africa is important. It would have been interesting to have included it in the model, however, the outcome and impact of this variable on informality has been studied extensively. South Africa has rural and urban provinces. Urban provinces tend to be more dense than rural provinces. Examples of urban provinces include Gauteng and the Western Cape. Meanwhile examples of rural provinces

include Limpopo and the Eastern Cape. Urban provinces are dense and therefore have lot of informal activity compared to rural provinces. Furthermore, the type of informal activity that takes place in urban settings is different compared to the one in rural provinces. Rural provinces informal activity is more agricultural related.

Population groups is a far more interesting variable to investigate as part of the informality models. It is over 27 years since democracy in South Africa and it is interesting to learn how race as a factor of employability in the formal sector or informal sector has evolved. In the three models above, there are three population groups included in the model as dummy variables, namely: African black, Coloured and White. It is worth noting that this does not mean that Indian/Asian is the base variable from which the other three race groups are compared to. Part of the reason is that the Indian/Asian group constituted a very small population in the sample size. As such, the impact of Indian/Asian is negligible. For each race group, the base is all other races combined. For example, in probit 2, African black individuals are 30.3% more likely to find employment in the informal sector, compared to those who are not African black, if they were employed in the formal sector in the previous period. Similarly, Coloured individuals are 88.8% more likely to find employment in the informal sector compared to those who are not Coloured, if they were employed in the informal sector in the previous period. One interesting finding of the study is that all three population groups have negative effect on the probability of finding employment in the formal sector if they were not employed in the previous sector. The degrees of these negative effect vary drastically: 9.6% for African black and 86.9% for White. The Affirmative action policies enacted by the South African government may have contributed to this finding.

Education level of an individual appears to have a positive effect in the probability of finding employment in the formal sector if one was not employed in the previous period. Probit indicates that one additional increase in education is associated with 0.0% more likelihood of finding employment in the formal sector if one was not employed in the previous sector. It should be noted that 0.0% is so due to rounding, there are more values after the decimal point which are not visible in the table. Probit 1 and probit 3 show that more education does not have negative effect in employability of an individual. Probit 2, however, indicates that for each additional year in education, individuals are 1.2% less likely to find employment in the informal sector, if they were employed in the formal sector in the previous period. This finding is consistent with the findings made earlier in the figure 4.2 and figure 4.3. Figure 4.2 found that over the years, the number of people getting more education has increased. Figure 4.3

found that in the same period, the size of the informal sector has shrunk. This is not evidence of cause and effect, but certainly, there is correlation between the two. The above finding is also consistent with the findings of Devey *et al*. (2003, p. 156), discussed in section 2.4.3 in the literature review. Devey *et al*. (2003, p. 156) had found that the higher the education level, the lower the probability of working in the informal sector. In similar fashion with the age-squared variable, probit 2 shows that more education eventually has an opposite impact on finding employment in the informal sector if one was working in the formal sector in the previous period. This is captured by the education years squared variable, although it is by a very minuscule positive value.

Trade unions are known to fight for the rights of their members. However, sometimes this could have unintended consequences. As explained in section 2.3.4 in chapter 2, unions sometimes cost its members jobs. Probit 2 shows that individuals who are members of unions are 9.5% less likely to find employment in the informal sector compared to those who are not part of any union if they were employed in the formal sector in the previous period. On the other hand, individuals who are members of a union are 2.7% more likely to find employment in the formal sector compared to those without union membership if they were employed in the informal sector in the previous period.

Skill level as defined in this study is concerned with occupation of an individual. High skilled individuals tend to occupy high earning and more secured jobs, meanwhile low skilled individuals occupation tends to be low paying and susceptible to economic conditions. Probit model 1 show that highly skilled individuals are 1.9% more likely to find employment in the formal sector compared to individuals who are low skilled if they were not employed in the previous period. What is even more interesting is employability of high skilled individuals in the formal sector, if they were employed in the informal sector in the previous period. The study finds that individuals with high skills are 33.9% more likely to find employment in the formal sector compared to those who are low skilled. This finding is not surprising since high skilled individuals are more sort after compared to low skilled individuals. Now that section 4.4 has determined how age, race, education, and trade union affects employability in the formal sector and the informal sector, the study presents findings on how the same factors affect income. Table 4.12 answers precisely this question.

4.3.2. Fixed Effects Models

Table 4.12: Fixed effects model showing the variables that affect wages

	Fixed Effects Model 1	**Fixed Effects Model 2**
	Dependent Variable (Prim/Sec Income)	Dependent Variable (Self-employed Income)
Age		
Age	0.160***	0.117**
age-squared	-0.001***	-0.000
Sector Race		
Sector Race (informal*African black)	-0.002	-0.394
Education Level		
Education years	-0.007	-0.219
Education year-squared	0.002*	0.009
Hours		
Hours worked	0.005***	0.003*
Informality		
informal	0.151***	0.281
Trade Union		
Union Member	0.111***	-0.791
Constant		
constant	2.157***	3.488**
Observations	9,514	1,497
Probability> F	0.0000	
Rho	0.8727	0.8102
R-Squared (within)	0.3201	0.118
R-Squared (between)	0.0001	0.0028
R-Squared (overall)	0.0280	0.0000

Source: Own computation based on Wave 1,2,3,4 & 5:2008/10/12/14/16 NIDS dataset, Collected and compiled by SALDRU Significance. levels: *** p<0.01, **

Income earned by individuals who work in primary and secondary occupations is different from income earned by those who are self-employed. Therefore, table 4.12 presents the findings of how age, education, hours worked, informality and trade union affect income. In fixed effect model 1, age is an important determinant of income at 1% standard deviation. 1-year increase in age results in a 16.0% increase in income. In other words, the greater the age, the more income one will earn. However, the polynomial nature of the model shows that eventually, age will have significantly less impact on income. Age squared indicates that the

rate of impact of age on income will decrease by 0.1% as age increases. Fixed effect model 2 demonstrates the same patterns as in model 1, except that 1 year increase in age lead to 11.7% increase in income of a self-employed individual.

The sector*race variable allows for an opportunity to evaluate the impact of race and sector on income. The results show that African black individuals who work in the informal sector are associated with a 0.2% decrease in income for those working in primary and secondary occupation, and a 21.9% decrease for those who are self-employed. This finding demonstrates the level of vulnerability of being an African black in the self-employed division. This vulnerability could be due to lack of financial support to sustain business during difficult times, and the high probability of exiting when a business is not making profit. Furthermore, in townships, spaza-shops are notoriously popular for operating in the same small room for decades without the owner expanding the business. As a result, income or profits earned from spaza shops are crippled and stagnant.

Interestingly enough, the number of hours worked per month has little impact on how much one earns. In model 1, if hours worked increase by 1 unit, income increase by 0.5% and 0.3% in model 2. This finding is disappointing; however, it may make sense since hours worked per month are often fixed at 40 hours per week and hourly rates are low. But very few people work over-time. Working in the informal sector increases income by 15.1% for model 1. The informal sector does not impact income for the self-employed, it is of no significance because these individuals determine their own income in the first place. Similarly, being a trade union member has no effect on income for the self -employed, although the relation is negative. This apparent negative relationship between trade union and self-employed income makes sense because one would have to pay union fees, thus, taking away from the potential income.

4.4 Conclusion

Chapter 4 is devoted to presenting and discussing the findings of the study. The findings were presented in two sections: section 4.2 and section 4.3. Section 4.2 focused on the trends in the formal and informal sector over the years, as well as the linkages between the two sectors. Section 4.3 dealt with how factors such as age, race, education, and skill affect employability in the formal and informal sector, as well as income. The study made use of the NIDS data and the ELMMFS data to conduct the research. Chapter 5 presents a summary of the all the findings made in this study and make recommendations, where possible.

CHAPTER 5: CONCLUSION

5.1 Introduction

The objectives of this research were to analyse the formal sector and the informal sector in South Africa and evaluate the role South Africans play in these two sectors. Furthermore, the study aimed to investigate the linkages between the formal sector and the informal sector. The informal sector has the potential to create job opportunities and stimulate economic growth. The study was also conducted to investigate how certain factors such as age and education affect the size of the informal sector.

Chapter 5 presents a summary of findings made through methods discussed in chapter 3. Section 5.2 provides a summary of what is the informal sector and the frameworks that describe it. Section 5.3 summarises the findings and provides recommendations. Finally, section 5.4 closes the chapter with a discussion of limitations in the study and possible further research required in the field.

5.2 Summary of concepts and theory

The formal sector is a sector that comprises registered enterprises that comply with all government regulations. For example, companies operating in the formal sector need to follow the operational guidelines as presented in legislation such as labour regulations and labour relations law and income tax laws. The informal sector has been in existence for over 40 years, however, there is still no universal definition of this sector. Different countries use different definitions, depending on their economic profile. However, all definitions of the informal sector differ slightly from the standard definition proposed by the ILO in 1993 and in 2002. The informal sector consists of all business operations that occur outside the boundaries of the government regulations. They do not have to comply with tax laws or labour regulations. The informal sector is characterized by low entry barriers, small-scale economic activities, and it is labour-intensive.

This research used the guidelines of the ILO and StatsSA to create a definition of the informal sector. The first definition is the enterprise-approach definition, which takes into account all firms that are not registered for income tax or VAT. The second definition used is the labour-approach definition which defines the informal sector as consisting of all employees who do not have employee contracts and who do not receive worker benefits such as paid leave and

pension funds. Workers such as seasonal workers, domestic workers and casual workers are not part of the informal sector, they are classified as Other.

There exists a relationship between the formal sector and the informal sector through what is called linkages. Some of these linkages include forward linkages, backward linkages, and churning. Forward linkages exist when there is flow of raw material, inputs, information, or any resources from the informal sector to the formal sector. The relationship could be in the form of trade. Backward linkage involves the flow of resources from the formal sector to the informal sector. Churning is defined as the tendency of workers to move in and out of a sector.

There are several theoretical frameworks that justify the informal sector as an independent sector separate from the formal sector. The informal sector is separate but structurally linked to the formal economy and is capable of capital accumulation and job creation. Theoretical frameworks that describe the informal sector include the dualistic labour market theory which describes the informal sector as less capital-intensive and agrarian in nature. On the other hand, the alternative theory emphasizes the need for the informal sector because of its low entry level costs, thus allowing individuals who want to start their own business and create jobs to thrive. The structural articulation theory describes the informal sector as inherently linked to the formal sector. The informal sector allows the formal sector to exist as it is and to be highly competitive because it can source raw inputs from the informal sector at a much lower rate. All the above theories advance the ideals of informal sector, it is because of these that the informal sector is a permanent feature of the economy.

5.3 Findings

The study investigated the size of the informal sector in South Africa and how it has changed over the years. Furthermore, the aim of this research was to study the individual profiles of informal sector participants. In addition, evaluate how the change in individual characteristics affect the size of the informal sector.

The study found that the population size of South Africa increased by over 7 million between 2008 and 2016 to 44.8 million people. Young people between the ages of 15-34 years make up the largest portion at over 60%. Furthermore, the study found evidence of relocation from the rural areas to urban areas. The urban area population increased from 66.0% in wave 1 to 70.4% in wave 5, meanwhile the rural area population size decreased from 27.6% to 25.2% in the

same period. This could be because people are moving to more industrialized provinces in search of job opportunities. This finding is consistent with the dualistic labour market theory.

Between wave 1 and wave 5, the research also found a surge in education levels in South Africa. For example, individuals who have matric and certificate as a highest education level has increased from 9.2% in wave 1 to 15.6%, while those who have university degrees increased from 2.5% to 3.6%. The more education individuals have, the higher the chances of their getting employment in the formal sector. This could be the reason why the size of the informal sector shrunk from 20.5% in wave 1 to 14.9% in wave 5 whilst the formal sector size increased by almost 10% in the same period. Individuals could be getting better job opportunities in the informal sector because they are more skilled. Individuals with less than matric make up the largest chunk of the informal sector, with over 68% of them in the sector whilst highly skilled individuals with higher education qualifications are in negligible proportions. The education trends and transitional matrix's evidence of churning toward the formal sector extends to the growth of industries. The study found that labour-intensive industries such as the manufacturing sector has decreased in employment size from 16.1% (0.9 million) in wave 1 to 11.2% (0.8 million) in wave 5. Although the size of the informal sector has decreased between wave 1 and wave 5,

The government must anticipate and prepare for more rural-urban migration trends into major cities. Municipalities should free up land in strategic areas of the city such as in public transport stations or entertainment venues and issue licences to street traders and vendors. This would allow for more entrepreneurial activities to take place, and thus creation of jobs for those who are unskilled and less educated.

Trade unions and government regulations and laws can sometimes hinder the growth of industry. Red tape is often highly restrictive, interfering with the operations of businesses. Over 27.6% of firms in the manufacturing industry find import and export regulations restrictive in their business. Similarly, 36.2% them find labour regulations cumbersome in business operations. This could be why most people who work in the manufacturing sector have union membership. Trade unions exist to protect the rights of employees in the workplace. The study found that most individuals who occupy low-ranking positions constitute the largest portion with union representation at 69.2% in wave 5. Even though this evidence was based on eThekwini municipality, the finding is still very much important.

The study investigated the relationship between the informal sector and formal sector in South Africa. If linkages exist between the formal sector and the informal sector, what kind of linkages and to what extent. The study found evidence of forward linkage relationships between the formal sector and the informal sector. In the manufacturing industry, 18% of raw inputs are purchased from the informal sector, while 41.4% of components are purchased from the informal sector. This finding corroborates the importance of the sector. This trade relationship ensures that the formal sector is competitive in the market because they get some inputs at affordable prices from the informal sector.

To investigate how certain characteristics affect employability in the formal sector and the informal sector. Furthermore, the study investigated how some of the individual characteristics affected income in the formal sector and informal economy. Age, race, education level, skill and trade union are highly significant determinants in finding employment. For example, an African black individual is 30.3% more likely to find employment in the informal sector compared to those who are not members of the population group, if they were employed in the formal sector. Income is highly influenced by education and skill level. The number of hours worked has very little impact on the income. A one-hour increase in hours worked increases income by 0.5%. This could be attributed to low hourly rates.

5.4 Conclusion

The informal sector is still in its infancy stage and government must ensure its protection because it has the potential to create jobs and grow the economy. The study investigated the linkages between the formal sector and the informal sector. The relationship bet ween these sectors exists in the form of forward linkages. However, due to limiting data, backward linkages could not be investigated. Furthermore, there is a lack of quality data that focusses on large and medium enterprises in all industries, not just the manufacturing industry. Nationwide surveys must be commissioned to collect data at firm level.

CHAPTER 6: REFERENCES

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