Labour markets and agglomeration: The urban rat race in South Africa

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ABSTRACT

This study focuses on testing for the existence of an urban rat race within urban South Africa by investigating the relationship between agglomeration and hours worked in the South African labour market. This dissertation follows the work of Rosenthal and Strange (2002), who find evidence that industrious professionals are drawn to agglomerated areas and that agglomeration increases the amount of hours worked, thus supporting Akerlof's (1976) theory of the urban rat race. Using cross-sectional data from the September 2007 Quarterly Labour Force Survey, Ordinary Least Squares (OLS) regressions were run using the log of hours worked as dependent variable and different worker attributes, dummy variables and agglomeration variables as explanatory variables in order to establish a relationship between agglomeration and hours worked in the urban areas of South Africa. Findings from the empirical analysis yield atypical results concerning the relationship between worker characteristics, agglomeration and hours worked in South Africa. Overall, results indicate that a work-spreading effect occurs amongst professional workers, whilst non-professional workers appear to work the longest hours in South Africa.

OPSOMMING

Hierdie studie bestudeer die verhouding tussen agglomerasie en werksomstandighede, en meer spesifiek die hoeveelheid ure gewerk in die Suid-Afrikaanse arbeidsmark. 'n Regressiemodel word geïmplementeer met behulp van kruissnitdata. Die verwantskap tussen ure gewerk en agglomerasie in stedelike areas in Suid-Afrika word bepaal deur 'n regressie te skat met ure gewerk as afhanklike veranderlike en sekere werkerseienskappe, agglomerasie veranderlikes en fopveranderlikes as onafhanklike veranderlikes. Resultate van die empiriese analise produseer teenstrydige bevindinge met betrekking tot die verwantskap tussen werkerseienskappe, agglomerasie en ure gewerk. Saam dui die resultate daarop dat daar 'n neiging van werksverdeling plaasvind by professionele werkers en dat nie-professionele werkers die meeste aantal ure werk in Suid-Afrika. Hierdie verhandeling hou verband met 'n studie deur Rosenthal en Strange (2002) wat bewyse gevind het dat agglomerasie van stede hardwerkende produktiewe professionele werkers lok en aanspoor om meer ure te werk. Hierdie teorie is in lyn met die studie wat deur Akerlof (1976) ontstaan het aangaande agglomerasie en ure gewerk.

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CHAPTER 1: INTRODUCTION

1.1 Background

A number of multilateral organisations have concerned themselves with developing programmes which assist developing countries worldwide in alleviating the incidence of poverty and inequality. The United Nations identifies the eradication of poverty and the reduction of inequality by 2015 as two of its millennium development goals stated in the Millennium Declaration of 2000. Many factors contribute to the prevalence of poverty and inequality in a country. Poverty is often due to a lack of resources causing a reduction in the efficiency and productivity of labour, hence decreasing income. The World Bank Development Report on poverty (World Bank, 2000) recognises employment as a focal instrument in the fight against poverty, stating that a combination of labour-intensive growth and investment in human capital is key to empowering the deprived.

In February 2007, the Millennium Development Goals were extended to include a target for employment together with four additional employment indicators[1].The new employment target stating "The achievement of full, productive employment and decent work for all, including women and the youth" will compel countries to come to terms with the dismal state of employment, urging them to make progress in terms of employment creation, reporting progress and providing data (ILO, 2009). In addition, the geographic or spatial distribution of economic activity within countries has become a prominent aspect affecting poverty and inequality. The theory that a country's economic performance is influenced by its physical location can be found as far back as Adam Smith in The Wealth of Nations (1776).

South Africa, defined as a developing country, is not immune to the international dilemma regarding inequality and poverty. A Gini coefficient of 57.8, together with a human poverty index of 25.4 per cent, indicates that the existence of inequality and

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[1] The four new employment indicators include: 1) Growth rate of labour productivity in terms of GDP per person employed, 2) Employment-to-population ratio, 3) Percentage of employed living below the poverty line, and
4) Percentage of contributing family workers in total employment (ILO, 2009).

deprivation in terms of access to knowledge and welfare is indisputable (UNDP, 2009). Increasing levels of population growth, industrialisation, urbanisation and the legacy of apartheid caused poor communities to agglomerate in urban areas. In South Africa, the estimated urban population increased from 56.25 per cent in 2001 to 61 per cent in 2008, indicating that the urban share of the country's total population is increasing (UNFPA, 2009).

Literature on the spatial and location aspects of urban labour markets can be found as early as 1955 with Goldner explaining that, in terms of economic and labour market activity, cities are at the industrial and occupational core increasing their economic influence. Although urban efficiency is a function of a number of factors such as well-functioning infrastructure, institutions and technological innovation, an additional factor improving productive efficiency in urban areas is the concentration of employment (Duranton, 2008:72). Goldner (1955:1) further claims that "the internal geographical arrangements of the labour market complement and reinforce occupational and industrial boundaries found in labour markets". This implies that the concentration of labour and capital in cities is much more significant than in other areas, resulting in more employment opportunities, thereby drawing more people to cities and strengthening population density (SACN, 2006). This also explains why cities are seen as the economic driving force of a country.

Cities contribute to agglomeration in two ways: firstly, by attracting industries which tend to concentrate in areas boasting greater economic activity, and secondly, by attracting workers who expect better economic resources such as employment opportunities, increased welfare and livelihoods. Industry agglomeration in conjunction with urban agglomeration brings about an increase in the supply of workers who are willing to work, increasing productivity and the intensity of labour supplied.

Rosenthal and Strange (2003a) found evidence that in larger urban labour markets, professional workers readily supply longer working hours if the density of labour supplied in the same line of work is high, describing this trend as an urban rat race. This implies that rivalry exists between employees, increasing the intensity of labour supplied relative to hours worked in agglomerated areas.

Despite incidences of agglomeration in South African industries, a high unemployment rate of 24.5 per cent in September 2009 (Department of Labour, 2009) combined with high labour costs, low productivity, income inequality and poverty cripples attempts at establishing a successful labour market (Barker, 2007:5). A noteworthy aspect of the South African labour market is an increasing unemployment rate and a rather unequal distribution between formal and informal unemployment. Informal sector employment totals a mere 15.47 per cent of total employment, whilst South Africa's formal sector comprises 70.42 per cent of total employment in September 2009 (Labour Force Survey, 2009). South Africa's formal sector employment is highly regulated, remunerated and scarce (Magruder, 2009). In many developing countries, a thriving informal sector provides employment for the unskilled and compensates for a restricted formal sector. However in South Africa, unemployment is exacerbated due to a discouraging entrepreneurial environment (Banerjee, Galiani, Levinsohn, McLaren and Woolard, 2007).

Kingdon and Knight (2004, 2007) review potential causes for persistent unemployment and long run trends within the South African labour market. Inability on the part of the labour market to absorb current labour supply or to increase employment opportunities inhibits reductions in unemployment. Furthermore, the continuous mismatch between labour supply and labour demand diminishes real wages in both the formal and the informal sectors. Accelerated divergence between growth in the labour force and growth in formal sector employment, combined with an unprofitable informal sector worsens the outcomes of the South African labour market.

Altman (2005) argues that rising wage demands from unions and major job losses in the manufacturing and mining industries were the culprits of rising unemployment rates

during the 1990's. Even in light of growing wage demands from unions, firms were able to adapt to increased remuneration for workers. An atypical occurrence was that average labour productivity was increasing, implying that only the skilled professional employees working in the formal sector retained their jobs, worked harder and received higher wages for it. In conclusion, the growing divergence between increasing labour force participation and formal sector employment is a significant cause of increasing unemployment within the South African labour market.

Literature on agglomeration of economic geography and labour markets in South Africa is limited, with recent contributions by Naudè (2008), Magruder (2009), Hofmeyr (2010) and Haveman and Kearney (2010). Naudè (2008) investigates the presence of unemployment in South Africa's metropolitan labour markets due to a spatial mismatch between population and employment opportunities. The paper in particular presents evidence of a spatial mismatch in the South African labour market, explaining the increased rates of unemployment amongst black populations as opposed to white populations.

Magruder (2009) analyses South African labour market rigidities such as centralised bargaining, trade unions and the effect of the bargaining process on the inadequate amounts of informal employment in small firms together with high unemployment rates. Spatial discontinuity amongst labour unions in different district councils implies that labour regulations vary across borders causing firms to relocate to a different geographical location in order to evade demanding labour agreements. He finds that bargaining councils contribute to lower employment rates in industries and higher wages amongst employees. Magruder (2009) concurs with Altman (2005) that in order to increase employment and productivity, South African labour market regulations need to be less burdensome for informal industries.

Hofmeyr (2010) takes a different approach, analysing the link between social networks and ethnic occupational niches in the manufacturing sector of South Africa. Using a 10 per cent sample of the 2001 Census survey, Hofmeyr finds that social networks matter for employment outcomes and that employment within a niche varies by language

groups causing some groups to cluster in high-skill, high-income groups whilst others become trapped in low-skill, low-income groups.

In terms of the effect of urbanisation on the probability of finding employment, Haveman and Kearney (2010) establish a relationship between the level of urbanisation and the likelihood of being employed. Using data from the March 2005 labour force survey and urbanisation data from the 2001 Census, findings show that geographical location and job market outcomes are interlinked.

Although the literature with regards to different aspects involving labour markets in South Africa is profuse, little has been said regarding the advantages and disadvantages firms and employees encounter as a result of greater density, defined as economies and diseconomies of agglomeration. This dissertation aims to advance the understanding of South African labour markets through examining labour supply and agglomeration effects, particularly increases in the amount of working hours supplied. The intensity of labour supplied by employed professional workers in terms of working hours in the agglomerated metropolitan labour market is explored. More specifically, this dissertation follows the work of Rosenthal and Strange's (2003a) urban rat race model, examining the relationship between hours worked and agglomeration.

1.2   Problem statement

South Africa, hampered by high unemployment rates yet few informal employment opportunities, is an international outlier (Kingdon & Knight, 2004). An era of increased industrialisation and urbanisation of labour supply is contributing to increased rivalry amongst professional workers within the formal employment sector. This dissertation investigates the tendency of labour markets in urban areas to either inspire or require hard work, long working hours and increased rivalry amongst employees. This relationship between agglomeration in cities and hours worked is defined as 'The Urban Rat Race', previously studied by Rosenthal and Strange (2003a). Controlling for a range of worker-specific characteristics, this dissertation attempts to find evidence of an urban

rat race in South Africa using data from the September 2007 Labour Force Survey compiled by Statistics South Africa.

1.3   Motivation

Increasing urbanisation throughout the 20th century has resulted in approximately 49 per cent of the global population living in urban areas (World Bank, 2009). Rapid expansions of metropolitan areas continue to occur internationally, including South Africa. Estimates are that 90 per cent of all future population growth will manifest in cities (South African Cities Network, 2006). No country has achieved significant increases in economic growth or productivity without the growth of its cities, therefore the economic importance of cities cannot be overlooked (World Bank, 2009; Quigley, 2009). The 2009 World Development Report further states that location is fundamental when considering a nation's welfare (World Bank, 2009). Developed countries have prospered economically by successfully modernising their economic geography, which involves developing greater density, urbanisation and agglomeration. As a result, in order to successfully transform a city's economic geography, the incessant rush to cities remains a necessary prerequisite.

Within developing countries a transformation from agriculture-based economies toward more industrial-service economies is becoming evident. Agglomeration improves efficiency in manufacturing industries due to close spatial proximity promoting information spillovers between industries, thereby increasing labour market flexibility (Henderson, 2000). The ability of cities to attract firms and industries will determine their economic success, and in effect, labour supply will agglomerate where employment opportunities are most likely to occur.

The importance of examining the influence of agglomeration in labour markets is stated in Rosenthal and Strange (2003a), where it is claimed that agglomeration provides an incentive for workers to be more productive, therefore increasing labour supply. This increase in agglomerated labour supply could instigate a certain amount of rivalry between workers in cities, producing an urban rat race amongst workers. Akerlof (1976)

originated the concept of the rat race, whilst Marshall (1920) already proposed that increased productivity in cities was a function of labour pooling, knowledge spillovers and input sharing, termed agglomeration economies.

A number of studies have addressed an array of different aspects involving labour markets in South Africa, however, little has been said regarding agglomeration and its influence on economic productivity amongst industries and labour markets. Magruder (2009) recognises that although the South African labour market has high unemployment levels, a small proportion of citizens are employed in the informal sector (15.47 per cent) relative to the formal sector (70.42 per cent). Naudè (2008) finds evidence of higher unemployment in South Africa's metropolitan labour markets due to a spatial mismatch in these areas. More recently, Hofmeyr (2010) suggests that the manufacturing sector of South Africa is characterised by occupational niches forcing some language groups to cluster in low-skill, low-income groups whilst the right social networks protect other ethnic groups in high-skill, high-income niches. Haveman and Kearney (2010) finds a positive relationship between the probability of finding employment and the degree of urbanisation.

This dissertation contributes to the existing South African literature on urban labour economics by examining agglomeration in South African cities and labour markets whilst investigating whether an urban rat race exists. This is accomplished by evaluating the relationship between spatial agglomeration and working conditions in the South African labour market, measured as the total amount of hours worked by professional workers.

1.4   Objectives

This dissertation focuses on testing for the existence of an urban rat race within South Africa's large cities and district municipalities, by investigating the relationship between agglomeration and working conditions in the South African labour market in terms of hours worked. The specific objectives include a review of the literature focusing on labour markets and agglomeration, alongside relevant literature regarding the South

African labour market. Conclusions drawn from this literature review are used in an empirical analysis in a South African context.

Secondly, data obtained from the September 2007 Labour Force Survey is used to describe patterns of labour supply and agglomeration. An econometric model estimates an urban rat race model for South Africa. Lastly, this dissertation aims to contribute to the policy debate on employment and where employment is located in South Africa.

1.5   Method

An empirical analysis is included alongside the literature review of labour markets, agglomeration and the labour market in a South African context. This analysis tests for a significant relationship between worker-specific characteristics, agglomeration variables, dummy variables and worker effort in terms of hours worked. Following the empirical work of Rosenthal and Strange (2002), an estimation of the log of hours worked is regressed as a function of worker-specific characteristics using Ordinary Least Squares (OLS), alongside agglomeration in the labour market. The analysis employs data obtained from the September 2007 Labour Force Survey compiled by Statistics South Africa. 2007 Labour Force Survey data is used due to quarterly Labour Force Survey data implemented from 2008 onwards, making it more challenging to conduct sufficient estimations.

1.6   Delimitation

The dissertation is structured as follows: Chapter 2 presents a literature review on labour markets and agglomeration. Chapter 3 examines literature on the South African labour market in particular. Chapter 4 provides an empirical analysis of the urban rat race model in South Africa. Chapter 5 presents the conclusions drawn and recommendations are made.

CHAPTER 2: AGGLOMERATION ECONOMIES

2.1 Introduction

Chapter 1 of this dissertation stated that as countries develop increased urbanisation transforms and develops economic activity from agriculture-based activity to industrialised market activity, contributing to the development and growth of industries which concentrate in one area. Although the spatial transition of economic activity and modernisation within a country is significantly affected by urbanisation, it is not the main cause of increased economic activity.

A number of studies have identified increases in urban primacy or urban concentration as a significant contributor to increased economic activity (Annez & Buckley, 2009; Duranton, 2008) implying that population groups gather in large urban cities as a result of rapid urbanisation (Henderson, 2002:91). The process of configuration is divided into agglomeration (centripetal) forces, and dispersion (centrifugal) forces, causing an unequal distribution of economic activity within geographic regions. When these centripetal forces are greater than the centrifugal forces, agglomeration of firms occurs. Forces that push and pull people and firms to concentrate in particular areas are central to the study of urban economics and the contribution which cities make toward transforming economic activity. Why do cities[2] grow more rapidly than other areas? Why do agglomeration economies compel people and firms to cluster together in urban areas? This chapter will address the different economic forces, or agglomeration economies, which act as incentive for firms to locate close to one another in urban areas.

When examining economic activity in terms of the location and distribution thereof, one must differentiate between specialisation, concentration and agglomeration. Firstly, geographic specialisation analyses a country or region's economic structure, asking if

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[2] The word 'city' refers to an entire urban area; therefore this dissertation will continually use 'city' or 'cities', 'metropolitan area' and 'urban area' interchangeably.

the location's share of an industry is larger compared to the share of other locations in that particular industry. Specialisation may lead to cost reductions within the production process and further enhance opportunities for input sharing amongst firms. Concentration and agglomeration both consider location as the concentration of economic activity and are concerned with location across space in a particular industry, whilst agglomeration involves location across space in a specific sector as a whole (Brakman, Garretsen & van Marrewijk, 2009:187).

The relevance of geography as a determinant of a country's economic performance was considered as early as the 18th century in Adam Smith's Wealth of Nations, which discusses greater specialisation, sharing of intermediate suppliers and pooling of labour. Today, even more emphasis is placed on geography as a significant influence on the economic growth and long term development of regions. The agglomeration of economic activity is seen as analogous to economic growth (Martin & Ottaviano, 2001; Annez & Buckley, 2009).

Urban economies generate two types of growth, namely economic growth and employment growth. Whilst economic growth is defined as an increase in per capita income, employment growth involves growth of the total city workforce. The general sources of economic growth include: 1) increases in capital per worker, 2) increases in human capital, and 3) technological progress. However, the geographical nature of economic growth introduces agglomeration economies as a source of prospective increases in per capita income, stating that proximity increases productivity through input sharing, labour pooling, labour matching and knowledge spillovers (O'Sullivan, 2007:91).

In Martin and Ottaviano (2001), the relationship between geography and economic activity is described by combining endogenous growth models with those of economic geography. They conclude that growth induces spatial agglomeration of economic activity and agglomeration reduces costs, thereby reinforcing growth. A study by Henderson (2003) evaluates urban structure and economic growth by estimating the dynamic effects of urbanisation on economic growth. He concludes that rather than

urbanisation influencing economic efficiency and national growth rates, the focus should fall on the particular degree of urbanisation in an urban area. Insufficient concentration and meagre resources in certain areas may cause those growth rates to decline whereas over-concentration in urban areas may also have a negative impact on growth.

Whilst absolute (or first-nature) geography focuses on climate or access to the sea, relative (or second-nature) geography examines market access to institutions and the effect on economic prosperity. As countries transform and develop in terms of increased economic concentration, or clustering, relative geographic transformations occur in terms of density, distance and division. Density, defined as the geographic compactness of economic activity, is a characteristic of local urban development. As people relocate to cities, economic density increases and stronger agglomeration forces are produced. On a national scale, distance from density determines the ease by which goods, services, labour or capital can be transported between two locations. If greater economic distance exists between areas it may lower labour productivity, real wages, and income per capita and cause poverty and unemployment in a particular area. Increased density locally, and reduced distance and division on a national and international level, will significantly increase market access to institutions, raising the concentration and rate of economic growth within a country (World Bank, 2009).

However, it is not just aggregate activity that is agglomerated, individual industries are becoming increasingly concentrated. Changes in terms of the distribution of production and population within cities are occurring frequently. In fact, the urban revolution causes industries to agglomerate, attracting populations in search of better working and living conditions (Brakman *et al*, 2009:22). This implies that firms and workers receive certain benefits from agglomerating in cities or urban areas, and different forces explain the clustering of industries and aggregate activity in metropolitan areas. Fujita and Thisse (2002:5) describe three factors leading to various types of agglomerations, namely returns to scale, externalities and imperfectly competitive markets.

The purpose of this chapter is to elaborate on these three factors leading to clustering in urban areas, explaining why industries agglomerate and attract industrious workers. Focusing on agglomeration economies, this chapter will analyse the extent and sources of urban increasing returns, evaluate Marshallian externalities[3] and discuss competition within industries by urban employees. In particular, competitive or rivalrous behaviour between professional workers in terms of the increased amount of hours worked in urban areas is examined.

The outline is as follows: Section 2.2 introduces increasing returns to scale, considering the extent of urban increasing returns at an industrial, geographic and temporal level. Section 2.3 studies external economies of scale, focusing on Alfred Marshall's categorisation of positive externalities. In Section 2.4 imperfectly competitive markets are discussed briefly. Thereafter, the competitive or rivalrous nature of firms and, in particular, skilled employees in urban areas is examined. This relationship was fundamentally introduced by Akerlof (1976) as the urban rat race. In Section 2.6 conclusions are drawn.

2.2 Economies of scale

2.2.1 Internal and external economies of scale

As countries have started to develop from agriculture-based toward industrial and service-oriented production, workers have entered into an environment where, in association with a particular location, production involves scale economies. Scale economies in production are one of the main factors in the formation of cities. Economies of scale occur at firm level where an increase in the level of output produced results in a decrease in the average costs per unit of output of the firm (Quigley, 2009:117). Increasing returns in production are important factors to address when

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[3] According to Marshall (1920), externalities arise from agglomeration and the formation of clusters in a particular area. These include 1) the availability and sharing of specialised input services, 2) accumulating human capital which culminate into a highly specialised labour force and 3) spillovers of knowledge between individuals and firms.

examining economic agglomerations without engaging in an analysis of first-nature geography.

When evaluating the causes of a decrease in average costs, two types of economies of scale are identified, namely internal and external, or agglomerated, economies of scale. Firstly, internal economies of scale are present when the decreased average costs are the result of an increase in the production level of an individual firm. If a firm can produce significantly more, its cost advantage over smaller firms will imply greater market power and a market structure of imperfect competition (Krugell, 2005:20).

At industry-level, external economies of scale are the result of increases in the output of the industry as a whole which lead to a decrease in average costs. External economies can be divided further into technological and pecuniary external economies. Technological external economies arise as a result of industry-wide output that alters the technological relationship between each individual firm's inputs and outputs, and has an impact on the firms' production function. An example of this would be information spillovers which imply that an increase in industry-wide output for firms increases the stock of knowledge by means of positive information spillovers to individual firms (Krugell, 2005:20; Venables, 2009:49). This raises the individual firm's output. Three types of technology externalities are defined: 1) Marshall-Arrow-Romer externalities, which suggest that an increased concentration of firms within a particular industry in a specific geographic location assists the development of knowledge spillovers; 2) Jacobs externalities which claim that knowledge exchanges also occur between individual sectors or a variety of industries within a geographic location, and that the exchange of knowledge across diverse firms produce a greater return to economic knowledge; and 3) Porter's competitive externalities which involve a certain degree of competition conducive to knowledge externalities in a geographical location. Reference here is made to competition for new ideas personified by economic agents rather than product markets (Feldman & Audretsch, 1999:411).

Pecuniary external economies, on the other hand, influence a firm's output decision through price effects transmitted via the market. Examples of pecuniary external

economies include the existence of a large local market for specialised inputs and labour market pooling which affects labour and product markets. If an industry in a particular location is large enough, it is able to support a market for specialised inputs and a pool of industry-specific workers. This, in turn, benefits individual firms. It is important to note that the price effects of pecuniary externalities are a result of imperfect competition, because firms compete for limited resources due to increasing returns. Two types of pecuniary externalities can be distinguished: the Chamberlanian approach emphasising diversity of inputs and the Smith-Marshallian approach. The Chamberlanian approach supposes that a large production market may allow for a large number of intermediate inputs and final goods.

These intermediate products could enhance productivity in the final sector resulting in higher wages as the urban labour force increases (Fujita & Thisse, 2002:98). The willingness of firms to pay higher wages for employees working in the same industries is interpreted as an agglomeration economy in urban labour markets. Therefore, increasing productivity within local urban labour markets will reflect in employees' wage levels (Wheaton & Lewis, 2002:543). The Smith-Marshallian approach to increasing returns proposes that a thick labour market allows for better matching between workers and job opportunities. This particular approach involves two models. Firstly, Helsley and Strange (1990) state that in large urban areas, a better match between heterogeneous workers and the job requirements of firms are established. Secondly, Duranton (1998) argues that large production markets allow workers to become more specialised thus increasing the efficiency of workers in cities.

Figure 2.1 summarises the concept of scale economies or increasing returns to scale. Scale economies can be divided internally and externally. At firm level, internal economies of scale lead to increased production which results in cost advantages. At industry-level, spillovers of cost advantages cause external economies of scale. Non-market interaction's cost advantages accrue from infrastructure or knowledge-sharing. Spillovers occurring through the market may be due to diversity of intermediate inputs

(Chamberlanian) or because of improved matching processes on the labour market (Smith-Marshall) (Krugell, 2005:22).

Continuing the investigation into the forces which lead to the formation of industrial clusters and aggregate activity in cities, the following section describes how agglomeration economies arise. The concept of Marshall's external economies of scale can be divided further into localisation and urbanisation economies. This will be discussed in the following section on the scope, or extent, of increasing returns in urban areas.

Figure 2.1: Economies of scale
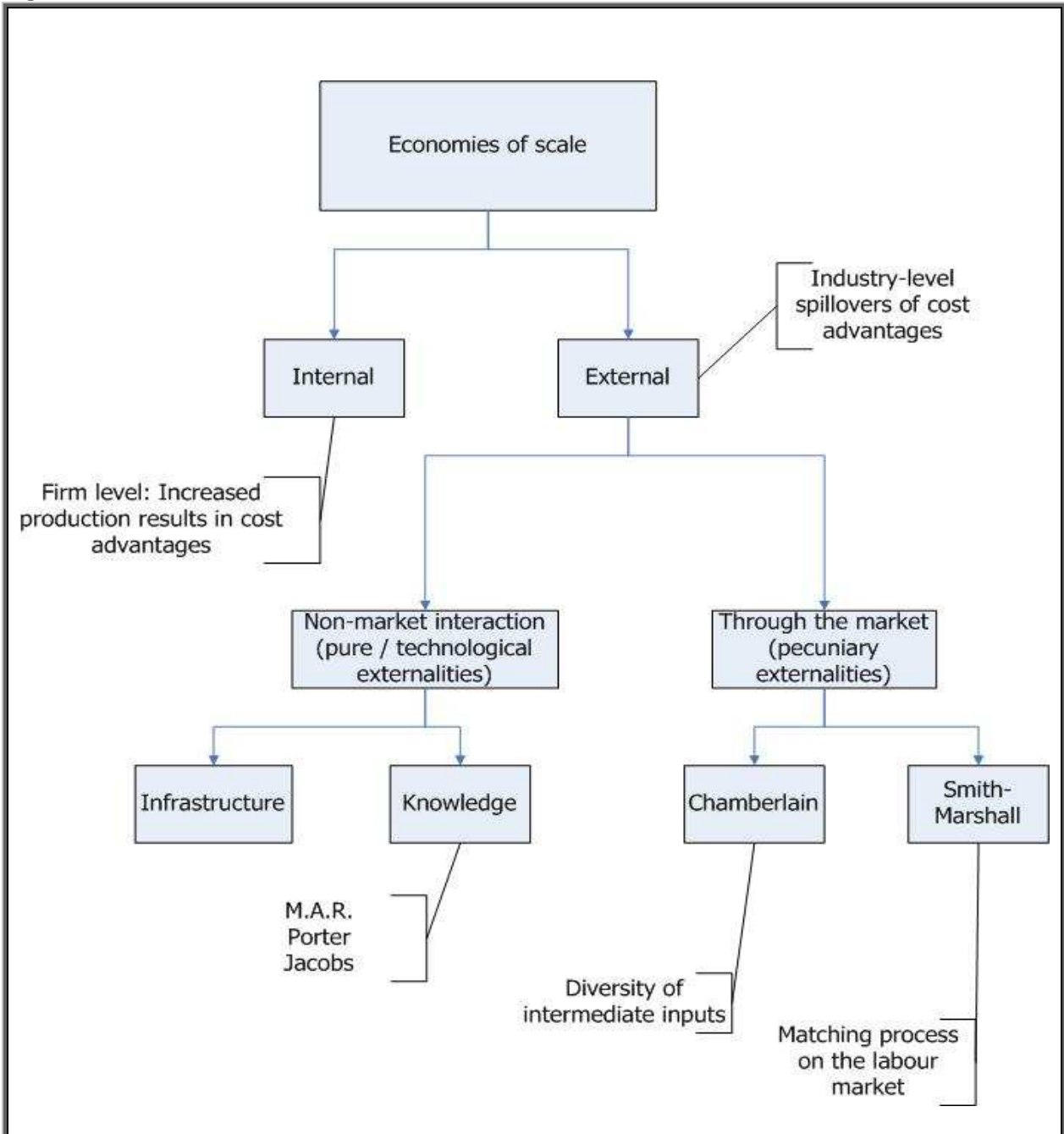
2.3 Alfred Marshall's externalities

2.3.1 Scope of urban increasing returns

External economies or increasing returns to scale exist when the scale or sheer size of an urban environment adds to its productivity. Puga (2010) acknowledges that firms and workers are more productive in large, dense urban regions compared to smaller, less concentrated locations. When productivity becomes geographically concentrated, firms receive benefits from increased spatial proximity. Agglomeration bolsters these benefits through the process of increasing returns. According to Marshall (1920), increasing returns are essential in creating economic agglomerations and geographically concentrated production. These sources include 1) sharing of inputs, 2) greater labour market pooling, and 3) spillovers in knowledge, discussed below in section 2.3.2. The first part of this section however, considers the nature or extent of urban increasing returns, evaluating the dimension to which external economies of scale may extend, namely the industrial, geographical and temporal scope of agglomeration. Thereafter, Alfred Marshall's sources of agglomeration are discussed in terms of input sharing, labour market pooling and knowledge spillovers.

2.3.1.1 Industrial scope

Probably the most familiar measure of the extent of urban increasing returns is the concept of industrial scope, asking whether agglomeration economies are related to the concentration of an industry or to the city size itself. It evaluates the degree to which agglomeration extends within an industry and across all industries within a city, as industrial structure and organisation influences industry clusters (Rosenthal & Strange, 2003b:11; Kim, 2009:154). As mentioned previously, economies of scale which follow from reductions in space between industries, within industries and across industries, are defined as localisation and urbanisation economies.

2.3.1.1.1   Localisation economies

Localisation economies arise from positive spillovers created when firms in a particular industry concentrate and interact in a city where other firms of the same industry are situated. Proximity between firms in the same industry influences their location decision, as geographically concentrated groups of firms align via technological advances, as well as the products and services they provide in addition to the types of skills which are required from employees. Conditions become relatively competitive when industry-specific firms and associated organisations cluster together (Rosenthal & Strange, 2003b:20). The question is whether or not industry-specific spillovers are important for cities. Drawing from the work of Marshall (1920), these spillovers include: 1) the sharing of information, 2) the existence of a large dependable pool of labour, and 3) the existence of specialised suppliers of goods and services. Marshall-Arrow-Romer externalities are additional sector-specific spillovers which are produced as a result of knowledge spillovers.

2.3.1.1.2   Additional factors providing evidence of localisation economies

The impact of industry concentration can be illustrated through worker productivity, the birth of new production plants and growth rates in industry employment. O'Sullivan (2007:57) states that, in the presence of localisation economies industry clusters will generate increased productivity, more new start-ups of production plants and rapid employment growth.

Supplementary indications of industrial scope include the specialisation and diversity of city employment. Specialisation is measured as the share of total city employment in a particular industry (Rosenthal & Strange, 2003b:3). Specialisation of employment lowers the degree of mismatch between skills demanded by employers and skills offered by employees. Feldman and Audretsch (1999:412) explain that interactions with a variety of firms within different industries create greater knowledge externalities, providing that there is some basis for interaction between diverse industries. Therefore, diversification

of employment should be considered taking into account that diversity of employment is a significant factor in innovation and agglomeration and ultimately, economic growth. As agglomerated industries located in urban areas become more concentrated, this simplifies efforts and increases the probability of finding employment (De Blasio & Di Addario, 2005:824). Industry concentration has an impact on employment growth, as large concentrations of industries continue their rapid growth when industries become mature. In an attempt to establish evidence of a localisation effect within industries, Rosenthal and Strange (2003b) evaluate the birth of new establishments and employment levels, concluding that locations with a large number of employees experience additional increases in employment than other locations with smaller numbers of employees, implying that localisation economies rapidly attenuate as the immediate distance between the spatial concentration of a given industry increases, and attenuates at a much slower pace as the spatial concentration decreases.

2.3.1.1.3 Urbanisation economies

Where localisation economies occur within the same type of industry, urbanisation economies arise from inter-industry interactions. These occur when a large number of diverse industries concentrate in urban areas. Where localisation economies are more concerned with increased efficiency between similar firms located near each other, urbanisation economies emphasise the sharing of basic assets, resources and institutions. The extent of urban concentration and the city size itself is a determinant of increased access to information between diverse industries resulting in greater competitive advantages to firms in large urban areas. These benefits are especially important for new or relatively small firms locating to industrial areas and the central business districts of cities.

Furthermore, corporate headquarters and the functional specialisation of industries have been introduced to further exploit urbanisation economies (O'Sullivan, 2007:58). Industries have resorted to locating headquarters in cities where a variety of tasks can be performed. By clustering in cities, firms that provide business services can be shared

amongst corporations. In terms of specialisation, large urban areas have become more specialised in managerial industries, with smaller cities specialising in production.

2.3.1.2   Geographic scope

The geographical extent of agglomeration economies involves instances where agglomeration economies diminish across geographic space. Cities exist as a result of increased proximity and concentration between industries encouraging productivity. Geographical concentration refers to the extent to which an industry is concentrated at a specific location, and whether industries are located in a few or in many regions nationally (Henderson, 2004:9). The question is, over what distance do firms benefit from being closer to other firms and people? Reduced geographical distance from density has beneficial interactions and exchanges between industries: if agents are physically closer, the potential to interact increases. Increased density of economic activity creates incentives for firms and workers to locate to urban areas because of favourable market opportunities, causing firms and workers to increase their market potential in metropolitan areas. Workers relocating to dense urban areas increase their productivity, thus receiving higher wages. However, increased competition between workers exists due to increased labour supply.

In an attempt to measure and compare static and dynamic geographic concentrations across industries, Ellison and Glaeser (1997) constructed a concentration index using U.S. manufacturing data. The agglomerative forces included in the model arise in two ways: physical and intellectual spillovers, and natural advantage. Measurements suggest that geographic concentration varies by industry and natural advantage does play a role. Changes in geographical concentration are disaggregated into two areas, namely industry mobility and varying stages of the industry life cycle. Dumais, Ellison and Glaeser (2002) continue by describing dynamic geographic concentration in U.S. manufacturing industries and find that by disaggregating concentrated areas in order to examine the decline of old industry centres, the growth of new firms and industry mobility are part of a dynamic life cycle of agglomerative forces.

2.3.1.3　　Temporal scope

Further investigation into the extent of urban increasing returns leads to the introduction of the temporal scope of agglomeration economies. Rosenthal and Strange (2002:18) explain that "one agent's interaction with another agent at some time in the past has a continued effect on present productivity". In other words, the historical component of agglomeration economies is referred to as its temporal scope, evaluating the degree to which time-separated associations continue to impact industries and workers. Static and dynamic agglomeration economies are distinguished, evaluating whether the main benefits of firms are in the form of faster growth and therefore higher income in the long run (dynamic), or increased productivity and income in the short run (static).

Whilst direct dynamic growth may be the result of knowledge spillovers through cumulated local learning, other dynamic processes occur when externalities from shared inputs invite additional industries to locate to concentrated areas which contribute to greater growth in urban areas. Accumulated knowledge may influence current productivity through economic activity. Equally, Varga (2007:2) explains that static growth processes include changes in technology or innovativeness in regions where impacts may be detected as a result of spillovers, whereas dynamic effects occur as a result of firms and workers relocating, thereby altering productivity and innovation.

2.3.2 Sources of agglomeration economies

In order to adequately comprehend the concept of urban development - why cities exist and why industries and workers continue to concentrate in cities - it is essential to understand the different sources of urban increasing returns. Agglomeration has a snowball effect caused by industries benefiting from higher density, greater diversity of activities and increased specialisation. Geographic concentration of industries may be due to profit-maximising location decisions made by each entity. Industries located in areas of dense economic activity are able to enjoy the benefits of localisation and urbanisation economies.

Various benefits may accrue to firms and workers due to reduced spatial proximity. These include rent-seeking and home market effects as well as urban consumption opportunities. This dissertation focuses on the sources of agglomerative spillovers suggested by Alfred Marshall (1920), which include knowledge spillovers, labour market pooling and input sharing. Dense urban areas produce large pools of skilled labour, which can benefit from sharing a variety of inputs. These concepts will be elaborated upon in the subsections that follow.

2.3.2.1   Input sharing

Cities reflect the demand for density through the creation of a concentrated environment where industries and workers continually agglomerate. The choice to live in these dense urban areas is offset by an overall reduction in distance (World Bank, 2009:134). Metropolitan areas create a natural market for firms to situate themselves in areas with an influential amount of workers and infrastructure, hoping to serve a large local market from a large plant with low transport costs. Industries in dense metropolitan areas tend to be larger and agglomerate to areas with large concentrations of other firms in similar industries.

Therefore, competing firms geographically concentrated in metropolitan areas locate close to one another in order to share access to firms which specialise in providing intermediate inputs, making production more efficient (Fujita, Krugman & Venables, 1999). Intermediate inputs are produced by one firm and utilised by another in its production process. By accumulating pools of skilled labour and suppliers of specialised intermediate inputs, better employer-employee and buyer-seller matching is constructed. Due to the large variety and quantity of inputs, the probability of finding a suitable match increases, thereby improving the quality of matches made, making it easier to find suitable inputs in urban areas.

For example, a clothing manufacturer may be able to purchase large amounts of buttons required in its production process from a nearby company specialising in manufacturing of buttons. Average costs are reduced in concentrated areas due to

increasing returns to scale and reduced transport costs (Rosenthal & Strange, 2004:15). Similar firms that agglomerate in urban areas are able to share communal technology, product markets and services as well as the particular type of skilled labour required.

2.3.2.2   Labour market pooling

Labour market pooling occurs as a result of agglomeration, allowing a better match between employer requirement and worker skills. Larger numbers of specialised labour inputs are readily available as a result of locating near other firms in the same industry. Industry clusters therefore have the ability to transform from unsuccessful to successful firms by interchanging workers in the large supply pool of employees working in the urban labour market. Labour market pooling can be defined in terms of localisation and urbanisation economies. Firstly, an urbanisation effect of labour market pooling states that workers are supposed to be better matched in cities. Secondly, the localisation effect of labour market pooling emphasises better matching of workers in concentrations of industries (Rosenthal & Strange, 2004:32). For example, a movie producer in need of an actor can swiftly hire the most appropriate candidate due to the large amount of talented actors situated within a city, thus improving the flow of workers between firms. Likewise, an actor living in the city could find a new position within the city without having to relocate. This benefits both employer and employee by reducing search costs and, improves the quality of labour matching in large cities.

Helsley and Strange (1990) introduce a formal model of labour matching, making several assumptions regarding workers and firms:

* There is variation in each worker's unique skills;

* Firms enter the market by choosing a product to produce and requiring certain skills from employees;

* Workers carry the cost of reducing the gap between workers' skills and the skills required by firms;

- There exists competition between workers as each firm offers a wage premium to workers who meet the skill requirements. Workers accept the position offering the highest net income, equal to wage minus the training costs required to reduce the skills gap.

The general conclusion of this model is that the presence of a large workforce attracts firms to metropolitan areas that compete for workers. This increases skill matches and reduces training costs, thereby increasing workers' net wage. A higher wage acts as an incentive for workers to live in cities, equalising the attraction between workers' skills and firms' requirements (O'Sullivan, 2007:56).

2.3.2.3 Knowledge spillovers

Marshall (1920) observes that industry agglomeration continues to accelerate partly because reduced proximity between firms allows workers to learn from each other. As a result, the spatial concentration of workers reduces the costs of producing knowledge through efficiency of innovation, learning, competition and transmission of ideas and education. Knowledgeable people may not be evenly distributed geographically. Therefore, cities facilitate the generation, diffusion and accumulation of knowledge by bringing together a large amount of workers and increasing the speed of interaction and productivity, particularly in technologically advanced industries (Annez & Buckley, 2009:14). These productivity-enhancing benefits within urban labour markets are termed as knowledge spillover effects. The production of knowledge may be difficult to measure empirically. Therefore, the term 'knowledge spillovers' may be more suited to defining the concept.

Earlier work by Glaeser (1999) focuses on the increased accumulation of human capital in cities, explaining that urban areas present the ideal backdrop for workers to specialise within their range of acquired skills, using and sharing knowledge to become more productive. The model further predicts that the size of urban agglomerations may expand as the knowledge of workers, in particular young people, becomes shared and accumulated within cities.

The facilitation of knowledge between individuals therefore becomes a noteworthy determinant when considering city formation. Dumais *et al.* (2002) explain that knowledge spillovers cause significant increases in new firm start-ups, particularly in industries which employ graduates. Results further suggest that knowledge spillovers indeed determine the locations of firms in innovative industries or new forms of organisation (Duranton, 2008:115). Rosenthal and Strange (2002) conclude that knowledge-oriented industries tend to form clusters of innovative activity, and that spillovers are localised, attenuating over a few miles. Knowledge spillovers are also associated with labour mobility. Duranton (2008:5), states that knowledge flows are caused by the flow of people between industries, and that the technological innovation of industries is associated with the movements of skilled workers between firms.

Fu (2006) studies the quality and localisation of human capital stock within the Boston metropolitan area, claiming that individual workers learn from others in the same industry via the depth of human capital stock, specialisation and peer competition effects (Marshallian labour market externalities), diversity of labour markets in terms of occupations (Jacobs labour market externalities) and thickness of the local labour market. These four mechanisms capture the dimensions of knowledge which contribute to human capital formation and increased productivity. Findings indicate that these four attributes contribute significantly to sharing and learning from occupational and industrial workers, and that knowledge spillovers are relatively localised within an urban region.

2.4 The role of competition in economic geography

2.4.1 Introduction

It is believed that a healthy amount of competition is good for society (Sheppard, 2001:170). Not only firms, but also nations, cities and people are required to increase competitiveness should they wish economic activity to prosper. Sheppard continues by stating that market-driven competition is generally seen as economically beneficial and illustrates competition by means of two individual representations. Firstly, competition is compared to an invisible hand. This implies that competition is described as an invariable equilibrium allocation of efficient economic resources amongst society members. Secondly, competition is an evolutionary process that may be ever changing and unstable, but promotes technological progress, increased productivity and higher wages. Progressive research on competitive advantage and industry location draws on the latter view. Though the focus of the competition literature is on firms, much of the theory would also apply to competition amongst workers.

The concept of competition in spatial economics has recently become more significant, with space giving competition a tangible form. Theory of spatial competition states that if production involves increasing returns, a finite economy can accommodate a finite number of imperfectly competitive firms. Because consumers buy from the firm with the lowest price, firms compete with neighbouring industries, regardless of the total number of firms in the industry. Hotelling (1929) introduced the base model of spatial competition by studying firms' price decisions under the assumption that consumers' locations are fixed. Kaldor (1935) extended the theory of spatial competition, stating that localisation is present between competing firms: each firm competes more prominently with its immediate neighbours than those separated by distance. Aiming to achieve more than their counterparts has merely shown that increased competitiveness between workers reflects human nature, and is accelerated in agglomerated areas. A substantial contribution to the literature regarding agglomeration and competitiveness of firms in

urban areas has been made, with firms and workers proving to be substantially more productive in urban areas (Puga, 2010).

Porter (2008) has written extensively on the topic of clusters and competition. He explains that, as competitive strategy intensifies amongst industry sectors and companies within industries, and spreads across geography industries and firms within countries are required to compete extensively to remain prosperous. According to Porter (2008:77), the competitive scope or extent of competitive advantage between firms is divided into four groups: geographic scope, segment scope, vertical scope, and industry scope.

The geographic scope of competition introduces a deeper understanding of industry structure, competitive advantage and rivalrous behaviour between firms. Location elements present in competitive advantage introduces the concept of clustering between firms and industries whilst influencing productivity and productivity growth. Porter (2008:215) defines a cluster as a geographically adjacent group of localised institutions, ranging from large or small industries within a city to a country or a network of neighbouring countries. Clusters affect competition by increasing the productivity of firms or industries along with the capacity for innovation and productivity growth, and expansion through new business formation. Therefore, clustering contributes to agglomeration benefits such as increased access to resources, knowledge exchanges and labour productivity (Kukalis, 2010:458).

Previous studies on the implication of space for competition purposes indicate that cities traditionally developed by attracting industrial firms. Today, service-oriented industries have become more spatially concentrated than manufacturing industries, mainly because less land is used per employee. By being able to operate in high-rise buildings and tower block offices, specialised services such as banks as well as accounting and law firms utilise land economically through high density (World Bank, 2009:134). In addition, the existence of external economies of scale produce even greater agglomeration as firms continue to serve one another, an example of input sharing, labour pooling and knowledge spillovers between service industries.

According to Brakman *et al.* (2009:277), this shift from industrial- to service-based activity places the emphasis on attracting people in their capacity as workers and what they contribute to urban growth and innovation, termed 'the creative class'. As early as 1920, Marshall introduced the localisation of skills, rating it as a central factor of industry concentration and implicit in the formation of cities. The prominence of agglomerated human capital as a determinant of urban growth has until recently been overlooked because the prior focus of increasing returns to scale was primarily on pecuniary externalities rather than on pure or technological externalities.

Florida (2002, 2003, 2005), wrote comprehensively on the fundamentals of the creative class and their contribution to economic activity in cities. The creative class, endowed with high levels of human capital, is defined as 'people who contribute to economic prosperity through creativity' (Florida, 2003:8). Creativity takes on a number of forms, such as 1) occupations attained as a result of the workers' education levels, 2) working in 'knowledge intensive' sectors, 3) working in sectors which require 'ways to fit and adapt to situations, exposed to a significant amount of responsibility' and 4) contributing through 'artistic' occupations. Therefore, the creative class represents a number of employment areas such as education and artistic occupations.

Through the examination of urban growth and the spatial patterns of population movement, Storper and Scott (2009) ask whether people move to jobs or jobs to people. Why do people choose to live in close proximity although there are costs to competing for land? Previous arguments on why human capital is introduced as a driver of agglomeration in urban areas has identified three principal claims, namely 1) preference-seeking on the part of individual workers accounts for spatial patterns in human capital, 2) preference-seeking by individual workers focuses on facilities or services which cities offer and 3) due to particular facilities offered by urban areas, workers migrate to cities, resulting in agglomeration and urban growth. These characteristics can be summarised as efficiency gains and consumption benefits.

Furthermore, Glaeser, Kolko and Saiz (2001) state that highly skilled workers are attracted to the services and facilities provided by cities such as 1) exclusive consumption goods not available elsewhere, 2) historical city centres, 3) improved access to basic public services and facilities such as schools and hospitals and 4) greater social interactions in cities due to the density of the population. Therefore, the basis of highly skilled workers concentrating in the urban dynamic resides on: localisation, economies of scale, providing both efficiency and consumption gains, and agglomeration effects. While the growth of cities depends on human capital and skills, Storper and Scott (2009:12) claim that productivity is improved by certain types of workers and skills in labour markets working in specific sectors in urban areas. However, Rosenthal and Strange (2004) find a significant relationship between agglomeration in urban areas and the intensity of work provided by professional workers, termed 'The Urban Rat Race'. This result indicates that, in terms of urbanisation and productivity, cities do make people work harder. The following section considers this relationship.

2.5   The urban rat race

2.5.1 Introduction

Literature on the relationship between agglomeration and work hours has been limited. Akerlof (1976) originated the principles of working conditions in the rat race model. The rat race model makes use of occupational and working conditions as indicators for selecting workers. In this particular analogy of the rat race, workers who are willing to work at faster speeds and in difficult conditions, are identified as being more creative or superior. In predicting the behaviour of individuals certain indicators are identified, for example race, gender, education and occupation. Akerlof (1976:603) states that obtaining an education or being able to work in more harsh conditions is positively correlated with increased productivity. A characteristic of the rat-race equilibrium is that individuals will be willing to work longer hours than the utility maximising level given the wage. Working hours and future career advancement have also been linked to wages

and promotions received by employees working in competitive conditions. Gicheva (2009:31) concurs with Akerlof and explains that workers who are fast learners, willing and able to endure long working hours will be the first to be promoted or receive increased wage offers.

Continuing on Akerlof's theory that hostile working conditions lead to overwork, Landers, Rebitzer and Taylor (1996) examine the organisational setting of law firms and the willingness and ability of employees to work undesirable hours in order to become eligible for promotion. Law firms introduce certain mechanisms which aim to screen out those workers who tend to work shorter hours. This mechanism requires willing employees to work long hours, indicating a measure of the productivity of workers.

 A model of adverse selection of work hours for large law firms is developed along with the income sharing and promotion characteristics of law firms inspiring associates to work long hours. Using survey data from two large law firms in large urban areas, evidence was found that a number of law firm associates were working too many hours. Similarly, Bell and Freeman (2001) analyse the relation between hours worked and earnings inequality in the United States and Germany respectively. Using cross-sectional and longitudinal data on hours worked and earnings by occupation from 1985 to 1995 within the United States and Germany, Bell and Freeman attempt to prove that a country with greater earnings inequality will generate more hours worked amongst employees. In conclusion, Bell and Freeman (2001:200) find evidence that inequality in earnings causes employees to increase the amount of hours worked particularly within the United States where there is a greater inequality in salaries than in Germany. Studies further indicate that a reward for increased effort and extended working hours improve the probability of being promoted.

Rosenthal and Strange (2004) observe that cities indeed attract professional workers who apply more effort at all ages. When the rewards for hard work become great and a certain amount of rivalry exists, young professionals may exert more effort in terms of hours worked than experienced professionals. The following section will explain three

different theoretical arguments which illustrate that agglomeration leads to harder work: signalling, thick markets, and productivity and selection.

2.5.2 Signalling

In terms of the effect of competition on labour supply in cities, Spence (1973) was instrumental in developing a model which illustrates the concept of job market signalling in game theory stating that investment in education by employees is assumed to be a signal for prospective employers. Employers are initially uncertain of the productive capabilities workers may or may not possess when hiring. Personal attributes of employees, such as gender or race, are not generally alterable and are therefore termed indices. However, aspects such as education have the ability to be improved upon or revised in order to alter employers' beliefs regarding workers' productive capabilities. Characteristics which can be manipulated are defined as signals. Wagner (2010) explains the model of job market signalling between worker and employer. The worker is familiar with his/her own ability level, however the employer is not. Together with his/her ability, the worker invests in education, which implies that certain costs are involved.

 The employer hires and pays a worker an allocated wage, according to ability and level of education. Rosenthal and Strange (2004) explain that worker utility is a function of the difference between wages, hours worked and individual ability. In the absence of rivalrous behaviour, no signalling would be required causing workers to only work the amount of hours relative to individual ability. In the spirit of Akerlof (1976) and Spence (1973), workers and firms participate in the following game. Firstly, workers demand a certain level of wage for a predetermined amount of work hours. Secondly, firms accept or reject these offers. Rivalry amongst employees now starts to present itself as firms will be required to pay individual workers accordingly. In this model, there are two types of workers, namely high-type and low-type workers. Because each type of worker sends different signals, separate equilibriums are a feature of this game. Within the separated equilibriums, the single-crossing condition plays an important role. This requires that the

high-type worker has to consistently send the 'high' signal, so that when the low-type worker is indifferent between the high and the low signal, he/she can be correctly identified as low-type. Therefore the signal-crossing condition links signals to types, guaranteeing that high-types send higher signals in equilibrium.

In order to establish whether or not the high-type worker only prefers working a high number of hours, one needs to find the amount of hours worked where he/she may be indifferent between being perceived as low-type or working harder to be identified as high-type (Rosenthal & Strange, 2003a:12). First differencing the amount of hours worked in order to find the marginal cost of additional hours is referred to as the Spence-Mirrlees condition (Rosenthal & Strange, 2003a).

Additional features of this theory of separate equilibriums are that rivalry is the key element which enables the high-type worker to work longer hours, and working longer hours is the manner in which the workers' type is signalled. It is, however, also possible to find certain productivity levels whereby high-type workers would increase effort, but from which low-type workers would shirk. To conclude, the signalling model established the effect of competition on labour supply in cities. Findings by Rosenthal and Strange (2002, 2003a) concur with Akerlof's (1976) rat race framework which states that workers are heterogeneous in type and that high-type workers will increase their productivity and willingness to work long hours in order to signal their ability.

2.5.3 Thick markets

Following Rosenthal and Strange's (2002) discussion of the urban rat race model, another concept linked to agglomeration and leading to concentrations of more productive workers is termed 'thick market externalities'. According to Gan and Li (2004), matching probability and rivalry amongst workers is increased in denser areas with thicker labour markets. Instead of there only being two workers in the signalling model, the number of workers becomes unlimited, implying that as the number of firms increase the amount of available candidates increases, thereby lowering unemployment in these areas. In a particular market, each institution has a minimum quality

requirement with better institutions in need of a higher requirement in terms of its minimum standard of quality. The candidate with the highest quality adhering to the minimum standards of the firm will be chosen. Therefore, in specialised labour markets, market thickness plays a significant role.

Rosenthal and Strange (2002:12) introduce two results of thick market externalities which characterise the urban rat race. Firstly, the probability of workers' signalling through working longer hours will increase as the number of competitive workers increases. Because there are more workers in agglomerated areas with similar levels of productivity, the chance of signalling their types will increase significantly. Secondly, the amount of working hours employees are willing to work increases as the number of competitive workers increase, implying that overwork becomes more apparent as worker populations concentrate in urban areas.

This signalling of skills may be more rigorous for certain occupations within geographical concentrations. The location choice of workers can signal their productivity to employers, with high-skill workers using locational agglomeration to separate themselves from low-types. Furthermore, Rosenthal and Strange (2002) ask whether employees are competing only with those in similar occupations or rather with all workers within the labour market. This introduces a localisation effect within a given occupation where workers may increase hours worked, thus distinguishing them from their fellow employees.

2.5.4 Productivity and selection

Rosenthal and Strange (2002) suggest two additional factors explaining the relationship between labour market size and worker effort, namely productivity between workers and selection effects. In terms of productivity differences between firms, those with a higher productivity level tend to agglomerate substantially and disperse less compared to lower productivity firms (Baldwin & Okubo, 2005:2). This self-selection of firms, choosing to locate in urban areas, occurs due to the greater benefits gained from high productivity. Melitz and Ottaviano (2008) describe competition and average productivity between

firms in heterogeneous markets. They conclude that increased aggregate productivity forces less productive firms to exit as a result of severe competition between firms. Feyrer (2007) examines the association between workforce demographics and productivity in OECD and low-income countries from 1960 to 1990. Findings indicate that productivity differences between rich and poor nations are associated with the age structures of the working population.

Moreover, results suggest that a significant proportion of 40-year-old workers work an increased amount of hours. Timmer, O'Mahony and van Ark (2007) explain that productivity levels differ between high and low type workers. A labour composition effect is discussed where a shift in the share of hours worked between low- and high-skilled workers may lead to greater growth in labour services which exceeds growth in total hours worked.

The spatial selection of firms and workers is derived from the productivity effect, stating that workers relocate to areas where firms are most productive. Saito and Gopinath (2009) assess the contribution industries make toward productivity through self-selection and agglomeration. Using data on plants in the Chilean food manufacturing industry, the contribution of agglomeration economies to productivity is estimated whilst controlling for self-selection. Results indicate that high-productivity plants indeed locate in industrially agglomerated regions that boast a diversified and large market structure. In comparing the relative contribution of agglomeration economies and self-selection with regional productivity, findings indicate that industry self-selection offsets agglomeration economies when enhanced productivity levels are present.

2.6   Conclusion

The purpose of this chapter was to explain the different economic forces, or agglomeration economies, which act as an incentive for firms to locate close to one another in urban areas. An international urban revolution and increased occurrences of urbanisation cause industries to agglomerate, attracting populations in search of better working and living conditions. Benefits which firms and workers receive from

agglomerating in cities or urban areas and different forces which explain the clustering of industries and aggregate activity in urban areas were examined, namely returns to scale, externalities and imperfectly competitive markets. Additionally, this chapter analysed the extent of urban increasing returns, evaluated Marshallian externalities namely the formation of a highly specialised labour force, the availability of specialised input services and spillovers of knowledge capital between workers, and discussed competition within industries between urban employees endowed with creative capabilities.

This chapter indicates that there are individuals who contribute to urban growth and innovation in their capacity as workers, termed 'the creative class' (Florida, 2003:12). It was established that the productivity of certain types of high-skilled workers in urban labour markets is improved if the intensity of the working environment is increased in terms of hours worked. Rosenthal and Strange (2004) observe that cities indeed attract professional workers who exert more effort at all ages. When the rewards for hard work become great and a certain amount of rivalry exists, young professionals may exert more effort in terms of hours worked than experienced professionals.

Theoretical arguments which illustrate that agglomeration leads to harder work and increased competitiveness were introduced namely 1) signalling, stating that investment in education by employees is assumed to be a signal to prospective employers, 2) thick markets, implying that as the number of firms increases, a specialised urban labour market causes the number of suitable candidates to increase and, 3) productivity and selection, where between firms, those with a higher productivity level tend to agglomerate substantially and disperse less compared to lower productivity firms (Baldwin & Okubo, 2005:2).

Spatial selection of firms and workers is derived from the productivity effect, stating that workers relocate to areas where firms are most productive. Rosenthal and Strange (2004) find a significant relationship between agglomeration in urban areas and the intensity of work provided by professional workers.

As stated in Chapter 1, the South African literature investigating the agglomeration of economic geography and movements within the labour market is limited. This dissertation attempts to examine the competitive scope of agglomeration economies in the urban areas of South Africa. The question is: do agglomerated urban areas increase competition, and thus productivity, by attracting skilled workers? Moreover, this dissertation evaluates skilled pools of labour as a factor of production and specialised input in the existence of competition. In particular, the rivalrous or competitive nature between employees working in the professional sectors of agglomerated firms and in the metropolitan areas of South Africa in terms of hours worked is discussed.

Chapter three elaborates on different aspects within the South African labour market. Whilst unemployment persists, this chapter focuses on the South African labour market and examines the different factors which influence employment and human capital, particularly whether there is evidence of increased competition in terms of hours worked in the urban areas of South Africa.

CHAPTER 3: THE SOUTH AFRICAN LABOUR MARKET

3.1   Introduction

Chapter 2 examined agglomeration effects within urban areas and evaluated the different factors which contribute to the clustering of firms and workers. The importance of Marshallian externalities within urban regions explained the different benefits of agglomeration, namely the formation of a highly specialised labour force, the availability of specialised input services and spillovers of knowledge capital between workers. Agglomeration has caused specialised labour to concentrate and locate near firms in similar industries contributing to urban growth. Rosenthal and Strange (2004) established that the productivity of certain types of highly-skilled workers in urban labour markets is improved if the intensity of the working environment is increased in terms of hours worked.

Within South Africa, the growth in urban population increased from 56.25 per cent in 2001 to 61 per cent in 2008, indicating that the urbanisation rate, i.e. the urban share of total population, is rising (UNFPA, 2009). Figure 3.1 indicates the four agglomerated municipal areas within South Africa, where three clustered cities are identified as a single agglomeration namely Johannesburg, Ekurhuleni (East Rand) and the City of Tshwane (Greater Pretoria). Cape Town, Nelson Mandela Metropolis (Port Elizabeth) and EThekwini (Durban) are the remaining three agglomerations located near coastal areas dominating South Africa's landscape in terms of economic activity and growth (Luus, 2005:2; Naudè, Rossouw & Krugell, 2009:2). Despite rapid urbanisation, South African cities have always been considered unfavourably due to the history of racial segregation that caused poverty, oppression and high levels of unemployment. During the apartheid era, urban space in South Africa was constructed along racial lines resulting in the formation of segregated, apartheid cities. Economic inequality within cities caused high levels of unemployment and poverty, forcing the poor and oppressed to move to the outskirts of the city. Additionally, the occupational profiles within townships were monitored resulting in restricted job mobility (Parnell, 2001:895).

Figure 3.1: Six metropolitan municipalities within South Africa
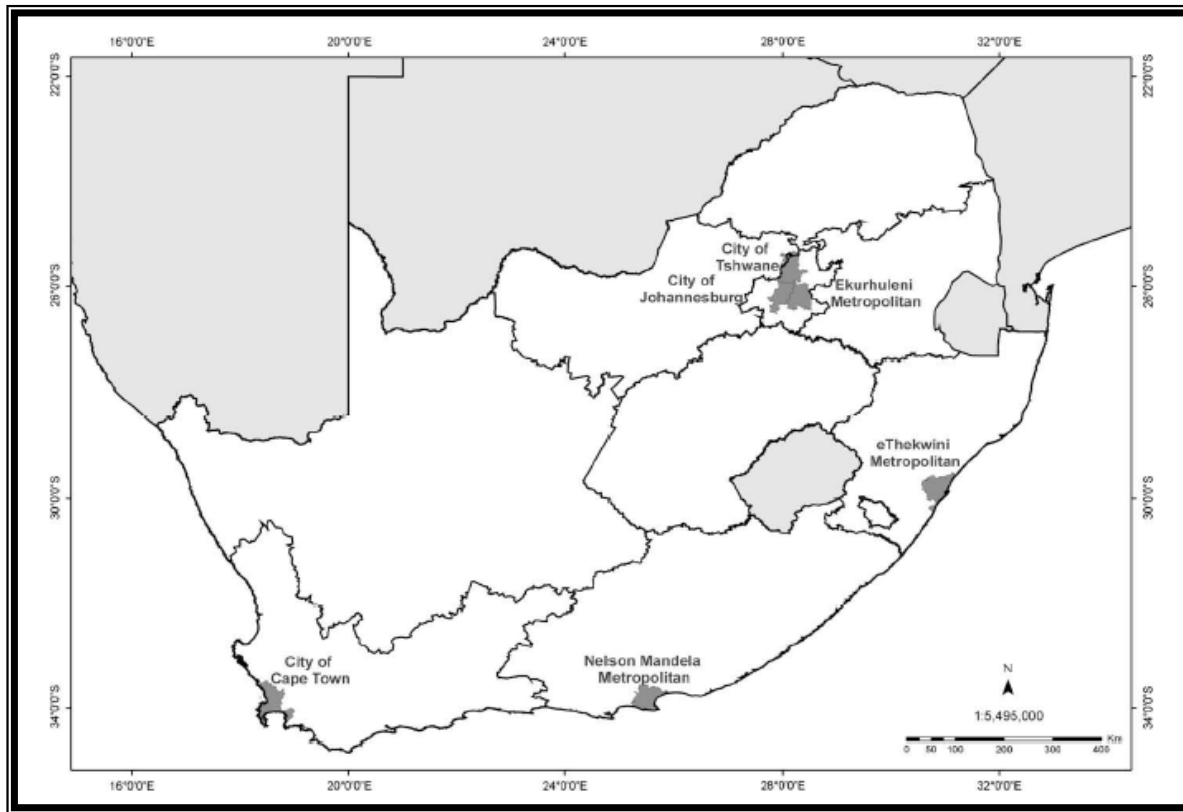
Source: Naudè, Rossouw & Krugell, 2009.

Naudè (2008) argues in favour of the existence of a spatial mismatch within the South African labour market due to 1) inefficient suburbanisation of working opportunities, 2) the lack of residential integration whilst areas closer to central business districts are growing in residential populations and 3) unemployment amongst blacks as a result of distance from city centre, though this does not hold for white population groups. Since the abolition of apartheid, residential desegregation and continued modernisation established South African cities as engines of economic growth and opportunity. The spatial organisation of the urban labour market in terms of what people do and where they work is imperative to the geography of urban expansion (Parnell, 2001:894). Therefore, firm location and labour mobility is in direct relation to urban growth and the economic geography of production whilst job creation is imperative to ensure sustained economic growth and reduced poverty within South Africa.

The Department of Labour has been striving to reduce unemployment and poverty in South Africa by implementing policies and programmes aimed primarily at:

- Improving economic efficiency and productivity;
- Developing skills and providing employment opportunities;
- Alleviating poverty in employment.

Employment creation and skills development remain essential labour market objectives within government in order to reduce poverty and provide citizens with appropriate opportunities to improve their economic circumstances (Department of Labour, 2009).

Focusing on the South African labour market in particular, this chapter examines various factors which influence employment and human capital. Employment, unemployment, trade union activities, human capital and the demand for skilled labour and productivity within the labour market is discussed. Following Rosenthal and Strange (2004), evidence of increased productivity levels as a result of agglomeration, particularly professional workers who signal their ability by working longer hours, is considered. Extending the work by Rosenthal and Strange, this dissertation investigates whether increased productivity exists within the urban areas of South Africa through changes in working conditions, particularly the hours worked by skilled professional workers. Agglomeration and labour market productivity is of particular relevance in the case of South Africa due to increased urbanisation and widespread concerns with regards to employment.

3.2   Labour market trends in South Africa

3.2.1 Overview of the South African labour market

Characterised by sharp segmentation, high levels of unemployment and an insignificant non-agricultural informal sector, the South African labour market persistently creates controversy (Kingdon & Knight, 2007). South Africa's racially divided past has dented most facets of life, including the labour market and the educational system (Burger & von Fintel, 2009:2). To some, the labour market is classified as rigid due to the high

wages demanded by trade unions and centralised bargaining councils, whilst others deem it flexible because of significant rates of non-standard employment.

In 1994 a number of policy incentives were introduced by government such as the Reconstruction and Development programme (RDP) aimed at increasing employment opportunities. In an effort to enhance sustainability, efficiency and a better quality of life, this program was aimed at developing a balanced economy for *all* South African citizens, with no particular focus on either rural or urban development (South Africa, 1994; Pillay, Tomlinson & du Toit, 2006:23). Based on the principles of reconstruction, development and redistribution, the Reconstruction and Development programme aimed at enabling the South African economy to grow. During 1996, the ANC lead government implemented the Growth, Employment and Redistribution policy (GEAR) highlighting job creation as a priority. The objectives of GEAR were based on the RDP commitment and recognised four sources of employment growth, namely economic growth, job creation and skills development programs as well as employment-enhancing government policies. Labour policy should create sustainable employment opportunities resulting in greater economic prosperity for all.

Economic growth rates remained stable during the first ten years of South African democracy, averaging a growth rate of three per cent (South Africa, 2006). From 2005 onwards, growth in GDP remained steady at five per cent (World Bank, 2005) up to the recession following the global financial crisis of 2008. Even though progress in economic prosperity and infrastructural developments had been made, unemployment peaked at 32 per cent in 2002 and improvements in growth and unemployment remained sluggish. Government realised that the RDP and GEAR policies failed to successfully implement employment creation objectives, as unemployment increased even further.

The World Bank Development Report on poverty (World Bank, 2000) recognises that a combination of labour-intensive growth and investment in human capital is key to empowering the deprived and increasing employment. One of the United Nations Millennium Development Goals identified for South Africa was to halve the amount of

unemployment and poverty present in South Africa by 2014. For this purpose, government initiated the Accelerated and Shared Growth Initiative (ASGISA) in 2006 as a national growth proposal to take up the challenge. ASGISA seeks to reduce barriers constraining growth whilst increasing employment opportunities and maintaining an annual economic growth rate of six per cent (Molefane, 2008:37). A list of six binding constraints were identified, namely volatility of the South African rand, shortage of skilled labour, limits to investment opportunities and competition, a weighty regulatory environment, inefficient government leadership and inadequate national infrastructure.

Government believes that the successful implementation of ASGISA may assist in improving social and economic objectives, whilst halving poverty and unemployment by 2014 and can become a greater priority for government with the assistance of ASGISA and the extended Millennium Development Goals elaborated upon in Section 1.1.

In response to the constraints highlighted by ASGISA, initiatives were developed in order to improve efficiency within the South African economy. The constraint regarding the shortage of skilled labour was addressed by introducing strategies to improve the overall quality of education, including adult basic- and further education and training (ABET, FET). Attempts by government to improve labour market conditions have been disheartening since policies fail to significantly reduce unemployment or supply sustainable job opportunities.

Before evaluating employment and unemployment issues, an overview of key labour market indicators within the South African labour market is required. Using data from the September 2009 Labour Force Survey, Table 3.1 illustrates that the working population aged between 15 and 64 years has increased by 92 000 or 0.3 per cent from Q2:2009 to Q3:2009 and by 371 000 or 1.2 per cent from Q3:2008 to Q3:2009. According to Barker (2007:2), the total labour force or total supply of labour is defined as "people over age 15, presenting their labour for the production of goods and services, despite being employed or not". This constitutes workers in the formal and informal sectors, self-employed persons or employees and the unemployed. Table 3.1 indicates that the labour force decreased by 418 000 or 2.39 per cent from Q2:2009 to

Q3:2009 and decreased annually by 700 000 or 3.94 per cent from Q3:2008 to Q3:2009.

The change in quarterly employment rates fell by 484 000 or 3.62 per cent from Q2:2009 to Q3:2009 with annual formal sector employment rates declining by 366 000 or 3.88 per cent during Q3:2008 and Q3:2009. However, total unemployment increased by 70 000 or 1.70 per cent annually from Q3:2008 to Q3:2009, whilst the number of discouraged workers – persons who desire to work but are not actively seeking employment – increased substantially on an annual basis by 52.38 per cent. Unemployment increased from 23.2 per cent to 24.5 per cent between Q3:2008 and Q3:2009. The following section considers unemployment in South Africa and is not evaluated extensively but merely outlined by highlighting some contributing factors.

Table3.1: South African labour market: key indicators

	Jul/Sep 2008	Apr/Jun 2009	Jul/Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousands						
Population 15-64 yrs	30,801	31,080	31,172	92	0.30%	371	1.20%
Labour force	17,777	17,495	17,077	-418	-2.39%	-700	-3.94%
Employed	13,655	13,369	12,885	-484	-3.62%	-770	-5.64%
Formal sector (non-agricultural)	9,439	9,356	9,073	-283	-3.02%	-366	-3.88%
Informal sector (non-agricultural)	2,175	2,109	1,993	-116	-5.50%	-182	-8.37%
Agriculture	767	710	653	-57	-8.03%	-114	-14.86%
Private households	1,274	1,194	1,166	-28	-2.35%	-108	-8.48%
Unemployed	4,122	4,125	4,192	67	1.62%	70	1.70%
Not economically active	13,024	13,585	14,095	510	3.75%	1,071	8.22%
Discouraged work-seekers	1,071	1,517	1,632	115	7.58%	561	52.38%
Other (not economically active)	11,953	12,068	12,463	395	3.27%	510	4.27%
Rates (%)							
Unemployment rate	23.2	23.6	24.5	1.0		1.4	
Employed/population ratio	44.3	43.0	41.3	-1.7		-3.0	
Labour force participation rate	57.7	56.3	54.8	-1.5		-2.9	

Source: Quarterly Labour Force Survey September 2009.

3.2.2 Unemployment

Despite positive trends in growth and other economic fundamentals, South Africa has been burdened by high unemployment levels for more than a decade, causing concern to both policymakers and labour market participants (Hodge, 2009:2). Unemployment may currently be the greatest source of poverty and inequality, reducing overall economic growth and prosperity within South Africa.

As stated above in Section 3.2.1, unemployment was estimated at 24.5 per cent in September 2009 according to the strict definition as illustrated in Table 3.1. In quarter two of 2009 the unemployment rate totalled 29.4 per cent using the expanded definition. Illustrating the distribution of unemployment amongst males and females, Tables 3.2 and 3.3 indicate that between Q2:2009 and Q3:2009 a 0.73 percentage change decrease in female unemployment occured, whilst a 2.57 percentage change decrease in male unemployment occured. However, it is interesting to note that while unemployment amongst males continued to increase by 141 000 or 7.15 per cent annually, unemployment amongst females decreased by 70 000 or 3.26 per cent.

Table 3.2: Female labour market indicators

	Jul/Sep 2008	Apr/Jun 2009	Jul/Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousand						
Population 15-64 yrs	16,127	16,252	16,293	41	0.25%	166	1.03%
Labour force	8,184	8,037	7,862	-175	-2.18%	-322	-3.93%
Employed	6,034	5,973	5,782	-191	-3.20%	-252	-4.18%
Formal sector (non-agricultural)	3,777	3,840	3,726	-114	-2.97%	-51	-1.35%
Informal sector (non-agricultural)	994	965	912	-53	-5.49%	-82	-8.25%
Agriculture	257	217	223	6	2.76%	-34	13.23%
Private households	1,006	951	921	-30	-3.15%	-85	-8.45%
Unemployed	2,150	2,065	2,080	15	0.73%	-70	-3.26%
Not economically active	7,943	8,215	8,431	216	2.63%	488	6.14%
Discouraged work-seekers	652	880	925	45	5.11%	273	41.87%
Other (not economically active)	7,291	7,334	7,506	172	2.35%	215	2.95%
Rates (%)							
Unemployment rate	26.3	25.7	26.5	0.8		0.2	
Employed/population ratio	37.4	36.8	35.5	-1.3		-1.9	
Labour force participation rate	50.7	49.5	48.3	-1.2		-2.5	

Source: Quarterly Labour Force Survey July - September 2009.

The participation of women in the labour force has increased, with approximately 45 per cent of the labour force being feminised in September 2009. Casale and Posel (2002) explore changes in female labour supply and employment, elaborating on possible causes for the proportionate increase in women's labour supply over the period from 1995 to 1999. Although increased education levels may have contributed to the rise in female labour force participation, it is rather the reductions in the proportion of married women, declining male income levels and remittance transfers which have urged women to enter the labour market. Female labour migration from rural to urban areas also contributed to spatial changes in the South African labour market. Continued feminisation of the South African labour force seems to be accompanied by rising levels of female unemployment and low-paid, insecure informal sector employment because of an increase in economically active females and unchanged labour supply levels. Age also plays a more predominant role in rising unemployment levels. Young workers make up a relatively large proportion of the labour force as studies have shown that three-quarters of all unemployed persons are younger than 35 years of age (Barker, 2007:182).

Table 3.3: Male labour market indicators

	Jul/Sep 2008	Apr/Jun 2009	Jul/Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousand						
Population 15-64 yrs	14,674	14,828	14,879	51	0.34%	205	1.40%
Labour force	9,593	9,457	9,215	-242	-2.56%	-378	-3.94%
Employed	7,621	7,397	7,102	-295	-3.99%	-519	-6.81%
Formal sector (non-agricultural)	5,662	5,517	5,346	-171	-3.10%	-316	-5.58%
Informal sector (non-agricultural)	1,181	1,144	1,081	-63	-5.51%	-100	-8.47%
Agriculture	510	494	430	-64	12.9%	-80	-15.69%
Private households	267	243	245	2	0.82%	-22	-8.24%
Unemployed	1,972	2,060	2,113	53	2.57%	141	7.15%
Not economically active	5,081	5,371	5,664	293	5.46%	583	11.47%
Discouraged work-seekers	420	637	707	70	10.9%	287	68.33%
Other (not economically active)	4,662	4,734	4,957	223	4.71%	295	6.33%
Rates (%)							
Unemployment Rate	20.6	21.8	22.9	1.1		2.4	
Employed/population ratio	51.9	49.9	47.7	-2.2		-4.2	
Labour force participation rate	65.4	63.8	61.9	-1.8		-3.4	

Source: Quarterly Labour Force Survey September 2009.

As discussed extensively by a number of authors, the causes of rising unemployment levels within South Africa are many. According to Kingdon and Knight (2007:816), the underlying cause of escalating unemployment can primarily be attributed to the divergence in growth levels of the labour force and formal sector employment within South Africa. Formal sector employment growth was too slow in order to accommodate the growth in labour supply whilst constrained job opportunities in the informal sector caused the gap between formal employment and labour supply to remain significant, thereby fuelling unemployment rates.

When comparing formal and informal sector employment, insider-outsider theories of labour economics consider formal sector employees as insiders, receiving the benefits of trade unions and collective bargaining, minimum wages and minimum standards of normal and overtime working hours. Informal sector workers are the outsiders, falling outside labour regulation systems and receiving substantially lower income levels. Failed attempts by employees to become involved in formal sector activities force the residual labour force to become occupied within the informal sector which disguises or indirectly subjects workers to unemployment.

The lack of skills within the labour market is an additional factor contributing to increased unemployment in South Africa. Table 3.4 indicates that in 2007, a substantial amount of employed South Africans did not possess the necessary skills or training for work, inducing a mismatch between the skills set of the unemployed and what is required within the labour market (Banerjee *et al.*, 2006:39). Even though the demand for unskilled labour is small, it seems as though the influx continues to rise implying that skills constraints are contributing to sustained unemployment in South Africa. Dias and Posel (2007) concur with Banerjee *et al.*, underscoring the persistent divergence between the skills requirements of labour demand and the qualifications of labour supply.

Table 3.4: Distribution of skills amongst population groups

Official unemployment definition				Race Groups				
				Black	Coloured	Indian/Asian	White	Total
Not economically active	Skills	Yes	Count	634	112	20	182	948
			% within Skills	66.9%	11.8%	2.1%	19.2%	100.0%
			% within Race Groups	2.1%	2.7%	2.9%	9.4%	2.6%
		No	Count	28985	4077	659	1744	35465
			% within Skills	81.7%	11.5%	1.9%	4.9%	100.0%
			% within Race Groups	97.9%	97.3%	97.1%	90.6%	97.4%
Employed	Skills	Yes	Count	2081	389	87	503	3060
			% within Skills	68.0%	12.7%	2.8%	16.4%	100.0%
			% within Race Groups	11.4%	9.0%	12.1%	18.8%	11.8%
		No	Count	16129	3925	630	2168	22852
			% within Skills	70.6%	17.2%	2.8%	9.5%	100.0%
			% within Race Groups	88.6%	91.0%	87.9%	81.2%	88.2%
Unemployed	Skills	Yes	Count	619	67	9	18	713
			% within Skills	86.8%	9.4%	1.3%	2.5%	100.0%
			% within Race Groups	8.8%	6.0%	8.7%	14.5%	8.5%
		No	Count	6420	1048	95	106	7669
			% within Skills	83.7%	13.7%	1.2%	1.4%	100.0%
			% within Race Groups	91.2%	94.0%	91.3%	85.5%	91.5%

Source: Labour Force Survey September 2007.

Table 3.5 confirms reports of a 'brain drain' within South Africa further explaining why the existing supply of labour cannot meet the demand for skilled labour. Substantial amounts of professional, semi-professional, technical and managerial workers emigrate in search of greater security and welfare whilst the number of clerical workers and artisans emigrating has also been noteworthy. In terms of globalisation, this has an unfavourable impact on unskilled workers within South Africa due to the promotion of skill-intensive industries and the increased demand for higher level human capital (Jenkins, 2006:654).

Table 3.5: Emigration levels of skilled workers in South Africa

Occupation	2001	2002	2003
Engineers, technologists	-412	-430	-639
Accountant and related	-475	-488	-703
Professional and semi-professional	-2405	-2113	-3817
Management	-696	-764	-1313
Clerical	-1217	-1093	-1870
Artisans and apprentices	-293	-239	-356
Total economically active persons	-6638	-6280	-9529

Source: Barker, 2007.

Continuing the analysis of unemployment levels within the formal and informal sectors, Magruder (2009) examines the effect of labour regulations on employment levels within large and small firms in South Africa. Due to strict labour market regulations and strong trade unionism, firms became reluctant to absorb labour supply, stimulating a climate of small-scale employment and high unemployment. Table 3.6 illustrates that during September 2007 a total of 35.9 per cent of formal sector workers belong to trade unions, whilst only 1.8 per cent of informal sector organisations are associated with trade unions.

Magruder explains that whilst there are a number of labour market regulations, the lack of employment growth in small firms of South Africa is a result of bargaining council systems. Within this system, trade unions may participate in bargaining councils, thereby extending agreements beyond only firms and workers represented at the council, making these agreements binding to all workers within an industry even if they do not participate in negotiations.

Table 3.6: Trade union membership within the formal and informal sectors

			Trade Union		Total
			Yes	No	
Occupation groups	Professionals	Count	2167	1728	3895
		% within occupation groups	55.6%	44.4%	100.0%
		% within trade union	32.0%	12.3%	18.7%
	Non-professionals	Count	3460	5903	9363
		% within occupation groups	37.0%	63.0%	100.0%
		% within trade union	51.1%	42.2%	45.1%
	Other	Count	1150	6371	7521
		% within occupation groups	15.3%	84.7%	100.0%
		% within trade union	17.0%	45.5%	36.2%
	Total	Count	6777	14002	20779
		% within occupation groups	32.6%	67.4%	100.0%
		% within trade union	100.0%	100.0%	100.0%

Source: Stats SA, Labour Force Survey September 2007.

Workers, who are members of unions which fall under centralised bargaining, benefit from greater wage and social security, whilst firms who opt to associate with centralised bargaining may benefit from a competitive advantage. In particular, large unionised firms benefit from less competition from small firms and lower wages, and large non-unionised firms also benefit from less competition but pay higher wages. Unfortunately, small-and medium-sized organisations lose by the greatest margin due to centralised bargaining systems pushing up wages and hindering job creation. Magruder's (2009) estimated model includes a spatial dimension, assuming that whilst local labour markets are spatially continuous, bargaining council agreements are enforced in a spatially discontinuous way.

In conclusion, Magruder (2009) finds that by using spatial fixed effects and assuming the spatial continuity of labour markets, bargaining councils are associated with approximately 8-14 per cent lower employment within a particular industry, 10-21 per cent higher wages and 7-15 per cent less employment in small firms. Furthermore, an additional setback within the informal sector is due to the relatively low numbers of employees at small firms in general. By not even being part of a trade union, small firms cannot begin to compete with large firms, unionised or not, which places South Africa's unemployment situation in an ever greater predicament.

The question arises as to whether some groups of individuals are hurt less by unemployment than others, in other words, if joblessness becomes more tolerable and permanent when living in clustered areas. Powdthavee (2006) investigates the extent to which people are unemployed when a proportion of people living in the same region are also without employment, implying that sustained unemployment could be indicative of geographical factors contributing to reduced well-being and positive labour market outcomes in different regions.

Using cross-sectional data from the South African Labour and Development Research unit (SALDRU) of 1993, Powdthavee (2006) attempts to find possible geographical variations in the well-being of the unemployed at household level in South Africa. He finds a strong positive correlation between the well-being of the unemployed and other's unemployment at the clustered level particularly for urban black groups, whilst insignificant relationships exist between non-black and rural black groups with regards to well-being and cluster unemployment. Powdthavee (2006) concludes that it may be easier to become unemployed and to remain so in a geographical region with noticeable joblessness within the labour market.

Continuing the investigation of the effect that geography has on labour market outcomes, in particular unemployment in South Africa, Naudè (2008), proposes that there exists a spatial mismatch in the South African metropolitan labour market which produces significant differences in unemployment levels amongst black and white populations. The racial segregation of metropolitan areas during apartheid caused limited spatial access to jobs. Discrimination, lack of adequate information, residential integration and commuting costs contribute to considerable divergence in unemployment rates. Furthermore, Naudè claims that unnatural residential patterns have caused a spatial mismatch between unemployment and population groups. The Spatial Mismatch Hypothesis (SMH) argues that the suburbanisation of economic activity within metropolitan areas has produced greater unemployment amongst low-skilled workers living in central business districts. Thus, while low-skill jobs are being created in suburban areas, low-skill workers remain situated in central city areas

uninformed about these employment opportunities, thereby leading to increased unemployment.

On the other hand, high-skill black households may be more able to move towards the employment opportunities, being less exposed to the spatial mismatch. In conclusion, evidence suggests that spatial restrictions related to mobility and the spatial structure within South African cities have had an impact on employment creation amongst black and white populations in metropolitan labour markets (Naudè, 2008).

This section examined unemployment within the South Africa labour market, focusing on aspects which contribute to raise unemployment levels such as gender, sectoral issues, trade unions, education and skills and geography. Findings with regards to skills indicate that a shortage of high-skill workers may limit growth and development in South Africa. Although the literature on unemployment trends is vast, analyses regarding employment remain limited particularly with regards to the relationship between geographical proximity and labour market outcomes.

Geography and education or skills appear to have become predominant factors influencing employment growth in South Africa. Therefore, following Rosenthal and Strange (2003a), this dissertation continues attempts to establish the existence of rivalrous or competitive behaviour between professional workers in the urban areas of South Africa. The subsequent section evaluates employment outcomes in the South African labour market, focuses on the existing literature and introduces the agglomeration-hours worked relationship amongst skilled workers.

3.2.3 Employment

As stated previously, the South African labour market is classified by some as rigid and by others as flexible. Whilst rigidity is indicative of high unemployment, flexibility may be necessary for job creation. It is important to have accurate employment data in order to determine factors which influence the demand of labour. Equally, the supply of labour is a function of the quantity and quality of labour, total population and hours worked, to name a few. Three key dimensions of the labour market are 1) the level of employment, 2) wages and 3) the quality of employment (Jenkins, 2006). The level of employment is defined in terms of the skills base and the productivity of the labour force which is currently of particular concern in South Africa. In relation to employment levels, wages play a significant role in workers' decisions regarding how many hours to work, greater skills acquirement and increased productivity (Barker, 2007:9). Although the quantity of employment opportunities within the South African labour market may contribute to an overall increase in economic well-being, the quality of employment in terms of working conditions is an essential factor to consider in ensuring increased prosperity within firms and the labour market.

This section elaborates on these three dimensions and how they are reflected in the South African labour market. The level of skill and education, productivity, and wages will be discussed. In this dissertation, the section focusing on working conditions examines the amount of hours worked by professional employees.

3.2.3.1   Level of employment

Jenkins (2006) explains the level of employment in terms of different skill levels and productivity.

3.2.3.1.1 Demand for skilled workers

A number of studies have examined the effect of inadequate education and skills on employment growth and economic growth in South Africa (Woolard, Kneebone & Lee,

2003; Dias & Posel, 2007). Mismatches between the supply of and demand for labour with regards to skill levels have become more pronounced, inhibiting economic growth rates. Government policy regarding skills development systems and structures in South Africa established the National Skills Authority (NSA) in 1999 which is responsible for advising the Minister of Labour on policies, strategies and progress made. More recent policy programmes include the Joint Initiative on Priority Skills Acquisition (JIPSA) established in March 2003 which aims to identify priority skills and develop skills required by all sectors of society. Other skills development programmes include the Sector Education and Training Authorities (SETA) and the National Skills Development Strategy (NSDS).

Education significantly increases the probability of being employed, with the amount and type of education reflecting a labourer's ability to learn, acquire skills, increase productivity and commit to a job (Dias & Posel, 2007:3). In addition, employees with higher educational qualifications earn a higher salary due to greater skill development which enhances productivity. This progression characterises the human capital theory, illustrated in Figure 3.2.

Figure 3.2: The human capital theory
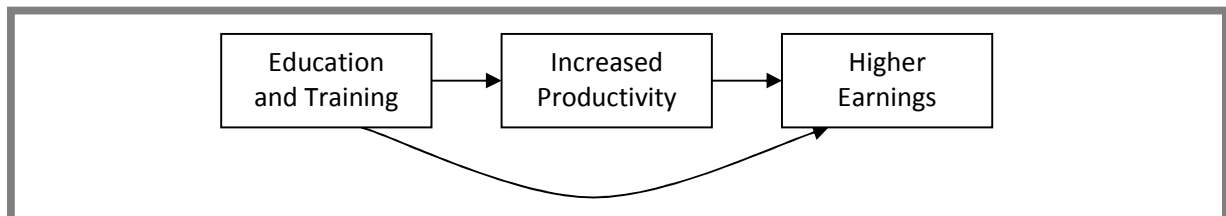
Source: Barker, 2007.

The educational level of the economically active population (EAP) of the labour force in September 2009 is highlighted in Table 3.7. It is apparent that an average of 35 per cent of the labour force consists of workers with uncompleted secondary education, whilst the percentage of workers who completed their secondary education relative to the labour force improved from 29.80 per cent in Q2:2009 to 30.11 per cent in Q3:2009.

Table 3.7: Educational level of the economically active population

	Jul-Sep 2008	Apr-Jun 2009	Jul-Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousand						
Highest level of education	17,777	17,494	17,077	-417	-2.4%	-700	-3.9%
No schooling	673	584	545	-39	-6.7%	-128	-19.0%
Less than primary completed	1,840	1,638	1,532	-106	-6.5%	-308	-16.7%
Primary completed	958	907	871	-36	-4.0%	-87	-9.1%
Secondary not completed	6,398	6,318	6,096	-222	-3.5%	-302	-4.7%
Secondary completed	5,185	5,213	5,142	-71	-1.4%	-43	-0.8%
Tertiary	2,540	2,679	2,693	14	0.5%	153	6.0%
Other	185	155	197	42	27.1%	12	6.5%

Source: Labour Force Survey September 2009.

The percentage of the labour force with a tertiary qualification increased marginally from 15.31 per cent in Q2:2009 to 15.77 per cent in Q3:2009. Although slight improvements in the education levels of the labour force are visible, a large number of illiteracy amongst workers remains.

As discussed in Chapter 2, the creative class, people endowed with high levels of human capital, have invested time in acquiring educational skills and qualifications. Unwilling to move to areas where this investment may become undervalued in the labour market, highly educated workers concentrate in cities where they are less at risk to compromise their education and where their geographical matching of resources are most relevant and remunerated (Storper & Scott, 2009:161). Some may argue that education is an inadequate indicator of skills attained as some qualified employees rely on experience gained rather than qualifications obtained. The occupational structure of the labour force is indicative of the amount of skill or training the members of the labour force possess.

Occupations are usually classified according to type of work done, although attention is sometimes paid to the specific sector of an occupation or the training required for a particular occupation (Barker, 2007:212).

Table 3.8: Employment by occupation in the formal and informal sectors

	Jul-Sep 2008	Apr-Jun 2009	Jul-Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousand						
Both genders	13655	13369	12885	-484	-3.6%	-770	-5.6%
Manager	1,054	1,022	994	-28	-2.7%	-60	-5.7%
Professional	727	654	703	49	7.5%	-24	-3.3%
Technician	1,485	1,550	1,493	-57	-3.7%	8	0.5%
Clerk	1,462	1,440	1,431	-9	-0.6%	-31	-2.1%
Sales and services	1,780	1,804	1,792	-12	-0.7%	12	0.7%
Skilled agriculture	99	83	72	-11	-13.3%	-27	-27.3%
Craft and related trade	1,881	1,779	1,568	-211	-11.9%	-313	-16.6%
Plant / machine operator	1,208	1,186	1,097	-89	-7.5%	-111	-9.2%
Elementary	2,960	2,889	2,812	-77	-2.7%	-148	-5.0%
Domestic worker	996	963	924	-39	-4.0%	-72	-7.2%
Other	1						

Source: Labour Force Survey September 2009.

Table 3.8 shows the occupational structure of the South Africa labour force in September 2009. Elementary occupations formed the largest component of the labour force, with approximately 22 per cent of workers in the labour force working in elementary occupations in Q3:2009. Sales and service workers comprised 13.9 per cent of the labour force, whilst plant and machine operators made up approximately 9 per cent of the total labour force in Q3:2009, according to the September 2009 Labour Force Survey.

Continuing to examine labour market outcomes in the manufacturing sector of South Africa, Hofmeyr (2010) analyses the extent to which social networks influence workers in engaging in certain occupations which eventually become ethnic occupational niches. According to Hofmeyr (2010:107), an ethnic occupational niche is defined as 'the concentration and specialisation of members of an ethnic group in a particular occupational activity'. This occurrence is heightened by social networks facilitating the transmission of job-related behaviour between individuals and is believed to be a useful tool due to the significance that personal contact has within labour markets and the probability of securing a job.

Hiring through social networks provides employers with a richer pool of applicants in terms of quality and size which results in the formation of ethnic niches. Individuals of the same niche continue to be informed of job opportunities whilst those who are not part of the niche remain excluded, causing ethnically segregated working environments. Using data from a 10 per cent sample of the 2001 Census, occupations in certain geographical areas are identified as niche or non-niche. Furthermore a linear probability model is implemented in order to estimate the extent to which social networks influence the probability of niche employment in the manufacturing sector. Magisterial districts are indicative of the geographic area and language groups represent the respective ethnic niches (Hofmeyr, 2010).

Hofmeyr's (2010) results identify corporate managers, general managers and other professionals as the three occupations with the most prominent incidence of ethnic niche employment. In terms of language groups, English speakers are dominant in these occupations, followed by Afrikaans speakers. Moreover, due to higher education levels and, to some extent the legacy of apartheid, high ranking positions are reserved for white South Africans, noted as highly skilled occupations. These occupations in which ethnic niches exist are also the highest paid, advantageous niches. On the other hand, traditional black language groups such as IsiZulu and IsiXhosa speakers are mostly in low-wage, low-skill occupations, classified as disadvantageous niches.

Hofmeyr (2010:128) concludes by verifying that social networks significantly influence the probability of being employed within a particular niche. Furthermore results indicate that, whilst traditional black language groups are concentrated in low-wage, low-skill, disadvantageous niches, English and Afrikaans speakers find themselves in concentrated groups of advantageous niches, boasting highly skilled, highly paid workers.

Segregation of the South African labour market in terms of social networks may assist those with the right networks and referrals to acquire employment more effectively, but trap those in low-wage disadvantageous occupations. In the long term, this may also influence workplace productivity and integration within the labour market as a whole.

In his earlier work, Jenkins (2006:653) explains that worker occupations may be divided into three categories, namely skilled, semi-skilled and unskilled workers. Skilled workers comprise those working in professional, technical and managerial occupations. Semi-skilled workers include clerks, sales and services, skilled agriculture, artisans, supervisors and machine operators. The unskilled category refers to all other remaining occupations, which include elementary and domestic work. According to Woolard *et al.* (2003) there exists a discrepancy in the South African labour market as some skills are in abundance whilst other skills are deficient.

Table 3.9: Skills levels of workers in the formal and informal sectors

	Jul-Sep 2008	Apr-Jun 2009	Jul-Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousand						
Both Genders	13655	13369	12885	-484	-3.6%	-770	-5.6%
Skilled	3,266	3,226	3,190	-36	-1.1%	-76	-2.3%
Semi-skilled	6,430	6,292	5,960	-332	-5.3%	-470	-7.3%
Unskilled	3,957	3,852	3,736	-116	-3.0%	-221	-5.6%

Source: Labour Force Survey September 2009.

Table 3.9 illustrates that during Q3:2009, about a quarter (24.76 per cent) of the labour force consisted of skilled workers, as well as the smallest decline both quarterly (-1.1 per cent) and an annual growth of -2.3 per cent. Semi-skilled workers comprised almost half of the labour force in Q3:2009 (46.26 per cent), with the amount of semi-skilled workers decreasing by 5.3 per cent quarterly and 7.3 per cent annually from Q3:2008 to Q3:2009. The numbers of unskilled workers are also on the downward path, declining by 3.0 per cent quarterly and 5.6 per cent annually from Q3:2008 to Q3:2009.

The need for skilled workers and occupations which require a higher level of skill is becoming more apparent (Bhorat & Lundall, 2001; Barker, 2007; Dias & Posel, 2007). Less emphasis is being placed on employment opportunities for semi-skilled and unskilled labour and minimum requirements are being demanded by industries. Skilled workers may find more permanent employment within the formal sector however, unskilled workers are more prone to finding work in the informal sector and, with the dismal state of South Africa's informal sector, they are most likely to become

unemployed. Therefore, in order for a country to achieve the necessary employment growth, rapid skills development is essential. Should higher growth be achieved in sectors utilising skilled labour, a greater demand for skilled workers will arise (Fallon & Lucas, 1998:29). In terms of policy measures, the National Skills Development Strategy (NSDS) is focusing on increasing the rate of scarce skills of workers, upgrading existing worker skills, expanding basic education to all citizens, whilst attempting to reduce the mismatch between external training institutions such as universities and employers (South Africa, 2009).

3.2.3.1.2 Productivity

As explained previously, labour market flexibility is important for improving the outcomes within labour market processes, particularly employment creation. Flexibility and productivity are adjoined as increases in flexibility, such as lenient working practices, working hours, wage determination and transfers within and between workplaces, lead to productivity increases (Barker,2007:116). Although Barker (2007) states that productivity levels influence the quality of the labour force, the insufficient skills levels of workers within the South African labour force limit increases in productivity performance.

Daniels (2007:1) claims that educational skills are a vital component in addressing productivity problems within firms, even though government fails to recognise this relationship as significant. In an effort to increase productivity, firms implement technological changes. However, this requires firms to provide employees with the necessary training which may induce greater skills shortages at an economy-wide level. Although training improves output levels, it improves productivity to a lesser extent. Furthermore, allowing foreign-skilled workers into the country may contribute to increased productivity through the transfer of their knowledge to local workers, thereby facilitating greater competitiveness within South African firms (Daniels, 2007:36).

Competition is shown to enhance productivity and forces firms to become more innovative (Rosenthal & Strange, 2002:20). Additional factors influencing productivity in

South Africa include lack of management skills, poor social circumstances such as inadequate housing and long travelling distances, a lack of productivity incentive schemes and productivity-linked remuneration (Barker, 2007). Efficiency wages result as workers receive greater compensation for increased productivity. Higher wages inspire improved job matching due to more careful consideration when recruiting and also motivate workers to increase their productive efforts.

It appears as though highly skilled workers are an essential resource to increasing productivity, flexibility and competitiveness within firms. An economic assessment of South Africa by the OECD in 2008 indicates that increasing competitiveness improves efficient allocation of resources and productivity, with domestic and foreign competition advancing productivity growth. Findings by Fedderke, Aghion and Braun (2007) conclude that reducing anti-competitive barriers may have a significant effect on the South African manufacturing industry, as high mark-ups greatly reduce productivity within industries.

The National Productivity Institute (NPI) plays an important role in increasing productivity and competitiveness in South Africa. Functions of the NPI include:

- Developing a competent culture of productivity within the workplace;
- Facilitating and developing improvements of productivity and competitiveness in workplaces;
- Maintaining a database of productivity and competitiveness systems.

Productivity initiatives such as employment growth, education and workforce training and the development of more competitive products and services need to be intensified.

3.2.3.2   Wages

As mentioned previously, productivity of human capital determines wage levels through efficiency wages, therefore, wages are a significant contributor to labour market outcomes. Wages play an important role with regards to the division of labour in occupations, sectors and regions, whilst decisions regarding the attainment of, in

particular, higher education levels, also depends on wages received (Barker, 2007:60). Wage differentials take on a number of different identities, namely skills, unions, geography and discrimination.

Table 3.10: Average monthly earnings in formal, non-agricultural industries, November 2009

	Average Monthly Earnings (2005)	Average Monthly Earnings (2009)	Percentage Growth ('05-'09)	Ratio to Total (2009)
Mining	R 7,212.00	R 12,030.00	66.81%	112.49%
Manufacturing	R 6,783.00	R 9,418.00	38.85%	88.07%
Electricity, gas and water	R 14,594.00	R 22,322.00	52.95%	208.73%
Construction	R 4,251.00	R 7,360.00	73.14%	68.82%
Trade	R 4,940.00	R 7,093.00	43.58%	66.33%
Transport, communication	R 10,432.00	R 13,530.00	29.70%	126.52%
Finance, real estate	R 7,575.00	R 11,512.00	51.97%	107.65%
Community, social services	R 8,575.00	R 12,981.00	51.38%	121.39%
Total	R 7,112.00	R 10,694.00	50.37%	100.0%

Source: Barker, 2007.

Although human capital characteristics and education significantly influence wage levels, South Africa remains burdened by labour market discrimination. Table 3.10 illustrates that formal sector average monthly earnings have increased considerably from November 2005 to November 2009.

3.2.3.3   Quality of employment

The quality of employment in terms of working conditions for employees is imperative to ensure higher quality of work produced within firms and the labour market. As explained earlier in Section 3.2.3, flexible working conditions have a considerable impact on productivity and working performance. Flexibility with regards to changes in the regulation of working hours and its impact on working conditions has been receiving more attention throughout the years, giving firms more power to establish and adjust working hours and patterns. This is discussed below.

3.2.3.3.1   Hours worked

The policy debate concerning working hours in the South African labour market has received much attention recently through a discussion on the impact of a legal reduction in the number of hours worked on employment and labour costs. The National Labour and Economic Development Institute (Naledi) launched a research project on hours of work in South Africa in an attempt to shed more light on the matter. Focusing on four sectors in South Africa, namely long-haul trucking, the metal sector, retail and gold mining, findings indicate that South Africans working in these industries log substantially longer hours than workers in the same industries in most other countries. In particular, employees classified as production workers work the longest hours in comparison to office workers, and this segmentation appears to take on a racial dimension. Reductions in working hours have been introduced in many countries including South Africa, where attempts have been made to implement a 40-hour working week in order to improve workers' welfare, increase employment opportunities, productivity and prevent excessive working hours (Barker, 2007:77). In terms of legislation, the Basic Conditions of Employment Act (BCEA) 75 of 1997 was promulgated to improve labour market standards by regulating the working conditions of employees. The Act specifies the working time of employees in chapter 2 of the BCEA, stating that "employees must be arranged so as not to endanger their health and safety, keeping family responsibilities in mind" (South Africa, 1997b:8). Basic conditions of employment with regards to ordinary working hours declare that employees may not work more than:

- Forty-five hours in any week;
- Nine hours in any day should the employee work five days or less in a week;
- Eight hours in any day should the employee work more than five days per week.

Agreements involving overtime must be negotiated, as employers may not demand employees to work more than:

- Three hours overtime a day;
- Ten hours overtime per week.

Wages should be calculated at one and one-half times the employee's ordinary wage. When ordinary daily hours of work are required to be extended, a written agreement should state that an employee may work for up to twelve hours per day without receiving overtime pay. Limits on working hours are not applicable to:

- Senior managers;
- Travelling sales personnel regulating their own hours of work;
- Employees working less than 24 hours per month for an employer;
- Workers receiving an annual salary of more than R115 572 and
- Workers involved in emergency work.

Although appropriate limitations on working hours should be implemented by labour legislation, this does not necessitate increased employment but is rather found to have fuelled unemployment in South Africa (Barker, 2007:33).

Table 3.11 indicates the usual hours worked by the South African labour force in September 2009. 53 per cent of all employees worked between 40 and 45 hours per week in Q3:2009, whilst 30 per cent of all employees logged more than 45 hours per week in Q3:2009. More than half of the total female workers worked between 40 and 45 hours, with approximately one quarter working more than 45 hours per week in Q3:2009. 54 per cent of male workers recorded between 40 and 45 hours of work per week with 35 per cent of male employees registering more than 45 hours of work in one week during Q3:2009.

Although these numbers have declined compared to previous quarters, a substantial number of workers are logging more hours than stipulated by labour legislation. This implies that working conditions of some employees require them to work longer hours, stimulating some sort of competitive or rivalrous environment and that exploitation of workers and their working conditions are still present despite labour legislation enforced to assist workers.

Oosthuizen and Goga (2007) investigate changes in the number of hours worked in South Africa between 2000 and 2005 using data from the Labour Force Surveys of 2000 and 2005 respectively. Findings show that formal sector, non-agricultural employees working 24 hours or more per month, earning more than R89 455 annually averaged 47.6 hours per week in 2000. During 2005, the average number of hours of work per week for employees earning the adjusted income cut-off of R115 572 per annum totalled 49.1, increasing by approximately an hour and a half (Oosthuizen & Goga, 2007:6). In terms of demographic characteristics, some interesting findings were made. With regards to race, it appears as though all citizens have increased the average hours worked from 2000 to 2005, with Africans working the longest hours (49.9), followed by Asians (47.3), Whites (46.3) and Coloureds (46.2) during 2005.

Table 3.11: South African labour force: Usual hours of work

	Jul-Sep 2008	Apr-Jun 2009	Jul-Sep 2009	Quarter change	% Change	Annual change	% Change
	Thousand	Thousand	Thousand	Thousand	Per cent	Thousand	Per cent
Working Hours							
Both genders	13655	13369	12885	-484	-3.6%	-770	-5.6%
< 15 hours per week	300	284	272	-12	-4.2%	-28	-9.3%
15-29 hours per week	811	843	812	-31	-3.7%	1	0.1%
30-39 hours per week	1,039	972	971	-1	-0.1%	-68	-6.5%
40-45 hours per week	6,965	7,187	6,864	-323	-4.5%	-101	-1.5%
> 45 hours per week	4,540	4,083	3,966	-117	-2.9%	-574	-12.6%
Female	6,034	5,973	5,782	-191	-3.2%	-252	-4.2%
< 15 hours per week	201	182	164	-18	-9.9%	-37	-18.4%
15-29 hours per week	550	566	543	-23	-4.1%	-7	-1.3%
30-39 hours per week	642	629	615	-14	-2.2%	-27	-4.2%
40-45 hours per week	3,011	3,110	3,009	-101	-3.2%	-2	-0.1%
> 45 hours per week	1630	1485	1451	-34	-2.3%	-179	-11.0%
Male	7621	7397	7102	-295	-4.0%	-519	-6.8%
< 15 hours per week	99	102	108	6	5.9%	9	9.1%
15-29 hours per week	261	277	269	-8	-2.9%	8	3.1%
30-39 hours per week	397	343	356	13	3.8%	-41	-10.3%
40-45 hours per week	3954	4077	3855	-222	-5.4%	-99	-2.5%
> 45 hours per week	2910	2598	2515	-83	-3.2%	-395	-13.6%

Source: Labour Force Survey September 2009.

The number of hours worked between male and female employees differs considerably. Male workers continued logging more working hours than females both in 2000 and in 2005. Males recorded an average of 50 hours' work in 2005, whilst females increased their average working hours in a week from 44.9 in 2000 to 46.8 in 2005. When combining race and gender, African males averaged the most hours per week (50.8) in 2005, followed by Asian and White males (48.3). African females worked the most amounts of hours per week (48.2) and White females logged the least amount of average hours in a week (44.5). Dividing average hours within different age categories indicates that, from 2000 to 2005, all ages groups increased the amount of hours worked. In 2005, employees aged between 25 to 34 years worked 1.5 hours more than in 2000 (from 48.1 to 49.6), whilst 35 to 44 year olds worked 1.2 hours extra per week (from 47.2 to 48.4).

Oosthuizen and Goga (2007) further analyse changes in the number of average hours worked between 2000 and 2005 in terms of education, wages, type of work, province, union membership, employment type, sector of work and occupation, as illustrated in Table 3.12. Findings indicate that workers with no education averaged the most hours per week in 2000 (51.7). During 2005, workers with incomplete general education training (GET) logged 50.2 hours per week and employees with completed GET's worked 49.8 hours per week. More significant to this dissertation, degree-holders are found to work less than those with lower education levels (from 43.6 hours per week in 2000 to 42.8 hours per week in 2005). However, Oosthuizen and Goga also find that the proportion of degree-holders averaging more than 55 hours per week increased from 2000 to 2005.

In terms of geography, Oosthuizen and Goga (2007:17) measure average hours worked in the nine provinces of South Africa. Table 3.12 illustrates that Limpopo clocked an average of 52.6 hours per week, followed by KwaZulu-Natal, increasing by ten per cent from 47.5 hours per week in 2000 to 52 hours per week in 2005. Gauteng employees maintained an average of 47.6 working hours per week between 2000 and 2005, whilst the Western Cape clocked 46.2 hours per week on average.

Table 3.12: Average hours worked by province, 2000-2005

	2000	2005	Change	
Province			Hours	Per cent
Western Cape	45.6	46.2	0.60	1.32%
Eastern Cape	45.7	46.5	0.80	1.75%
Northern Cape	48.1	48.5	0.40	0.83%
Free State	47.8	48.1	0.30	0.63%
KZN	47.5	52.0	4.50	9.47%
North West	48.9	49.1	0.20	0.41%
Gauteng	47.6	47.6	0.00	0.00%
Mpumalanga	50.3	50.7	0.40	0.80%
Limpopo	50.2	52.6	2.40	4.78%

Source: Oosthuizen & Goga, 2007.

Furthermore, Oosthuizen and Goga (2007:21) divide mean hours worked amongst occupational categories and Table 3.13 shows that all professions increased the average amount of hours worked between 2000 and 2005. Professionals (includes technical and associate professionals) and managerial occupations, defined earlier as skilled workers, clocked fewer hours on average than semi-skilled (clerical, service, craft and trade, operators and assemblers) and unskilled (elementary) occupations.

Table 3.13: Average hours worked by occupation, 2000-2005

	2000	2005	Change	
Province			Hours	Per cent
Managerial	47.4	48.5	1.10	2.32%
Professional	43.6	44.3	0.70	1.61%
Clerical	44.7	45.4	0.70	1.57%
Service	52.2	53.8	1.60	3.07%
Craft and trade	48.2	49.1	0.90	1.87%
Operators and assemblers	50.1	51.7	1.60	3.19%
Elementary	47.5	48.8	1.30	2.74%

Source: Oosthuizen & Goga, 2007.

Table 3.13 further indicates that service workers and operators and assemblers, part of the semi-skilled occupations, logged the most hours per week in 2005, averaging 53.8 and 51.7 hours respectively. Oosthuizen and Goga (2007) conclude by stating that the average hours of formal sector non-agricultural workers experienced little change from 2000 to 2005 with regards to mean hours worked per week. Some significant increases

in working hours were observed between 2000 and 2005, and findings indicate that government's attempts at introducing a 40-hour work week were unsuccessful during this period.

3.3 Urbanisation and labour market outcomes in South Africa

As stated previously in Section 3.1, the urban share of total population in South Africa is rising implying that urbanisation presents challenges, in particular for citizens concentrated in agglomerated areas searching for employment. Because of the significant increases in the concentrations of labour and capital in cities, the probability of finding employment opportunities in urban areas is far greater than in other areas, thereby drawing more people to live in cities and strengthening population density (SACN,2006). Cities boasting greater economic activity therefore contribute to agglomeration and concentration by attracting industries. Industry agglomeration brings about an increase in the supply of workers who are willing to work, increasing productivity and the intensity of labour supplied. Socio-economic outcomes such as finding employment and improving welfare may increase as a result of increasing urbanisation and concentration of workers.

A recent article by Haveman and Kearney (2010) establish a positive relationship between the probability of finding employment and the degree of urbanisation within a geographic location. Because employment opportunities are far greater within metropolitan areas, the probability for citizens to continually search for work in these areas is also improved. Using data from the 2005 Labour Force Survey and urbanisation data from Census 2001, a multinomial logit model is implemented. Demographic factors such as age, gender, population group, marital status, education and skills training are used to determine whether they increase the probability of being employed and living in more urbanised areas. Results show that the degree of urbanisation is positively related to an individual who is male, of working age (between 15 and 64), non-black, educated, working for a wage on a permanent basis and heading a small household. Haveman and Kearney (2010:13) conclude that whilst the

development of people in terms of skill and education is important, geographic location proves to be equally important in improving people's welfare.

3.4 Conclusion

The purpose of this chapter was to provide an overview of the South African labour market, examining recent literature and developments made with regards to various labour market issues. Unemployment remains evident in the South African labour market, fuelling poverty and inequality and, more particularly, reducing growth and the well-being of South African citizens. Factors such as increased divergence between labour market growth and growth in formal sector employment, inadequate informal sector employment opportunities and a lack of skilled or trained workers are some of the contributors of high unemployment levels. Magruder (2009) examines the effect of labour regulations on employment levels within large and small firms in South Africa including a spatial dimension in the estimated model assuming that, whilst local labour markets are spatially continuous, bargaining council agreements are enforced in a spatially discontinuous way. In conclusion, Magruder finds that by using spatial fixed effects and assuming spatial continuity of labour markets, bargaining councils are associated with approximately 8-14 per cent lower employment within a particular industry, 10-21 per cent higher wages and 7-15 per cent less employment in small firms.

Powdthavee (2006) investigates the extent to which people are unemployed when a proportion of people living in the same region are also without employment, implying that sustained unemployment could be indicative of geographical factors contributing to reduced well-being and positive labour market outcomes in different regions. He concludes that it may be easier to become unemployed and to remain so in a geographical region with noticeable joblessness. Lastly, Naudè (2008) proposes the presence of a spatial mismatch in the South African metropolitan labour market which produces significant differences in unemployment levels amongst black and white populations. Findings conclude that spatial restrictions related to mobility and spatial

structure within South African cities has impacted on employment creation amongst black and white populations in metropolitan labour markets.

The focus of this chapter was, however, on employment within the South African labour market, in particular the level of employment, wages and quality of employment in terms of working conditions. With regards to the level of employment in South Africa, findings indicate insufficient education levels and skills training in the labour market reduce the probability of being employed, and the occupational structure of the labour force is indicative of the amount of skill or training the members of the labour force possess. Hofmeyr (2010) examines the occupational structure of the South African labour market by analysing the extent to which social networks influence workers to engage in certain occupations which eventually become ethnic occupational niches. Empirical results verify that social networks significantly influence the probability of being employed within a particular niche, and may influence productivity within firms. Employment levels are, in addition, influenced by productivity as lenient working practices, working hours, wage determination and transfers within and between workplaces lead to productivity increases. Barker (2007) explains that an inadequate percentage of the South African labour force has acquired the necessary skills and education required by employers which limits productivity performance. Daniels (2007:1) emphasises that skills requirements are a vital component in addressing productivity problems within firms. An increase in competitive measures amongst manufacturing firms in South Africa is shown by Fedderke, Aghion and Braun (2008) to significantly improve productivity.

The influence of wages in labour market outcomes is merely outlined, as a number of authors have written extensively on the subject. Wages improve productivity and the division of labour into occupations, sectors and regions, whilst education may also influence the particular level of wages received.

The quality of employment in terms of working conditions, particularly the number of hours worked, was considered. Although a 40-hour working week has been introduced in the South African labour legislation aiming to improve workers' welfare, increase employment opportunities and productivity and prevent excessive working hours,

Oosthuizen and Goga (2007) find that between 2000 and 2005 this has not been the case. Results indicate that formal sector non-agricultural workers experienced modest changes in average hours worked from 2000 to 2005 with regards to mean hours worked per week. Some significant increases in working hours were observed between 2000 and 2005 and findings indicate that government's attempt to introduce a 40-hour work week was unsuccessful during this period. Using the nine provinces in South Africa as geographical proxies, Oosthuizen and Goga (2007) find that during 2005 KwaZulu-Natal and Limpopo clocked the most hours worked per week, whilst Gauteng maintained average working hours for 2000 and 2005. With regards to occupational categories, skilled professional workers clocked fewer hours than semi-skilled and unskilled workers in the period from 2000 to 2005. Lastly, an article by Haveman and Kearney (2010) demonstrates that geographic location does matter when attempting to find employment and those certain socio-economic factors such as education and skills training, certainly influence the probability of finding a job in more urbanised areas. Using data from the 2005 Labour Force Survey and the 2001 Census urbanisation index, results indicate that whilst socio-economic outcomes are caused by the level of urbanisation, the degree of urbanisation is also influenced by socio-economic outcomes.

This chapter indicates that education, skill, productivity and the amount of hours worked are essential components used to achieve a certain labour market outcome. Barker (2007: 28) states that better educated, younger and more energetic citizens migrate to urban areas in search of employment. Combining these attributes with a geographical element of living within concentrated urban areas as explained in Chapter 2, this may produce a rat race where individual worker attributes such as education, skill and productivity within agglomerated areas inspire or require workers to increase the amount of hours worked.

Rosenthal and Strange (2004) examine the connection between agglomeration and the work behaviour of professional workers in formal sectors, and find that an urban rat race either inspires employees to choose longer hours, or requires employees to work under

rivalrous conditions. This implies that rivalry exists between employees, increasing the intensity of labour supplied relative to hours worked in agglomerated areas.

Following Rosenthal and Strange's (2004) findings of an urban rat race, this dissertation continues by measuring rat race effects in the urban areas of South Africa. Although the literature on South African labour market issues has been wide-ranging, limited research has been done with regards to urban agglomeration in South Africa and its impact on professional employees, particularly on the number of hours worked. This dissertation aims to expand existing literature and contribute to further understanding labour market trends within South Africa. The focus of Chapter 4 is to use cross-sectional data to test for rat race effects within the urban areas of South Africa.

CHAPTER 4: EMPIRICAL ANALYSIS

4.1 Introduction

Chapter 2 showed that greater emphasis is being placed on geography as a significant factor influencing a country's economic performance (Martin & Ottaviano, 2001; Annez & Buckley, 2009; Duranton, 2008) and that there are different economic forces, or agglomeration economies, acting as incentives for firms to locate near each other in urban areas. These agglomeration economies derive from input sharing, labour market pooling and knowledge spillovers (Marshall, 1920; O'Sullivan, 2007). Chapter 3 discussed various issues within the South African labour market, observing that the need for highly-skilled workers within certain occupations was evident (Barker, 2007; Dias & Posel, 2007; Bhorat & Lundall, 2001). With regards to hours worked in South Africa, Oosthuizen and Goga (2007) established that although government attempted to regulate employees' working conditions by introducing a 40-hour work week there still remains a substantial number of workers logging more hours than stipulated by legislation.

The focus of this dissertation is to establish a relationship between labour supply in terms of hours worked and agglomeration effects in urban areas by testing for evidence of rat race effects within the South African labour market. As stated in Section 2.5 of Chapter 2, previous studies of labour and urban economics, both internationally and in South Africa, have overlooked the relationship between spatial concentration and the intensity of labour supplied in terms of hours worked. Akerlof's (1976) contribution to the literature determined the principals of the rat race model and a number of subsequent studies have analysed the working conditions of professional employees in terms of hours worked (Landers *et al.*, 1996; Bell & Freeman, 2001; Gicheva, 2009). However, limited empirical work on the rat race has been published.

This dissertation follows from the work of Rosenthal and Strange (2002), who find evidence that industrious professionals are drawn to agglomerated areas and that agglomeration increases the amount of hours worked, thus supporting Akerlof's (1976)

theory of the urban rat race. This chapter presents an overview of the data variables used and the results of regression models which test for rat race effects within South Africa.

4.2 Review of data used in the analysis

Taking into account the variables examined in the study by Rosenthal and Strange (2002), this dissertation attempts to use similar variables to evaluate the relationship between agglomeration and working hours within South Africa. Data for the measurement of rat race effects are sourced from the September 2007 South African Labour Force Survey (LFS). 2007 Labour Force Survey data is used due to quarterly Labour Force Survey data implemented from 2008 onwards, making it more challenging to conduct sufficient estimations.

Focusing on labour issues, the LFS provides measures of labour supply and input, employment, unemployment and the extent to which labour time and human resources are utilised. The levels of spatial disaggregation are the nine provinces, 44 district councils, six metropolitan municipalities and five cross-border district councils in South Africa (Stats SA:2008).

Following Rosenthal and Strange (2002), only full-time workers, defined as those working between 35 and 140 hours per week, are included. Of the 65 380 respondents participating in the September 2007 LFS, 2 286 workers are classified as full-time and adhere to the criteria required for this particular analysis. Furthermore, workers are divided into two occupational groups, namely professional and non-professional workers. Professional workers include legislators, senior professionals, technical and managerial workers. Non-professional workers are classified as clerks, service workers, skilled agriculture, craft and trade workers and plant and machine operators. Elementary occupations and domestic workers are grouped under 'other' workers, falling outside the scope of this dissertation.

Figure 1 illustrates the distribution of professional and non-professional employees within the 44 district councils, six metropolitan municipalities and five cross border district councils in South Africa. It appears as though a sizeable number of respondents of the 2007 September Labour Force Survey are defined as non-professional. The Cape Town, Ekurhuleni and Nelson Mandela metropolitan municipalities have large shares of non-professional workers with 60.24 per cent, 66.67 per cent and 50.31 per cent of the labour force reached by the LFS classified as non-professional.

Figure 4.1: Distribution of hours worked amongst professional and non-professional workers
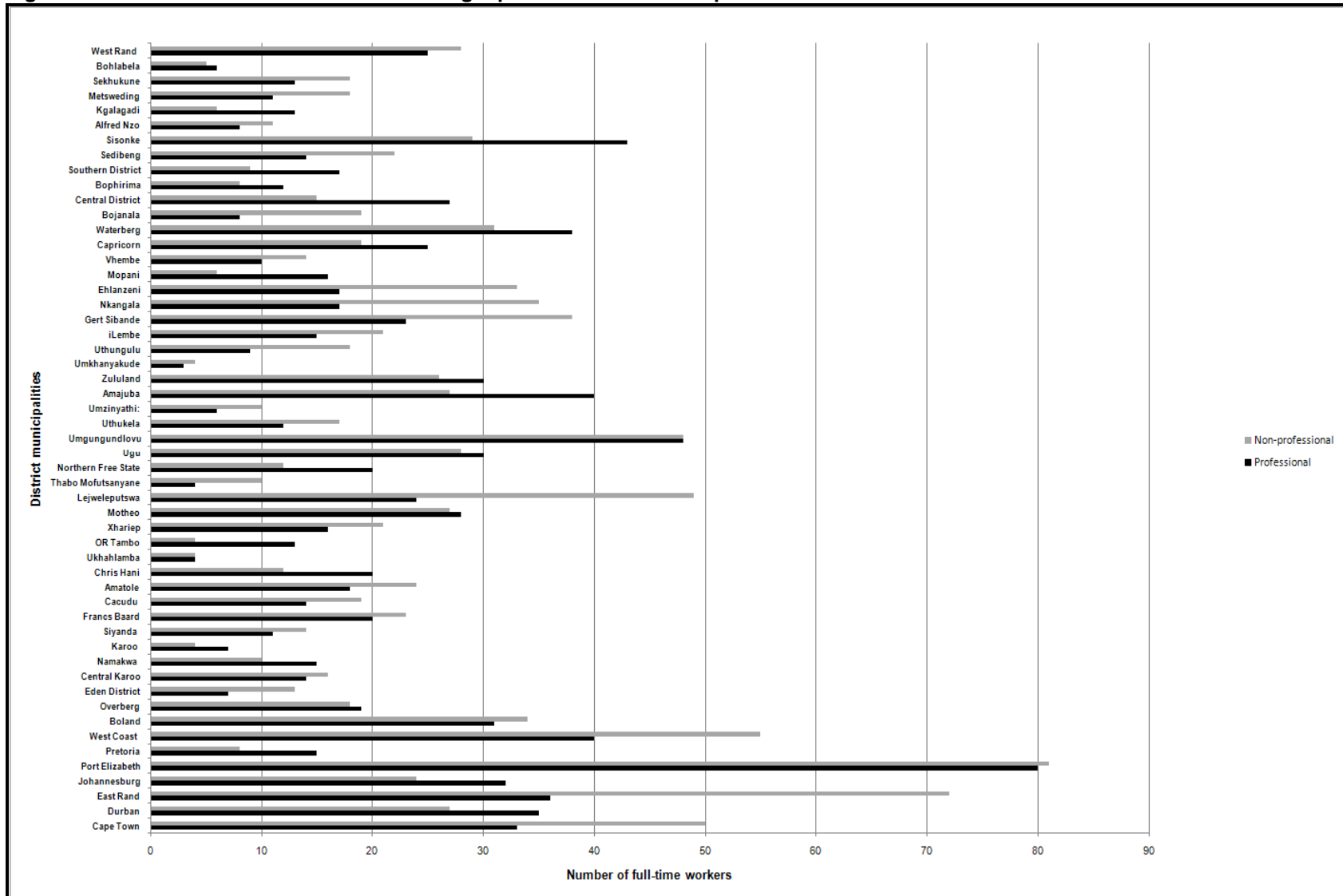
Source: Stats SA, Quarterly Labour Force Survey September 2007.

District municipalities with more than 60 per cent of employees defined as non-professionals include the Eden district municipality (65 per cent), Lejweleputswa (67.12 per cent), Umzinyathi (62.50 per cent), Uthungulu (66.67 per cent), Ehlanzeni (66 per cent), Bojanala (70.37 per cent), Sedibeng district municipality (61.11 per cent) and Metsweding cross-border district municipality (62.07 per cent). Amongst the 44 district municipalities a number of jurisdictions have defined more than 60 per cent of workers as professional workers, namely Namakwa (60 per cent), Karoo (63.64 per cent), Chris Hani (62.50 per cent), OR Tambo (76.47per cent), Northern Free State (62.50 per cent), Mopani (72.73 per cent), Central district municipality (64.29 per cent), Bophirima (60 per cent), Kgalagadi cross-border district municipality (68.42 per cent) and Southern district municipality (65.38 per cent). The metropolitan municipalities of Pretoria, Durban and Johannesburg have more professional workers with 65.22, 56.45 and 57.14 per cent grouped under professional employees[4]. Table 4.1 shows that approximately 452 full-time workers, or 42 per cent, work 40 hours per week whilst 452 full-time workers, or 20 per cent, work a total of between 41 and 45 hours per week. It appears as though non-professional workers are working more hours when full-time workers are averaging between 51 and 140 hours per week.

Table 4.1: Distribution of full-time workers in terms of hours worked

Hours worked per week	Professionals	Non-professionals	Total
35-39	151	38	189
40	487	469	956
41-45	206	246	452
46-50	92	173	265
51-55	33	56	89
56-60	62	101	163
61-70	30	43	73
71-80	15	40	55
81-90	7	18	25
91-140	9	10	22
Total	1092	1194	2286

Source: Stats SA, Quarterly Labour Force Survey September 2007.

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[4] Note that this is not Census data, therefore the distribution of workers per occupational group may reflect the sampling of the LFS data.

Furthermore, the estimated models require employees to be divided into age groups, namely young and middle-aged workers, with young workers aged between 30 and 40 whilst middle-aged workers are aged between 41 through 50, as illustrated in Table 4.2. Of the 2 286 full time workers within the LFS, 1 335 or 58 per cent are classified as young, whereas 951 or approximately 42 per cent of employees are middle-aged.

Table 4.2: Distribution of age groups within full-time workers

Age of workers	Professionals	Non-professionals	Total
30-40	601	734	1335
41-50	491	460	951
Total	1092	1194	2286

Source: Stats SA, Quarterly Labour Force Survey September 2007.

In their analysis, Rosenthal and Strange (2002) control for a number of individual-specific attributes, however the South African Labour Force Survey does not contain data on the presence of children, marital status, years of residency in South Africa and commute times. Individual-specific attributes in this dissertation therefore only include the worker's level of education, age and race.

Dividing professional and non-professional workers into the different race groups in South Africa reveals interesting results. Of the 2 286 full time workers used within the analysis, Table 4.3 shows that approximately 54 per cent are Black whilst only 15 per cent are coloured, 5 per cent are Indian or Asian and 26 per cent are white employees. Compared to the distribution of the population, there is over-sampling of the white population group, however, it reflects the racially-skewed labour market outcomes discussed in Section 3.2.

Table 4.3: Distribution of population groups amongst full-time workers

Population Groups	Professionals	Non-professionals	Total
Black	587	645	1232
Coloured	116	217	333
Indian/Asian	63	63	126
White	326	269	595
Total	1092	1194	2286

Source: Stats SA, Quarterly Labour Force Survey September 2007.

Table 4.4 indicates the distribution of education levels amongst full time workers, dividing professional and non-professional workers into two groups, namely those who have schooling up to Grade 12, and those who managed to complete a qualification[5] higher than Grade 12. Of the 2 286 full time workers participating in the survey, 360 professional workers, or 33 per cent completed only a secondary education, whilst 67 per cent graduated with a tertiary qualification of some kind. Within the distribution of non-professional workers, 79 per cent completed a secondary qualification and only approximately 21 per cent completed a tertiary education.

Table 4.4: Distribution of education levels amongst occupation groups

Education level	Professionals	Non-professionals	Total
Up to Grade 12 qualification	360	947	1307
More than a Grade 12 qualification	732	247	979
Total	1092	1194	2286

Source: Stats SA, Quarterly Labour Force Survey September 2007.

When evaluating trade union membership of professional and non-professional workers in the 2007 LFS, Table 4.5 illustrates that 65 per cent of professional workers are members of a trade union whilst approximately 34 per cent do not belong to a trade union. 52 per cent of non-professional workers within the survey stated that they were part of a trade union and 48 per cent were not.

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[5] A qualification higher than Grade 12 includes NTCI, NTCII, NTCIII, Diploma or Certificate, bachelor's degree, bachelor's and a diploma, honours, masters or doctorate degree.

Table 4.5: Trade union membership: professional and non-professional workers

Trade Union Membership	Professionals	Non-professionals	Total
Yes	611	527	1138
No	318	484	802
Total	929	1011	1940
Missing			346
Total			2286

Source: Stats SA, Quarterly Labour Force Survey September 2007.

A number of agglomeration variables have to be included when testing the relationship between agglomeration and hours worked in South Africa. In order to capture the influence of urbanisation, a log of population density within the particular district municipality is included. Data was sourced from the Regional Economic Explorer (REX) database compiled by Global Insight and contains the 2006 measurements of population density for each district municipality. Although population density is important in estimating the influence it has on hours worked, Rosenthal and Strange (2002:21) state that workers may be more willing to work longer hours if they were aware of the number of employees working within their particular occupation.

To capture this, a variable named occupation density was constructed to measure occupation-specific employment density within each district municipality. Adding the number of full time workers (working 35 hours or more per week) between the ages of 30 and 65 for professional and non-professional employees within a particular district municipality and then dividing this number by the geographic area of the district municipality produces a localisation variable capturing employment density within the two occupational groups. Rivalrous behaviour amongst employees is denoted by creating a variable isolating labour market rivalry. This was done by calculating an hourly wage distribution and grouping the distribution amongst young and middle-aged full time workers within each occupation. The result gives the number of rivals per occupation group per salary group. Table 4.12 indicates that as salaries increase, the number of rivals amongst professional workers increases. At the monthly salary levels of between R1 501 and R6 000 non-professional employees appear to have more competitive rivals than do professional workers.

Table 4.6: Number of rivals within different occupation groups and wage groups

Salary groups	Professional	Non-professional	Total
R1 – R200	3	29	32
R201 – R500	17	40	57
R501 – R1 000	21	76	97
R1 001 – R1 500	14	69	83
R1 501 – R2 500	25	153	178
R2 501 – R3 500	48	155	203
R3 501 – R4 500	74	154	228
R4 501 – R6 000	142	163	305
R6 001 – R8 000	189	137	326
R8 001 – R11 000	258	103	361
R11 001 – R16 000	147	68	215
R16 001 – R30 000	100	33	133
R30 001 or more	54	14	68
Total	1092	1194	2286

Source: Stats SA, Quarterly Labour Force Survey September 2007.

4.3 Empirical tests

Section 2.5 of Chapter 2 discussed different theoretical arguments of why the urban rat race causes employees in agglomerated areas to work harder, namely signalling, thick markets and productivity and selection effects. In the signalling model, workers put in long hours and invest in education in order to signal their ability to prospective employers. Rivalry starts to present itself as employees receive compensation according to the number of hours worked. Market thickness implies that hours worked amongst employees increase as the worker populations concentrate and competition increases in urban areas. Productivity models indicate that employees work longer hours as they are compensated for doing so, whereas selection models require workers to choose longer working hours in anticipation of increased remuneration.

Rosenthal and Strange (2002) find evidence that these effects determine the relationship between agglomeration and hours worked. Using cross-sectional data from the September 2007 Quarterly Labour Force Survey including worker-specific characteristics, dummy variables and several agglomeration variables, this dissertation

aims to explore the relationship between agglomeration and hours worked in the urban areas of South Africa.

The hypothesis for the analysis is that the number of hours worked per week in South Africa depends on worker's level of education, occupation in terms of professional and non-professional workers, age, race and gender. Agglomeration variables included in the analysis are population density, occupation density, rivalry and a location dummy variable. Dummy variables are included in all models to control for occupation fixed effects.

4.4 Model specification

A number of model specifications are used in the empirical analysis. The dependent variable remains the same throughout, but the explanatory variables differ between model specifications as some are added or excluded from the analysis. The base model is specified as:

LogHoursWorked = f(GenderMaleDum, Age, YoungProf, MiddleAgeProf, MiddleAgeNonProf, DumEducMoreThanGrade 12, DumPopBlack, DumPopColoured, DumPopIndian, LogPopDensity)

Where:
GenderMaleDum = Male worker dummy;
YoungProf = Professional workers between 30 and 40;
MiddleAgeProf = Professional workers between 41 and 50;
MiddleAgeNonProf = Non-professional workers between 41 and 50;
DumEducMoreThanGrade 12 = Dummy for education levels higher than Grade 12;
DumPopBlack = Black population group dummy;
DumPopColoured = Coloured population group dummy;
DumPopIndian = Indian population group dummy;
LogPopDensity = Log of population density within each district municipality.

Additional agglomeration variables measuring the effects of urbanisation, localisation and competition amongst workers are added to the model which includes occupation density, rivalry and dummies identifying the metropolitan municipalities in South Africa, namely a dummy for Gauteng (includes Johannesburg, Ekurhuleni and Pretoria), Cape Town, Durban and Port Elizabeth.

4.5   Results expected

According to findings made by Rosenthal and Strange (2003a), it is expected that for young and middle-aged professional workers the number of hours worked will increase as education levels increase and that White population groups will work longer hours than other ethnic groups. The coefficient on population density, capturing the influence of urbanisation, is expected to have a positive relationship with hours worked whilst occupation density defined as a measure of localisation also influences hours worked positively amongst young and middle-aged professionals. As a result, the rivalry effect created by an increased presence of workers in the same occupation is expected to have a positive effect on hours worked amongst young professional workers and a negative, work-spreading effect between middle-aged professionals.

These results are consistent with the three models of selection, productivity and rivalry where Rosenthal and Strange (2003a) describe that those young professionals choose to work longer hours in active professional environments where productivity, wages and rivalrous behaviour encourages hard work. For professional workers the effect of agglomeration on hours worked should result in increased hours worked, whereas non-professional workers will experience a negative effect as agglomeration spreads out the workload over a larger number of individuals.

With regards to non-professional workers, a pattern of work-spreading is expected to prevail as agglomeration causes non-professionals to work fewer hours. The anticipated coefficient on both the log of population density and occupation density is negative, implying that increases in city size and increases in proximity to similar type workers cause work-spreading amongst non-professionals.

The coefficient of rivalry between non-professional workers is expected to negatively influence hours worked as workloads are spread out across individuals reducing the amount of work hours. Due to work-spreading, non-professional workers are not expected to partake in signalling activities or rivalrous behaviour and therefore do not participate in an urban rat race.

4.6   Analysis of results

Using cross-sectional data from the September 2007 South African Labour Survey, OLS regressions were run using the log of hours worked as the dependent variable and different worker attributes, dummy variables and agglomeration variables as explanatory variables. Results found using 2007 LFS data yields atypical results concerning the relationship between worker characteristics, agglomeration and hours worked. This will be discussed below. Robust standard errors are used in order to ensure the validity of variables in the presence of heteroskedasticity.

Table 4.7 illustrates the base model estimated by regressing the log of hours worked on worker attributes and the log of population density capturing the influence of urbanisation and a number of dummy variables. Contrary to expectations, young professional workers in South Africa work 1.89 per cent fewer hours than the base group of young non-professional workers this difference being highly significant; middle-aged professionals work 0.24 per cent fewer hours than young non-professional workers with this difference being insignificant. It is interesting to note that the number of hours worked amongst middle-aged non-professional employees is 0.44 per cent higher than the base of young non-professionals.

In terms of education levels, it is noteworthy that individuals with an educational qualification higher than Grade 12 work 1.62 per cent fewer hours in comparison to the category of employees with Grade 12 as their highest qualification. Both of the latter variables are significant. The variable age does not have a significant impact on the estimated relationship.

Results of the race dummies indicate that black employees work 1.04 per cent less than white workers and that coloured and Indian employees work 3.14 and 1.47 per cent fewer hours than white population groups respectively. The estimate pertaining to race indicates that male workers spend 2.53 per cent more hours at work than their female counterparts. Lastly, the coefficient of the log of population density is indicative of a work-spreading effect, as hours worked decrease by 0.042 per cent for every one unit increase in population density, implying that in South Africa increased city size causes workloads to spread out.

Table 4.7: Base model

Dependent Variable: LOGHOURSWORKED
Method: Least Squares
Sample: 1 2286
Included observations: 2286
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. error	t-statistic	Prob.
C	1.7296	0.0210	82.188	0.0000
EDUCMORETHANGRADE 12	-0.0162	0.0041	-4.0020	0.0001
AGE	-0.0015	0.0006	-2.7863	0.0054
DUMPOPBLACK	-0.0104	0.0043	-2.4070	0.0162
DUMPOPCOLOURED	-0.0314	0.0053	-5.8903	0.0000
DUMPOPINDIAN	-0.0147	0.0064	-2.3002	0.0215
GENDERMALEDUM	0.0253	0.0035	7.2532	0.0000
YOUNGPROF	-0.0189	0.0049	-3.8682	0.0001
MIDDLEAGEPROF	-0.0024	0.0037	-0.6488	0.5165
MIDDLEAGENONPROF	0.0044	0.0020	2.2266	0.0261
LOGPOPULATIONDENSITY	-0.0042	0.0024	-1.7723	0.0765

R-squared	0.0727	Mean dependent var	1.6539
Adjusted R-squared	0.0686	S.D. dependent var	0.0863
S.E. of regression	0.0833	Akaike info criterion	-2.1290
Sum squared resid	15.7696	Schwarz criterion	-2.1014
Log likelihood	2444.415	Hannan-Quinn criter.	-2.1189
F-statistic	17.8234	Durbin-Watson stat	1.7883
Prob(F-statistic)	0.00000		

Table 4.8: Base model with occupation density included

Dependent Variable: LOGHOURSWORKED
Method: Least Squares
Sample: 1 2286
Included observations: 2286
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. error	t-statistic	Prob.
C	1.7296	0.0211	82.130	0.0000
EDUCMORETHANGRADE 12	-0.0161	0.0041	-3.9783	0.0001
AGE	-0.0016	0.0006	-2.8002	0.0052
DUMPOPBLACK	-0.0105	0.0043	-2.4103	0.0160
DUMPOPCOLOURED	-0.0315	0.0054	-5.8923	0.0000
DUMPOPINDIAN	-0.0150	0.0065	-2.3033	0.0214
GENDERMALEDUM	0.0253	0.0035	7.2512	0.0000
YOUNGPROF	-0.0199	0.0055	-3.6396	0.0003
MIDDLEAGEPROF	-0.0024	0.0037	-0.6466	0.5179
MIDDLEAGENONPROF	0.0045	0.0020	2.2337	0.0256
LOGPOPULATIONDENSITY	-0.0043	0.0024	-1.7895	0.0737
OCCUPATIONDENSITY	0.0126	0.0351	0.3596	0.7192

R-squared	0.0727	Mean dependent var	1.6539
Adjusted R-squared	0.0682	S.D. dependent var	0.0863
S.E. of regression	0.0833	Akaike info criterion	-2.1282
Sum squared resid	15.7686	Schwarz criterion	-2.0981
Log likelihood	2444.490	Hannan-Quinn criter.	-2.1172
F-statistic	16.2105	Durbin-Watson stat	1.7886
Prob(F-statistic)	0.0000		

In Table 4.8, the variable occupation density, representing the concentration of workers in similar occupations within a district, is added to the base model in Table 6. Defined as a measure of localisation, Rosenthal and Strange (2003a:21) state that occupation density evaluates whether or not a worker is more motivated to work when in the presence of workers in similar occupations. Although insignificant, the coefficient of occupation density is positive implying that the number of hours worked is 1.26 per cent higher for employees working in close proximity to similar occupations.

Table 4.9 includes a variable named rivalry which captures the influence of rivalrous behaviour on hours worked when there is an increase in the number of employees working in similar occupations in the same income category. By adding rivalry to the regression, the coefficient of occupation density becomes negative and remain insignificant, further adding to the theory of a work-spreading effect. The number of hours worked decreases by 0.02 per cent for every one unit increase in rivalry and is highly significant, implying that an increase in the amount of workers within similar occupation and salary groups causes workloads to spread across individuals therefore reducing the number of hours worked.

Increased proximity to similar type workers rather than city size could perhaps better support the explanation as to why work-spreading occurs in agglomerated areas of South Africa. This result does not provide evidence of rivalrous behaviour amongst employees in agglomerated areas within South Africa. Rosenthal and Strange (2003a) explain that a positive and significant coefficient of occupation density provides evidence of a selection and productivity effect, however, the negative and insignificant value for the South African estimates on occupation density may imply that although workers are drawn to agglomerated areas in search of employment, this does not imply that workers are drawn to the professional occupational industries in urban areas or that agglomeration increases worker productivity.

Table 4.9: Base model with occupation density and rivalry variables

Dependent Variable: LOGHOURSWORKED
Method: Least Squares
Sample: 1 2286
Included observations: 2286
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. error	t-statistic	Prob.
C	1.7466	0.0212	82.5990	0.0000
EDUCMORETHANGRADE 12	-0.0130	0.0041	-3.16270	0.0016
AGE	-0.0014	0.0006	-2.56434	0.0104
DUMPOPBLACK	-0.0102	0.0043	-2.36490	0.0181
DUMPOPCOLOURED	-0.0281	0.0054	-5.26518	0.0000
DUMPOPINDIAN	-0.0163	0.0065	-2.48619	0.0130
GENDERMALEDUM	0.0248	0.0035	7.18496	0.0000
YOUNGPROF	-0.0134	0.0055	-2.42742	0.0153
MIDDLEAGEPROF	-0.0010	0.0037	-0.27641	0.7823
MIDDLEAGENONPROF	0.0038	0.0020	1.91963	0.0550
LOGPOPULATIONDENSITY	-0.0036	0.0024	-1.53866	0.1240
OCCUPATIONDENSITY	-0.0303	0.0351	-0.86218	0.3887
RIVALRY	-0.0002	2.94E-05	-6.39702	0.0000

R-squared	0.0900	Mean dependent var	1.6539
Adjusted R-squared	0.0852	S.D. dependent var	0.0863
S.E. of regression	0.0825	Akaike info criterion	-2.1461
Sum squared resid	15.4742	Schwarz criterion	-2.1135
Log likelihood	2466.031	Hannan-Quinn criter.	-2.1342
F-statistic	18.7393	Durbin-Watson stat	1.8237
Prob(F-statistic)	0.0000		

Table 4.10: Base model with agglomeration and dummy variables

Dependent Variable: LOGHOURSWORKED
Method: Least Squares
Sample: 1 2286
Included observations: 2286
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. error	t-statistic	Prob.
C	1.7459	0.0212	82.4468	0.0000
EDUCMORETHANGRADE 12	-0.0129	0.0041	-3.1239	0.0018
AGE	-0.0015	0.0006	-2.5985	0.0094
DUMPOPBLACK	-0.0102	0.0043	-2.3727	0.0177
DUMPOPCOLOURED	-0.0279	0.0054	-5.1741	0.0000
DUMPOPINDIAN	-0.0167	0.0066	-2.5646	0.0104
GENDERMALEDUM	0.0247	0.0035	7.1650	0.0000
YOUNGPROF	-0.0072	0.0067	-1.0677	0.2858
MIDDLEAGEPROF	-0.0007	0.0037	-0.1961	0.8446
MIDDLEAGENONPROF	0.0038	0.0020	1.9346	0.0532
LOGPOPULATIONDENSITY	-0.0032	0.0024	-1.3165	0.1881
OCCUPATIONDENSITY	0.0378	0.0491	0.7688	0.4421
RIVALRY	-0.0002	3.01E-05	-6.4139	0.0000
DUMGAUTENG	-0.0244	0.0106	-2.2963	0.0218
DUMDURBAN	0.0049	0.0146	0.3330	0.7392
DUMCAPETOWN	-0.0079	0.0104	-0.7590	0.4480
DUMPE	-0.0177	0.0084	-2.1105	0.0349

R-squared	0.0934	Mean dependent var	1.6539
Adjusted R-squared	0.0870	S.D. dependent var	0.0863
S.E. of regression	0.0824	Akaike info criterion	-2.1463
Sum squared resid	15.4170	Schwarz criterion	-2.1037
Log likelihood	2470.269	Hannan-Quinn criter.	-2.1308
F-statistic	14.6087	Durbin-Watson stat	1.8299
Prob(F-statistic)	0.0000		

In order to capture the effect of district municipalities' geographical locations on the number of hours worked, dummy variables are added for the metropolitan municipalities within South Africa. A dummy for Gauteng includes Pretoria, Ekurhuleni and Johannesburg. Cape Town, Port Elizabeth and Durban are included separately and are compared with the base group of all other district municipalities in South Africa. Results are presented in Table 4.10. Adding metropolitan dummies causes young professionals, middle-aged professionals, middle-aged non-professionals, the log of population density and occupation density to become insignificant. The coefficient for Gauteng implies that the number of hours worked is 2.4 per cent lower than in the other district municipalities of South Africa, whilst workers in Port Elizabeth work 1.77 per cent fewer hours than other district municipalities of South Africa, this being significant. The coefficients of the variables of Durban and Cape Town are both insignificant and imply that the number of hours worked is respectively 0.49 per cent higher and 0.79 per cent lower than other district municipalities within South Africa.

4.7   Conclusion

This chapter examined the relationship between hours worked and agglomeration in the urban areas of South Africa. Using cross-sectional data from the September 2007 Labour Force survey, a regression analysis was carried out to test for evidence of an urban rat race amongst professional workers.

Contrary to findings made by Rosenthal and Strange (2003a) regarding hours worked amongst professional workers in agglomerated areas, results of the analysis for South Africa were uncharacteristic. In terms of education levels in South Africa, the number of hours worked decreases amongst workers who have an education higher than Grade 12 and as a result they work fewer hours than employees who possess a secondary qualification. As expected, male workers put in longer hours than females, whilst white employees log more hours than their black, Indian and coloured counterparts.

Furthermore, with regards to different occupational groups in South Africa, it is found that young professional workers aged between 30 and 40 years and middle-aged professionals aged between 41 and 50 years are working fewer hours than the base group of middle-aged non-professional workers. Adding agglomeration variables measuring the effect of urbanisation and localisation on hours worked continues to provide unexpected results. Population density, defined as the measure of urbanisation, continues to negatively influence hours worked, whilst occupation density measuring localisation between employees increases working hours but remains insignificant. To the extent that occupation density is an indicator of rivalry effects amongst workers, the negative and insignificant coefficients suggest inconsistency regarding the selection and productivity effects found by Rosenthal and Strange (2003a:22). This implies that workers may not be drawn to urban areas particularly for active professional environments. The highly significant coefficient of rivalry continues to negatively impact the number of hours worked within South Africa and fails to provide evidence of increased competition amongst employees in agglomerated areas of South Africa.

Tentative evidence of a work-spreading pattern is found between workers in agglomerated areas of South Africa. Young and middle-aged professional workers in particular are found to work fewer hours than middle-aged professional workers who are estimated to work the longest hours per week.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1   Introduction

This study began with the observation that agglomerated areas enhance productivity between professional workers thereby encouraging workers to log longer hours. The study set out to determine whether there are certain characteristics of urban labour markets in South Africa which inspire or require hard work, long working hours and increased rivalry amongst professional employees. In terms of a country's growth and prosperity, cities have an abundance of economic and labour market activity thereby increasing job opportunities and population density. The question is: do agglomerated urban areas therefore increase competitiveness in terms of increased hours worked by professional employees? Moreover, this dissertation evaluates skilled pools of labour as a factor of production and specialised input in the existence of competition between workers in the South African labour market. This study follows on from an article by Rosenthal and Strange (2003a) who find evidence of a relationship between agglomeration and hours worked, and that the impact of agglomeration differs between young and middle-aged professional and non-professional workers.

5.2   Summary

Chapter 2 consisted of a literature review of agglomeration economies addressing the different economic forces which act as incentives for firms to locate or agglomerate close to one another in urban areas. Three factors resulting in various agglomerations are discussed, namely increasing returns to scale, externalities and competition and economic geography. Increasing returns to scale arise when the scale or size of an urban environment adds to its productivity. Alfred Marshall (1920) identifies the sources of increasing returns as being 1) input sharing, 2) labour market pooling and 3) knowledge spillovers which contribute to economic agglomeration and geographical concentration.

The extent of increasing returns to scale can be measured on an industrial, geographic and temporal level. Industry scope explains the concept of urbanisation and localisation economies. Whilst localisation economies are more concerned with reduced distance between similar firms, thus increasing efficiency, urbanisation economies emphasise sharing resources amongst a diverse number of institutions. The extent of geographic concentration explains industry concentration within specific locations, and discusses whether industries are located at few or many regions nationally (Henderson, 2004:9). Reduced geographical distance from density has beneficial interactions and exchanges between industries: if agents are physically closer, the potential to interact increases. The temporal scope of economies of scale are also found to either be static – increasing income and productivity in the short run, or dynamic – resulting in faster growth and higher income in the long run. Most importantly, the role of competition in economic geography and the effects of clustering on industry activity are considered.

As cities continue to expand, manufacturing development is inundated by service-based industries taking the forefront and, as a result, requires large amounts of human capital (Brakman *et al.*, 2009: 277). Florida (2002, 2003, 2005) defined people with high levels of human capital as the 'creative class' whilst Storper and Scott (2009) claim that human capital is a driver of agglomeration as workers are attracted to the facilities and services provided by cities. This chapter concludes by introducing the concept of Akerlof's (1976) urban rat race, stating that workers who are willing work at faster speeds and in harsh conditions are identified as being more creative and competitive. By being willing to work longer hours, the probability of gaining a promotion or receiving a higher salary further fuels the drive to succeed. In the rat race model described by Rosenthal and Strange (2003a), three theoretical arguments are elaborated upon, namely signalling, thick markets and productivity and selection. They find evidence that the intensity of the professional working environment is enhanced in cities this being reflected in increased working hours amongst professional workers.

Chapter 3 presented an overview of the South African labour market, briefly discussing unemployment in South Africa whilst elaborating on different factors influencing employment and human capital. A number of reasons for high unemployment levels are highlighted. Kingdon and Knight (2007:816) attributes high unemployment to constrained job opportunities in the informal sector sustaining the divergence between labour supply and formal employment. Other factors referred to include the lack of formal high-skilled employment, continued occurrences of a brain drain and an insufficient informal labour market. Magruder (2009) examined the effect of labour regulations on employment levels within large and small firms in South Africa and finds that due to strict labour market regulations and strong trade unionism, firms became unwilling to absorb labour supply, stimulating a climate of small-scale employment and high unemployment.

Naudè (2008) proposed a spatial mismatch in the South African metropolitan labour market which produces significant differences in unemployment levels amongst black and white populations. Racial segregation of metropolitan areas during apartheid caused limited spatial access to jobs. Discrimination, lack of adequate information and residential integration and commuting costs amounted to a considerable divergence in unemployment rates.

The main objective of Chapter 3 was to examine employment outcomes in the South African labour market. Three key dimensions of the labour market are evaluated namely 1) the level of employment, 2) wages and 3) the quality of employment (Jenkins, 2006). Employment levels are defined in terms of the skills base and the productivity of the labour force, which is currently of particular concern in South Africa. In relation to employment levels, wages play a significant role in workers' decisions regarding how many hours to work, greater skills attainment and increased productivity (Barker, 2007:9). The quantity of employment opportunities within the South African labour market may contribute to an overall increase in economic well-being. However, the quality of employment in terms of working conditions is imperative in ensuring a higher quality of work produced within firms and the labour market.

In terms of the level of employment, inadequate education and skills have contributed to reductions in employment and economic growth in South Africa. Dias and Posel (2007) explain that the probability of being employed is becoming increasingly correlated with a worker's ability to learn, acquire skills and increase productivity - defined as the human capital theory. Hofmeyr (2010) continues examining labour market outcomes in the manufacturing sector of South Africa, analysing the extent to which social networks influence workers to engage in certain occupations which eventually become ethnic occupational niches. Hofmeyr's (2010) results identify corporate managers, general managers and other professionals as the three occupations with the most prominent incidence of ethnic niche employment. In terms of language groups, English speakers are dominant in these occupations, followed by Afrikaans speakers. Moreover, due to higher education levels and, to some extent, the legacy of apartheid, high-ranking positions are reserved for white South Africans and are noted as highly skilled occupations. These occupations in which ethnic niches exist are also the highest paid, advantageous niches. On the other hand, traditional black language groups such as IsiZulu and IsiXhosa speakers are mostly in low wage, low-skill occupations, classified as disadvantageous niches.

Wages were briefly discussed as productivity of human capital determines wage levels through the concept of efficiency wages. Wage is a significant contributor to labour market outcomes and plays an important role in the division of labour in occupations, sectors and regions, whilst decisions regarding the attainment of particularly higher education levels also depend on wages received (Barker, 2007:60).

More importantly, the quality of employment within the South African labour market is examined in terms of working conditions. Flexible working conditions have received greater attention in previous years. In particular, this chapter studied flexibility with regards to the regulation of working hours in South Africa. Government's legislative framework has attempted to implement a 40-hour working week in South Africa in order to improve workers' welfare, increase employment opportunities and productivity and prevent excessive working hours (Barker, 2007:77). Although decreases in the amount

of hours worked was reported, a substantial number of workers were still logging hours worked in excess of the number of hours to be worked stipulated by legislation in September 2009. Oosthuizen and Goga (2007) investigated changes in the number of hours worked in South Africa between 2000 and 2005 using data from the Labour Force Surveys of 2000 and 2005 respectively and found that government's attempts at introducing a 40-hour working week was unsuccessful during this period. Chapter 3 concludes by evaluating the effect of urbanisation on labour market outcomes in South Africa.

Haveman and Kearney (2010) established a positive relationship between the probability of finding employment and the degree of urbanisation within a geographic location. Because employment opportunities are far greater within metropolitan areas, the probability that citizens will continually search for work in these areas is also improved. Results show that the degree of urbanisation is positively related to an individual who is: male, of working age (between 15 and 64), non-black, educated or skilled, having a relatively small household and working on a permanent basis receiving a salary. Haveman and Kearney (2010:13) conclude that whilst the development of people in terms of skill and education is important, geographic location proves to be equally important in improving people's welfare.

In Chapter 4, regression analysis was used to test for rat race effects amongst professional workers in South Africa. Using data from the September 2007 Labour Force Survey this chapter attempted to establish a relationship between labour supply in terms of hours worked and agglomeration effects in the urban areas of South Africa. Due to the scarcity of empirical work published on the rat race, calculation of the variables follows Rosenthal and Strange (2003a). The base model included the log of hours worked as dependent variable and worker specific characteristics, dummy variables and agglomeration variables as explanatory variables. Additional estimation of the base model required the inclusion of variables such as occupation density, rivalry and dummy variables for the metropolitan municipalities in South Africa. These estimations were undertaken to test the effect that urbanisation, localisation and rivalry

have on hours worked in the urban areas of South Africa amongst professional and non-professional workers.

Results of the analysis indicated that, although mostly significant, the coefficients of the variables are not as expected. In terms of education, employees with an educational qualification higher than Grade 12 are estimated to work fewer hours than workers with schooling up to Grade 12. While age does not have a great impact on hours worked, gender plays a role in the amount of hours worked as male employees are estimated to log more hours than females. With regards to different race groups, the white working population is working longer hours than the black, coloured and Indian population groups respectively.

In all four regression models the log of population density measuring the influence of urbanisation indicates that within South Africa there is a work-spreading effect as the number of hours worked decreases for each one unit increase in population density. Insignificance and the varying sign on the coefficient of the occupation density variable measuring localisation suggest that, in some instances, employees benefit from increased proximity between workers, however, work-spreading becomes even more apparent. The highly significant coefficient of rivalry within the estimating equation negatively influences hours worked within South Africa and fail to provide evidence of increased competition amongst employees in agglomerated areas of South Africa.

5.3   Conclusion

To conclude, the focus of this dissertation was to test whether an urban rat race exists within South Africa's metropolitan and district municipalities by investigating the relationship between agglomeration and the number of hours worked. This study has made three important contributions, namely:

i)   Adding to the literature on geographical economics and labour market issues, in particular the effect of urbanisation on employment in South Africa.

ii) Contributing to the policy debate regarding working conditions, in particular the number of hours worked in South Africa.

iii) Providing an empirical analysis which tests the effect of agglomeration on the number of hours worked in South Africa.

Although the empirical analysis produced unexpected results in comparison to results by Rosenthal and Strange (2003a), a few interesting observations can be made.

Firstly it appears as though labour regulations do play a role when evaluating the number of hours worked amongst professional and non-professional employees in the South African labour market. Magruder (2009:2) explains that an extensive social safety net created by labour unions tends to increase the demand for leisure. Furthermore, Magruder finds that labour market agreements are enforced in a spatially discontinuous manner, implying that agreements vary amongst district councils and firms jump from border to border to avoid having to adhere to strict labour agreements. Data from the September 2007 LFS used in this dissertation indicate that the greater part of professional workers belong to a labour union, which may contribute to reductions in hours worked. Non-professional employees who are members of trade unions according to the 2007 LFS are relatively fewer than professional workers, and are found to work significantly longer hours than professionals in South Africa.

Secondly, this study found that white population groups work significantly longer hours than black, Indian and coloured races in South Africa. This may be in line with a study by Naudè (2008) which tests for evidence of a spatial mismatch between black and white population groups in the metropolitan labour market of South Africa. Whilst Naudè (2008) points out that variation in spatial access to employment result in different unemployment rates between race groups, this study indicates that differences in spatial access to employment may encourage different working hours amongst race groups, but does not discriminate between occupational groups. Nevertheless, a developing country such as South Africa requires an influx of skilled professional employees as increased density appears to favour both professional and non-professional workers irrespectively.

Thirdly, this dissertation concurs with Hofmeyr (2010) who studies the effect of social networks and occupational niches on labour market outcomes. Hofmeyr finds evidence of concentration and specialisation of members of an ethnic group in a particular occupational activity. Particularly within the manufacturing sector, a number of ethnic niches are identified keeping some language groups trapped in low-skilled, low-paying occupations whilst acting as a protective barrier to high-skilled, high-paying occupations. This dissertation suggests that longer hours are logged amongst members of a particular ethnic group and occupation. However, due to the limited scope of the September 2007 LFS data this statement requires more convincing empirical results.

Moreover, due to the limited supply of highly skilled professional workers in the South African labour market, this study finds evidence of a work-spreading effect between professional employees. The constrained supply of highly skilled workers in professional occupations in South Africa may compel occupational groups to implicitly collude to cap working hours rather than participate in rivalrous or competitive behaviour. Highly skilled professionals thus appear to work together in South Africa, dividing workloads and as a result diminishing the amount of hours worked.

Even though developing countries may depict cities as an urban problem due to congestion, overcrowding and inefficiency, the international phenomena of urbanisation, agglomeration and concentration of populations yield cities as clusters producing higher returns and better long-term opportunities than other areas. Policy regarding urban development and labour growth in South Africa should make a considerable attempt at providing sustained opportunities for highly skilled professional workers and informal sector non-professionals alike.

5.4 Recommendations

The aim of this dissertation was to find evidence of agglomeration affecting the number of hours worked amongst professional workers in South Africa. Some unexpected results obtained could reflect the nature of the Labour Force Survey that tends to focus on unemployment rather than the high-skilled employed sections of the labour force. In order to supply concrete results regarding the extent of the effect of agglomeration on hours worked, a thorough and diligent completion of survey data is recommended. Pooling a number of Labour Force Surveys together into one dataset may provide more significant results. The introduction of a separate survey collecting data on hours worked amongst employees in their capacity as professional workers may assist in better evaluating policy recommendations regarding the number of hours worked in South Africa.

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