

ECONOMIC SPECIALISATION AND DIVERSITY OF SOUTH AFRICA'S CITIES

by

M. Luus & W.F. Krugell¹

School of Economics, Risk Management and International Trade, North-West University (Potchefstroom Campus), South Africa

Paper submitted to the Biennial Conference of the Economic Society of South Africa "Development Perspectives: Is Africa Different?", Elangeni Holiday Inn, Durban, 7-9 September 2005

ABSTRACT

South Africa is quickly developing its very own unique identity. According to Naudé and Krugell (2003) South Africa's cities are too small, dispersed, and over-concentrated. In South Africa, households in the country's urban areas have average incomes almost thrice as high as the households in rural areas. More than 70 per cent of South Africa's GDP is produced in only 19 urban areas (Naudé and Krugell, 2003). In past studies that have been carried out, they have found that the rank-size rule shows that South Africa's urban agglomerations are too small and the cities mainly offer urbanisation economies rather than localisation economies. Our main focus of the study will be looking at the specialization of cities. We would like to determine whether certain cities should specialize in certain sectors, which they are currently involved in or should they add to their city and become more diverse and specialize in other sectors. Many historians believe that a city which is more diverse would grow quicker and thus be more beneficial to the economy than a specialized city would. This paper would like to address this phenomenon with regard to South African cities.

Key words: Localisation economies, Urbanisation economies, cities, South Africa

JEL Classification numbers: F01, R12, R58

¹ Lecturer, School of Economics, Risk-Management & International Trade, North-West University, Potchefstroom campus, South Africa, E-mail: eknwfk@puk.ac.za

ECONOMIC SPECIALISATION AND DIVERSITY OF SOUTH AFRICA'S CITIES

1. Introduction

A particular characteristic of economic activity across South Africa is its spatial lumpiness. Six cities, namely, Johannesburg, the East Rand Metropole (Ekurhuleni), Durban (eThikwini), Cape Town, Pretoria (Tshwane metropole) and Port Elizabeth (Nelson Mandela metropole) dominate the economic landscape. Until recently, economic science has been silent on explaining why economic activity in South Africa tends to lump together as it does, and what that implies for the challenges of low growth, poverty and inequality that face South Africa today. This may, however, be changing.

New developments in the field of geographical economics and availability of data mean that economists are beginning to focus on cities as drivers of economic growth and development. Living standards as measured, for example, by income and literacy, tend to be higher in urban areas and urbanized economies than in rural areas. In South Africa, households in urban areas have average incomes almost thrice as high as the households in rural areas.

The benefits of being located in a city are due to localisation economies and urbanisation economies. Localisation economies refer to the benefits a firm receives from being with other firms in the same industry. Urbanisation economies refer to the benefits of overall scale and diversity in cities. Apart from these "static" benefits there are also dynamic benefits which accrue over time due to knowledge sharing, learning and imitation in a particular area. Cities are therefore important for economic growth precisely because they provide the dynamic information spillovers that are important for innovation. The lumpiness of economic activity in South Africa may be good for economic development!

Such spatial development and local economic development issues are currently receiving much attention. In a recent article by Ann Bernstein and Prof Jeff McCarthy (2005), the importance of not only cities, but also of that of smaller towns, in aiding

economic growth, is stressed. It is not surprise that South Africa needs much higher economic growth rates to meet the needs of the more than 30 per cent of the population that is unemployed. Growth also has to be more widely dispersed, beyond the major metropolitan areas and a few tourism-driven coastal areas. Bernstein and McCarthy (2005) argue that the localities that do grow do so due to natural resources, technology, lifestyles that attract entrepreneurs and effective local governance.

The local determinants of growth and development and the important role of cities are also receiving attention in academic circles, specifically in the guise of geographical economics. The localisation and urbanisation economies mentioned above tie in with what Venables (2005) calls "spatial complementarities". The significance of geography is not one of determinism. There are benefits from nearby and intense economic interactions, thus there is a possibility of establishing new centres of activity. Theoretical models of agglomeration explore the roles of congestion, immobile factors and market size in spatial growth and development. Empirical approaches use concentration indices to measure the extent of agglomeration.

This paper follows exactly such an empirical approach to determine whether South Africa's cities and towns – specifically the fast growers – have specialised or diversified economies. This may in turn indicate whether they are offering specialisation or urbanisation economies, and inform local policies for growth and development. Duranton and Puga (1999) suggest the simplest way to measure a city's specialisation in a given sector is to quantify the share of this sector in local employment. Different approaches include the Ellison and Glaeser (1997) specialisation index and Middelfart-Knarvik, Overman, Redding and Venables' (2000) use of a Krugman specialisation index. This paper, however, follows Mukkala (2004), the details of which are explained in section 4.

The rest of the paper is structured as follows. The following section examines South African cities as a whole including the history, special trends, policies and the current state of affairs. The third section concerns the special complementarities for growth and development. In the fourth section the specialisation and diversity of South

African cities are discussed and the empirical analysis and results are presented. The last section concerns the road ahead for further research.

2. SA cities

An explanation of spatial economic inequality in South Africa should be an explanation of the self-reinforcing development of cities and towns. The following sub-sections briefly outline the history of South African structures, policies and shocks as well as the current state of the urban system.

2.1 The history up to democratisation

South Africa has six "large" cities, namely Johannesburg, the East Rand (Ekurhuleni metropolitan government) Durban, Cape Town, Pretoria (Tshwane metropolitan government) and Port Elizabeth (Nelson Mandela metropolitan government). Their importance and the consequent spatial economic inequality in South Africa can be explained by looking at trade, extraction, climate and culture, along with Apartheid's social engineering and the recent transformation of local governments.

Cape Town and Durban were first developed in the 17th and 18th centuries as trading posts on the shipping route between Western Europe and Asia. During the 19th century this role changed with the discovery of diamonds and gold in the interior. The port cities developed from being stop-over and service points providing shipping services, to being ports through which these precious commodities were handled. Today this dominance continues due to the importance of sea transport for South Africa's international trade.

Mineral wealth determined the location and growth of the other two dominant cities, Johannesburg and Pretoria. The distances of the location of mining commodities, as well as the extraction technology required in mining influenced the pattern of South Africa's inland development. Where railways and electric power were provided for mining, they also contributed to the development of the manufacturing sector. Industries such as steel and mining, which are heavy consumers of electric power are predominantly located in the historic mining areas whilst chemicals are concentrated heavily around Durban from where the majority of the country's crude oil imports are

obtained. Suleman (1998) shows that the basic metals and fabricated metal products are concentrated in the Gauteng Province (around Johannesburg and Pretoria areas), paper and chemicals in the KwaZulu-Natal province (around Durban) and food processing and textiles in the Western Cape Province (around Cape Town).

The unequal development determined by trade and extraction was reinforced by climate and culture. Acemoglu, Johnson and Robinson (2001:1370) argue that *“Colonies where Europeans faced higher mortality rates are today substantially poorer than colonies that were healthy for Europeans....settler colonies had representative institutions which promoted what the settlers wanted and what they wanted was freedom and the ability to get rich by engaging in trade”*. Following this argument, the location of South Africa’s southern ports and the Mediterranean climate around Cape Town translated into better subsequent economic performance. The persistence of British institutions (Westminster-style democracy, property rights and education systems) in South Africa had a further favourable impact on settler mortality. These effects persist and provide explanation for the sizes and functions of the major cities and the associated spatial inequality.

In the 20th century Apartheid reinforced the historical regional development patterns induced by the emerging mineral-energy complex of the 19th century with its homeland policies and Group Areas Act. Support of inefficient industries in the homelands and the segregation of cities created a spatial economy characterised by inefficient land use, excessive transport costs, and under-investment in transport infrastructure, telecommunications and electric power. It also resulted in segmented labour and consumption markets and created artificial internal barriers to trade.

The cost of unequal development was paid particularly by the manufacturing sector. Nel (2002:83) shows that by 1970, South African had a relatively advanced and diversified manufacturing sector, but thereafter output stagnated and employment declined. Contributing factors included: declining gold exports and gold prices, a reduction in global commodity demand from the early 1980s, the debt crises of the 1980s, depreciation of the value of the Rand, the imposition of sanctions, foreign exchange shortages, skill and capital shortages. By the 1990s job losses occurred in places and de-industrialisation took place.

Against this background of spatial inequality, the new democratic government has, since 1994, been introducing new spatial policies and engaging in local government transformation.

2.2 Spatial trends and developments since 1994

In 1994 the new democratic government inherited an economy challenged with low growth, high unemployment and severe poverty and inequality. Much has been written about the growth of the economy in aggregate, the fiscal and exchange rate challenges, but less so about the spatial character of the economy.

Spatially, the historical dominance of the six largest cities has remained largely unaltered, though there are a number of factors impacting on the location of economic activity. Rogerson (1991:364) for example, states that "*the new industrial geographies of post-Apartheid South Africa appear set to be dominated by a re-focussing of manufacturing activity around the large metropolitan centres, (and) the demise of the industrial base of several favoured decentralised growth points*". But despite the strength of the traditional core areas it should also be acknowledged that all is not well within the cores. Nel (2002:86) cites the closure of textile firms in Cape Town and the Witwatersrand area of Gauteng that is experiencing a contraction of its manufacturing economy. Nel also identifies a number of factors that currently influence the location of economic activity (p.87-88):

- Trade liberalisation has benefitted industries and locations that have expanded to new markets, such as the motor industry in the Eastern Cape, but it has harmed sectors and locations that have struggled to cope with international competition, such as textile manufacturers in the Western Cape.
- Related to liberalisation, there are also sectors that have benefitted from foreign direct investment, including information technology and telecommunications, energy and oil, food and vehicles.
- There has been a gradual shift towards serviced-based and knowledge-intensive activities.

- There has been a decline in employment opportunities in manufacturing due to fluctuating commodity prices, skills shortages and the mixed fortunes of gold and the global economy in general.
- Also, there is increasing informalisation of the economy and the growth of the small business sector.
- Finally, new growth areas such as Midrand, the development corridors and special Industrial Development Zones all impact on the location of economic activity.

The spatial aspects of government policies since 1994 that are mentioned last are of particular significance to future developments. These can be discussed in two parts: the spatial characteristics of industrial policy and the local government transition process.

2.2.1 The spatial characteristics of industrial policy

Early on, the new government started out with an 'aspatial' industrial policy. This was in contrast to the apartheid government's regional development strategies, which were aimed at supporting apartheid-created homelands. So, for example, in 1997 a tax holiday scheme was introduced to encourage industrial development throughout the country. In recent years, however, thinking has swung back to spatially focused considerations in the form of Spatial Development Initiatives (SDI) and Industrial Development Zones (IDZ) (Nel, 2002:90).

The SDI programme was conceived and launched during 1995-96 as an important component of restructuring the post-apartheid economy. With the SDIs, government seeks to encourage investment, manufacturing and other economic activities along a series of defined transport corridors. Here, bottlenecks to investment, such as inadequate infrastructure, are to be removed and strategic opportunities for private sector investment identified. Lemon and Rogerson (2002:8-9) identify several components of the SDI strategy:

- Firstly, it involves crowding-in of private investment through co-ordination of public sector investment in areas with proven potential for economic development, which is currently unexploited.

- Secondly, to ensure fast and focused planning, government provides political support, commitment, and buy-in for the SDI process.
- Thirdly, government clears obstacles to investment and contributes towards the building of vital infrastructure.
- Detailed information about the SDIs and packages of potential investment opportunities are publicised.
- Targeted industries are clustered around anchor projects to ensure the strongest local linkages and greatest multiplier effects.

With such a process, it may still be early for an evaluation of the SDI strategy, but Nel (2002:90) argues that, despite the considerable efforts that have been put into the promotion of the SDIs, it does not yet appear that the initiatives have brought about dramatic economic transformation in their areas – with the exception of the Maputo Development Corridor.

Similarly, the establishment of the IDZs has been slow. The IDZs are industrial zones with a defined export focus and are all planned to be sited at major ports and airports. Only in 2001 did government announce IDZ incentives to the value of R3 billion. Of this, R600 million is for wage incentives to boost job creation. There is also a 50-100 per cent investment allowance for investors who undertake approved projects (Nel, 2002:91).

Along with the spatial focus of industrial policy, the South African space economy has recently also been shaped by the local government transition process.

2.2.2 The local government transition process

After 1994 the local government transition process was given a very strong legal driving force through three pieces of legislation. The most important was probably the Local Government Transition Act (LGTA) of 1993 that provided for transitional local governments as well as for a clearly defined transition process. Other pieces of important legislation were the Development Facilitation Act which attempted to address the “mindset” of local governments and to steer them in the direction of being more participative, and the Demarcation Act that allowed for the radical reconsideration of the geographical areas of jurisdiction of local governments and to ensure that every area of

South Africa falls under democratically elected local government – so-called “wall-to-wall” local government.

The Demarcation Act (1997) has led to a complete change in the borders and size of local governments in South Africa. Before December 2000, South Africa had 843 municipalities, many of which were financially unsustainable. According to surveys in 2000, about 100 municipalities in South Africa were unable to pay or service their debts to banks, while another 100 were in some form of financial distress. In terms of the Demarcation Act, an independent, expert committee, the Demarcation Board, was mandated to demarcate South Africa’s local government’s areas of jurisdiction. In deciding on the boundaries for new municipalities after 5 December 2000, the Demarcation Board considered the following factors:

- The interdependence of people, communities and economics such as employment, public transport, human settlement, migration patterns and access to services and recreational facilities
- The relationship to districts, voting areas, health, police, population, existing or expected land use, type of land in the area and environmental implications.

The result was that the number of municipalities was reduced to 284. The demarcation process, together with the organizational restructuring effected by the Municipal Structures Act, and the way in which municipalities function in terms of the Municipal Systems Act (2000) has revolutionised local government in South Africa.

The current discontent with local governments and service delivery, however, highlights the tensions that local authorities have to manage: Firstly, municipalities have to overcome historical legacies including having inherited administrations that are often ill equipped, inexperienced and unmotivated. Secondly the system makes them responsible for basic service delivery and development. Thirdly, national fiscal policy is reducing financial resources available to fulfil these obligations. Finally, globalisation is pressuring municipalities to create internationally competitive locations for businesses and households, going beyond merely supplying basic services and infrastructure.

Against this background the current state of the urban system can be described as follows.

2.3 The urban economic system

South Africa has eight cities with population densities greater than 400 persons per square kilometre. These cities are shown in table 1 below.

Table 1: SA Cities with Population Density > 400 persons per km²

CITY	Population 2004	Population Density 2004	Population 1996
City of Johannesburg	884,478	1,088.35	815,119
Ethekwini	650,878	2,447.18	602,174
City of Cape Town	212,094	1,088.35	193,874
Msunduzi	682,031	624.33	601,831
Ekurhuleni	456,233	1,961.52	384,098
Tshwane	825,868	762.06	756,592
Emfuleni	606,954	700.08	,504,698
Nelson Mandela	899,932	650.61	809,884
TOTALS	5,218,468	9,322.48	4,163,572

(Source of data: Global Insight, 2005)

Of these eight cities, six are governed by a metropolitan council (all except Msunduzi and Emfuleni) and all, except Emfuleni, are part of the "Cities Network" of South Africa. In these eight places about 40% (almost 15 million) of the South African population resides. The population size of these eight areas is likely to increase. Recent analysis confirms that most localities outside of the major metropolitan areas will experience a net decline in population due to out-migration, declining fertility and the impact of HIV/AIDS.

Johannesburg, Ethekwini (Durban), Cape Town and Ekurhuleni (East Rand) have the largest populations, as well as the largest population densities. The table shows that there are instances when population absolute size and population density differ: Msunduzi (Pietermaritzburg) has the fifth largest population density (624 persons per km²) but a lower absolute population that for instance Emfuleni.

Three of the largest cities in South Africa (eThekwini, Cape Town and Nelson Mandela Metro) are port cities through which much of South Africa's international trade moves. Durban (eThekwini) is also close to the port of Richardsbay (Umhlatuzi), and Cape Town close to the port of Saldanha. These two ports are important for South

Africa's exports of coal and steel, respectively. In all, approximately 98 per cent of the volumes of South Africa's exports are conveyed by sea. It is expected that South Africa's port cities, and towns and cities with close proximity to international ports, will experience the fastest economic growth in future, and will be in a better position to benefit from South Africa's rising international trade, competitive exchange rate, and increased integration into the world economy. Distance to harbours and airports, and the cost of transport, can be a significant obstacle in growing the urban economy outside of these six large cities.

Apart from the big eight cities discussed above, there are another eleven "metropolitan cities" in the making that would in all likelihood see high population growth, as well as economic growth, over the near future. These urban areas stand out in terms of population density, economic contribution, strategic location and economic function, and destination for rural-urban migration. Many of these eleven cities also function as important regional government and rural service nodes. The most important of these are Emfuleni (Vaal Triangle) on the N1 with its linkage to the chemical industries in Sasolburg, Msunduzi (Pietermaritzburg) on the important N3 transport route, and Richardsbay (Umhlathuzi) both close to Ethetwini (Durban), Mangaung (Bloemfontein), Buffalo City (East London) with its Coega Industrial Development Zone (IDZ), Mogale City (on the West Rand), Rustenburg (on the N4 route in proximity to Tshwane), Nelspruit (on the N4 Maputo Development Corridor), Polokwane (Pietersburg), Kimberley on the N12, and the combined cities of Potchefstroom-Klerksdorp on the N12.

Taken together with the eight big cities there are therefore 19 cities and towns that form the economic backbone of the South African economy. They contribute 70 per cent of South Africa's GDP and contain over 20 per cent of its population. They are also the first choice candidates for the location of additional urban renewal and growth nodes aimed as fast-tracking urban economic growth in South Africa. This, however, is not to imply that there are not other urban areas without importance in the economy.

There are a number of secondary cities in South Africa that fulfill an important role as either location for government services, or in servicing a rural area. Examples include Mafikeng, Vryburg, Newcastle, Upington, Musina, Greater Giyani, Ulundi, and

George. These places face significant challenges in economic development, as many of their economies have been contracting over the past few years, few have inherent potential to sustain and grow employment-intensive manufacturing or tourism, whilst at the same time their informal urban populations have increased significantly.

Also, there are about 170 small towns across South Africa, characterized by low population and low population densities (generally lower than 50 persons per km²), very small contributions to South Africa's GDP, and functioning mainly as rural service centres and holiday resorts. These places are characterized by significant out-migration, high unemployment rates and dependency on the primary sectors of the economy. The economic viability of many of these small places is in question.

Finally, in many of the smaller rural towns, especially in Kwazulu-Natal, Eastern Province and parts of Limpopo Province (e.g. Greater Giyani) and some of the secondary cities (e.g. Mafikeng, Brits, Vryburg, Newcastle and Upington) in South Africa, the boundaries between urban and rural are increasingly being blurred by rural-densification. It is even estimated that rural densification is taking place on a much larger scale than urban concentration. This poses a fundamental challenge to many smaller municipalities and secondary cities in South Africa along whose perimeters this rural densification takes place, since the population in rural dense areas is not a traditional rural population as is usually understood, and may not be demographically stable. According to Schlemmer and Lovell (2000:11) "*Strategies of local economic development for smaller towns and intensified strategies of rural and small-scale agricultural development are likely to become more important as time goes by...there will be increasing deprivation in many rural and smaller towns*".

Against this background it is clear that South African cities and towns can and have to play a leading role in addressing the challenges of economic growth, unemployment, poverty and inequality in South Africa. There are however numerous ways of examining this possible role. This paper focuses on the importance of spatial complementarities and the following section asks whether cities and towns should be more specialised or more diversified.

3. Spatial complementarities for growth and development.

Arguments in favour of cities as drivers of growth and development build on the notions of spatial complementarities and external economies.

Economies of scale (also sometimes labelled as increasing returns to scale) refer to the circumstances where an increase in the level of output produced leads to a decrease in the average cost per unit of output of a firm (Brakman, Garretsen and Van Marrewijk, 2001:26). This fall in the average cost occurs because of externalities – costs or benefits that spill over beyond the private costs of, or benefits to, the individual firm.

In this it is possible to distinguish between internal and external economies of scale. Internal economies of scale occur at firm level where increased production results in a cost advantage over smaller firms.

External economies of scale occur at industry level. In this case, an increase in the output of the industry as a whole leads to a decrease in average costs. Such external economies of scale can be further divided into pure (or technological) external economies, and pecuniary external economies.

In the case of pure external economies, an increase in industry-wide output causes a change in the technological relationship between inputs and output for each individual firm. There are two examples of this. The first is that of knowledge sharing, learning and innovation: As industry output rises, the stock of knowledge rises and information spills over to firms. This is a positive external benefit that is not paid for, reducing cost and causing an increase in the level of output at the firm level. Glaeser, Kallal, Scheinkman and Shleifer (1992) distinguished between three types of these externalities: (i) Marshall-Arrow-Romer externalities that are due to knowledge sharing, learning and imitation between firms in the same industry and where local monopoly fosters these spillovers;

(ii) Porter externalities that are industry-specific knowledge spillovers, but where local competition fosters the spillovers; and (iii) Jacobs externalities where knowledge spillovers occur between firms of different industries and where local competition

stimulates these spillovers. The second type of spillover from non-market institutions involves public goods.

The supply of public goods and services provides benefits to members of a community – benefits that are non-rivalrous and non-excludable in consumption. Non-rivalry in consumption means that each individual's consumption does not detract from any other individual's consumption of the good or service. Non-excludability in consumption means that it is impossible to exclude anyone from consumption – even when they are not willing to pay for the benefits. Public goods or services thus have external benefits that lower costs and enhance efficiency, giving rise to increasing returns in the aggregate.

In both these cases it is important to note the importance of proximity. The concentration of consumers and producers at a specific location makes it possible to capture the spillovers of knowledge, or from infrastructure, which increase productivity and lower costs. These are the spatial complementarities which cities and towns offer and which may drive growth and development. But being in a city or town not only offers pure external economies, but also cost and demand linkages that also foster growth.

In contrast to pure externalities that affect the production function, pecuniary externalities affect a firm's output decisions through price effects that are transmitted via the market. Two approaches to pecuniary externalities can be distinguished: The Chamberlainian approach to the diversity of intermediate inputs and the Smith-Marshallian approach to the matching process on the labour market.

The Chamberlainian approach rests on the idea that a large market allows for a large number of intermediate commodities and final goods. Particularly, diversified and non-tradable inputs, such as legal and communication services, non-traded industrial inputs, maintenance and repair services and finance can enhance the productivity of the final sector (Fujita & Thisse, 2002:98). The economy then displays increasing returns to scale at the level of the agglomeration (city level).

The Smith-Marshallian approach holds that the size and proximity of economic activity found in agglomerations ensures a thick labour market that allows for better matching between workers and jobs. In this approach there are two models.

Helsley and Strange (1990) showed that a large city allows for a better average match between heterogeneous workers and firms' job requirements and this enhances efficiency. On the other hand, Duranton (1998) argued that a large market allows workers to become more specialised and, therefore, to be more efficient. Either way, the better matching gives rise to increasing returns in the aggregate.

Finally, in the case of external economies, a further distinction is possible between localisation economies and urbanisation economies. Localisation economies are industry-specific external economies. Urbanisation economies are external economies that apply to firms across industries and capture the notion of positive spillovers for a firm as a result of total economic activity at a location (Brakman *et al.*, 2001:29).

It is these localisation and urbanisation economies that have been the focus of empirical work that seek to quantify the importance of spatial complementarities for growth and development. Typically, concentration ratios are used to measure the extent of agglomeration and the existence of localisation or urbanisation economies. The ones that are most commonly used is the Ellison and Glaeser (1997) index and Krugman specialisation index (See Middelfart-Knarvik *et al.*, 2000). The conclusions drawn from the empirical studies pertain to whether a city should specialise in a certain industry or whether it should diversify more to promote growth and development.

Ellison and Glaeser's (1997) index measures the specialisation of a city in an industry in terms of the employment in the industry in the city relative to the share of the employment in the industry nationally.

$$Specialisation = \left(\frac{E_{ij}/E_j}{E_i/E_n} \right)^2 \quad (1)$$

Where E_{ij} is the the employment in industry i in city j , E_j is the total employment in city j , E_i is the employment in industry i nationally and E_n is total national employment. With perfect deconcentration the index is zero and its highest possible value is two. The view is that if external economies exist, they are realised only when firms locate in the same geographical area. In a study of industries and locations in the United States Ellison and Glaeser (1997) found that concentration exceeds what would be expected to arise randomly. Also, slight concentration was found to be remarkably

wide-spread, but extreme concentration less so. They conclude that concentration can be attributed to some form of external economies of natural advantage rather than to randomness.

Middelfart-Knarvik *et al.*'s (2000) index compares the industrial structure of a location with the average for the country or region – specifically countries' industrial structure with the average for the rest of the European Union. It is calculated as follows: the share of industry k in the country's total manufacturing output is calculated as well as the share of that industry in the production of all other countries. Then the difference between the industrial structure of country i and the average of all the other countries is calculated by taking the absolute values of the differences between the shares, summed over all industries. The Krugman specialisation index takes a value of zero if country i has an industrial structure identical to the average and a value of two if it has no industries in common with the average country or region.

The following section presents some empirical evidence of the case of South Africa.

4. The specialisation and diversity of South Africa's cities.

Analysis of spatial complementarities and the extent of the specialisation and diversity of South Africa's cities is somewhat limited by the availability of data. A lack of data on employment and plants at sub-national level precludes approaches such as those of Ellison and Glaeser (1997) or Black and Henderson (1999). Specifically, only limited sectoral disaggregation is possible. Therefore, this paper follows that approach of Mikkala (2004) who calculates a regional location quotient for Finland.

The location quotient is related to the approach followed by Ellison and Glaeser (1997) and is based on the share of employment of the different sub-sectors in regions, relative to sectors' share of national employment.

$$LOC = \frac{emp_{ij}/emp_j}{emp_{ic}/emp_c} \quad (2)$$

Where emp_{ij} is employment in manufacturing sector i in region j , emp_j is total employment in region j , emp_{ic} is national employment in sector i and emp_c is total employment. If the value of the index exceeds one it indicates that the region is more specialised in a given sector than the national average, and alternatively, if the value is less than one, the sector is less represented in the region than it is nationally.

This location quotient was calculated for South Africa using data from Global Insight's Regional Economic Focus. Employment in manufacturing in 354 magisterial districts was used along with total employment in the districts, manufacturing employment at the national level and total employment at the national level. Some of the results are presented in table 2.

Table 2: Location quotient and city statistics

City	Population 04	Urbanisation Rate	Total Employment	Location Quotient
Johannesburg	884,478	98.4%	909,190	1.029006
Cape Town	212,094	99.8%	335,874	1.366701
Port Elizabeth	899,932	87.1%	246,964	1.715166
Durban	650,878	100.0%	572,127	1.683128
Botshabelo	205,645	100.0%	22,791	2
Goodwood	367,564	100%	117,987	2.204239
Malmesbury	131,095	75.4%	41,051	2.014006
Temba	375,687	12.3%	39,166	2.294101
Kliprivier	231,640	63.1%	36,090	2.150705
Newcastle	363,466	80.5%	67,094	2.055731
Eshowe	252,930	16.5%	28,846	2.589219
Highveld Ridge	193,823	90.6%	66,269	2
Waterval Boven	11,154	77.1%	4,536	2.065603
Zwelitsha	277,069	31.4%	29,693	2

As illustrated in the table above, the results are mixed. The cities which were expected to be significant such as Johannesburg, Cape Town, Port Elizabeth and Durban are all present; however they touched just above one for their location quotients. The surprise here is from little unknown entities which few would have expected. A place like Eshowe in KwaZulu Natal has the largest location quotient, i.e. concentration in employment in manufacturing. All the unknowns ranging from Botshabelo to Zwelitsha have reached a quotient of 2 at some period from 1996 to 2004.

The usual suspects such as Johannesburg, Cape Town, Port Elizabeth and Durban all showed significant concentration, however it is not as high as some of the others as illustrated above. Cities such as Pretoria, Bloemfontein and Rustenburg do not have much concentration of employment in manufacturing and do not show up in the table. Ekurhuleni, also known as the East Rand, is comprised of a number of urban settlements such as Alberton, Benoni, Boksburg, Germiston, Kempton Park, Brakpan, Nigel and Springs; and all these settlements had significant figures which appeared above one. Then are also those that show up as somewhat of a surprise.

Botshabelo is a town situated in the Free State Province only 60 km from the provincial capital, Bloemfontein. Botshabelo is the single largest monument to apartheid planning in the region and owes its existence to apartheid subsidies exceeding R80 million per annum in 1996. According to the REF statistics, the most prominent sectors which are represented in terms of gross value added (GVA) are textiles, clothing and leather goods and retail trade and repair of goods.

Table 2 also shows two interesting localities in the Western Cape, that of Goodwood and Malmesbury. Malmesbury is known for its wine farms and to no surprise has significant GVA in agriculture. Goodwood on the other hand is within the City of Cape Town's limits. Grand West Casino is located near to or within it, but most significant value added statistics comes from the fuel, petroleum, chemical and rubber products; food, beverages and tobacco products sectors.

There are a number of localities KwaZulu Natal in the table, including Kliprivier Newcastle and Eshowe. Newcastle shows significant GVA shares in the manufacturing of metal products, however there is also coal mining in the area. Eshowe's manufacturing lies most prominently in metal products as well as fuel, petroleum, chemical and rubber products, while Kliprivier was also significant value added in fuel, petroleum, chemical and rubber products, while textiles, clothing and leather goods comes a close second.

Somewhat surprising places show up in the province of Mpumalanga, that of Highveld Ridge and Waterval Boven. Highveld Ridge comprises of Secunda, eMbalenhle, Trichard, Kinross, Evander and Leande. Sasol has profit centres located in Secunda, thus gross value added is specifically in fuel, petroleum, chemical and rubber products, as well as mining of coal. The mining of gold is also prominent in Evander and Leande.

Waterval Boven is known as a tourist destination in Mpumalanga, however GVA statistics also show the importance of coal mining as well as wood and wood products in the area.

Two other areas which show significant concentration of employment in manufacturing are significant are Temba in the North West Province and Zwelitsha in the Eastern Cape. Temba borders the North West province and Northern Province and located close to the Carousel Casino and Entertainment World. In terms of gross value added the fuel, petroleum, chemical and rubber products as well as metal products sectors make large contributions to the local economy. While Zwelisha is a little known entity in the Eastern Cape it shows significant GVA shares in the manufacturing of metal products, food, beverages and tobacco products.

In conclusion, the results above show that there are a number of places (60 altogether) that are currently marked by concentration in employment in manufacturing and as such may be said to be offering localisation economies for growth and development. These places present a varied profile. They are both large and small, and marked by high and low levels of urbanisation with diverse economic and social profiles. Also, not all the places that high location quotients have been fast growers, nor are all the fast growers specialised in manufacturing. A number of questions as to the specialisation and diversity of South Africa's cities and the importance thereof for growth and development, remain. The following section indicates the way forward.

5. Way forward

The next step in this analysis is to further extend the empirical work. The aim is to follow Mikkala (2004) and estimate the determinants of local growth and including the above measure of concentration. He estimates the following equation

$$LPROD_{ij} = constant + \alpha_1 * LRATIO_{ij} + (\alpha_1 + \alpha_2 - 1) * LEMP_{ij} + \alpha_3 * URB_j + \alpha_4 * LOC_{ij} + \varepsilon$$

Regional labour productivity (LPROD) is used as a dependent variable. The independent variables include the capital-labour ratio (LRATIO), number of employees (LEMP) and the variables that measure the impact of localisation and urbanisation. The

regional level of urbanisation is measured by the share of the population living in built-up areas (URB). The (LOC) is the location quotient.

The coefficient $(\alpha_1 + \alpha_2 - 1)$ measures the deviation of the elasticity of scale $(\alpha_1 + \alpha_2)$ from constant returns. If one or other (or both) coefficients of the agglomeration variables (α_3, α_4) turns out to be positive and statistically significant, it means that productivity is higher in the regions where the urbanisation (diversity) and/or localisation (specialisation) level is high.

Once the regression analysis has been completed it may be possible to draw more specific conclusions as to whether South African cities should be more specialised or diversified in order to promote economic growth.

List of references

- ACEMOGLU, D. JOHNSON, S. & ROBINSON, J.A. 2001. The colonial origins of comparative development: An empirical investigation. *American economic review*, 91(5):1369-1401, December.
- BERNSTEIN, A. & MCCARTHY, J. 2005. Thinking big in small-town South Africa. *Business day*, Aug. 5.
- BLACK, D. & HENDERSON, J.V. 1999. A theory of urban growth. *Journal of political economy*, 107(2):252-284, April.
- BRAKMAN, S., GARRETSEN, H. & VAN MARREWIIJK, C. 2001. An introduction to geographical economics: Trade, location and growth. Cambridge: Cambridge University Press.
- DURANTON, G. 1998. Labour specialisation, transport costs and city size. *Journal of regional science*, 38(4): 533-573, November.
- DURANTON, G. & PUGA, 1999. Diversity and specialisation in cities: Why, where and when does it matter? *C.E.P.R. Discussion papers* no. 2256.
- ELLISON, G. & GLAESER, E.L. 1997. Geographical concentration in US manufacturing industries: A dartboard approach. *Journal of political economy*, 105:889-927.
- FUJITA, M. & THISSE, J-F. 2002. Economics of agglomeration. Cambridge: Cambridge University Press.
- GLEASER, E., KALLAL, H. SCHEINKMAN, J. & SHLEIFER, A. 1992. Growth in cities. *Journal of political economy*, 100(6):1126-1152, December.
- HELSLEY, R.W. & STRANGE, W.C. 1990. Matching and agglomeration economies in a system of cities. *Regional science and urban economics*, 20(2):189-212, September.

LEMON, A. & ROGERSON, C.M. 2002. Geography and economy in South Africa and its neighbours: An introduction. (*In* Lemon, A. & Rogerson, C.M. eds. Geography and economy in South Africa and its neighbours. Aldershot: Ashgate. p. 1-24.)

MIDELFART-KNARVIK, K.H., OVERMAN, H.G., REDDING, S.J. & VENABLES, A.J. 2000. The location of European industry. *Economic papers*.

MUKKALA, K. 2004. Agglomeration economies in the Finnish manufacturing sector. *Applied economics*, 36:2419-2427.

NAUDÉ, W.A. & KRUGELL, W.F. 2003. Spatial inequality in Africa. (Review of the conference on spatial inequality in Africa (WIDER project on spatial disparities in human development), Centre for the study of African economies, University of Oxford.) *Development Southern Africa*, 20(1): 161-167.

NEL, E. 2002. South Africa's manufacturing economy: Problems and performance. (*In*: Lemon, A. & Rogerson, C.M. eds. Geography and economy in South Africa and its neighbours. Aldershot: Ashgate. p. 81-94.)

ROGERSON, C.M. 1991. Beyond racial Fordism: Restructuring industry in the "new" South Africa. *Tijdschrift voor economische en sociale geografie*, 82:355-366.

SCHLEMMER & LOVELL 2000.

SULEMAN, A. 1998. The competitiveness and comparative advantages of the manufacturing sector in South Africa's nine provinces. Unpublished PhD thesis, School of Economics, Risk Management and International Trade, Potchefstroom University, South Africa.

VENABLES, A.J. 2005. Geographical economics: Notes on Africa. *Journal of development perspectives*, 1(1): 63-84.

WORLD BANK. 2000. World Development Report 1999/2000. Entering the 21st Century. Washington DC : The World Bank.