

**SUB-NATIONAL DIFFERENCES IN THE QUALITY OF LIFE
IN SOUTH AFRICA**

by

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SUB-NATIONAL DIFFERENCES IN THE QUALITY OF LIFE IN SOUTH AFRICA

Abstract

It is increasingly acknowledged that the proper objective of government efforts towards economic development should be aimed at improvements beyond simple measures of growth, poverty and inequality towards richer measures of human well-being. Herein, the economic and non-economic quality of life, as well as the quantity of life, becomes important indicators. Economists and other social planners therefore need to develop more meaningful indicators of the quality of life. Objective and subjective indicators of the quality of life can be distinguished. For various reasons, this thesis will focus on the search for more meaningful objective indicators of the quality of life.

One of the most well known objective indicators of quality of life is the Human Development Index (HDI). There is, however, a growing dissatisfaction with the HDI. In this thesis, two recent methodological advances in the measurement of quality of life are applied and combined and, in particular, in the measurement of the non-economic quality of life, to the sub-national quality of life in South Africa. As such, this thesis' contribution is twofold. First, it investigates the extent to which the quality of life differs within a developing country, as opposed to most studies that focus on either inter-country differences in quality of life, or studies that focus only on spatial inequalities within countries using a restricted set of measures such as per capita income or poverty rates and headcounts. Secondly, this thesis applies a recent methodology proposed by McGillivray (2005) to isolate the non-economic (non-monetary) quality of life in various composite indices and to focus on the non-economic quality of life across 354 South African magisterial districts.

Indices for the non-economic quality of life are compiled for geographical quality, for demographic quality, and based on the human development index. Furthermore, given that composite indices used in the construction of measures of quality of life consist of weightings of multiple proxies, this thesis implements the method of Lubotsky and

Wittenberg (2006) which proposed a new estimator for the case where multiple proxies are to be used for a single, unobserved variable such as quality of life.

This thesis establishes that when the non-economic quality of life of the demographic index is considered, the top ten regions in 2004 were as follows: Pretoria, Johannesburg, Soweto, Port Elizabeth, Durban, Inanda, Pietermaritzburg, Wynberg, Mitchellsplain and Vanderbijlpark. It is important to note that, when interpreting these results, one should take caution since variables such as the number of people, number of households etc. is included in this index and as a region grows in population size the more negative consequences such as a higher crime rate can be associated with the particular region.

The top ten regions in which to reside in 2004 as determined by the geography quality of life index were: Calvinia, Gordonia, Namaqualand, Kenhardt, Carnarvon, Ubombo, Williston, Hlabisa, Ceres and Ingwavuma. This geography index measures a region's natural beauty which, according to Wey (2000), contributes positively to one's perceived quality of life.

Considering changes in non-economic quality of life indices between 1996 and 2004, the conclusion can be drawn that the South African government has been successful to a certain degree in addressing non-economic quality of life. Social policies such as health care, education, housing, water and sanitation appear to have had a positive effect on people's perceived non-economic quality of life in areas that were relatively deprived in 1996.

Key words: Quality of life, non-economic measures, sub-national inequality, Human Development Index, multiple proxies, South Africa.

JEL classification codes: O15, O16, O18, O55, R11, R00, C01, C33, C43.

SUB-NASIONALE VERSKILLE IN KWALITEIT VAN LEWE IN SUID-AFRIKA

Opsomming

Daar word al hoe meer besef dat die werklike doelwit van regeringspogings ten opsigte van ekonomiese ontwikkeling gerig moet wees op verbeterings wat verder strek as eenvoudige stappe om groei, armoede en ongelykheid te hanteer, maar dat dit ook omvattender stappe tot menslike welsyn moet behels. Hierin word die ekonomiese en nie-ekonomiese lewensgehalte, sowel as die lewenshoeveelheid, belangrike indikatore. Ekonome en ander sosiale beplanners moet daarom meer betekenisvolle indikatore van lewensgehalte ontwikkel. Objektiewe en subjektiewe indikatore van lewensgehalte kan onderskei word. Om verskeie gemotiveerde redes sal hierdie proefskrif fokus op die soeke na meer betekenisvolle objektiewe indikatore van lewensgehalte.

Een van die bekendste objektiewe indikatore van lewensgehalte is die Menslike Ontwikkelings Indeks (MOI). Daar is egter toenemende ontevredenheid met die MOI. In hierdie proefskrif word derhalwe twee resente metodologiese ontwikkelings in die meting van lewensgehalte toegepas en gekombineer. In die besonder word die meting van die nie-ekonomiese lewensgehalte toegepas op die sub-nasionale gehalte van lewe in Suid-Afrika. As sodanig is die bydrae van hierdie proefskrif tweeledig. Eerstens ondersoek dit die mate waartoe lewensgehalte verskil binne 'n ontwikkelende land – hierteenoor fokus die meeste ander studies op verskille in lewensgehalte tussen lande, of op ruimtelike ongelykhede binne lande deur middel van 'n beperkte stel maatstawwe, soos per capita inkomste of armoedesyfers en koptellings. Tweedens pas hierdie proefskrif 'n resente metodologie toe wat voorgestel is deur McGillivray (2005) om die nie-ekonomiese (nie-monetêre) lewensgehalte in verskeie saamgestelde indekse te isoleer, om te fokus op die nie-ekonomiese lewensgehalte in 354 Suid-Afrikaanse munisipale distrikte.

Indekse vir die nie-ekonomiese lewensgehalte word saamgestel vir geografiese gehalte en vir demografiese gehalte, en word gebaseer op die MOI. Saamgestelde indekse wat gebruik word in die konstruksie van maatstawwe vir lewensgehalte behels die weeg van veelvuldige

proksies; gevolglik implementeer hierdie proefskrif voorts die metode van Lubotsky en Wittenberg (2006), wat 'n nuwe beramer voorgestel het vir die geval waar veelvuldige proksies gebruik moet word vir 'n enkele, nie-waarneembare veranderlike soos lewensgehalte.

Hierdie proefskrif bevind dat wanneer die nie-ekonomiese lewensgehalte van die demografiese indeks in ag geneem word, die tien topstreke in 2004 Pretoria, Johannesburg, Soweto, Port Elizabeth, Durban, Inanda, Pietermaritzburg, Wynberg, Mitchellsplain en Vanderbijlpark was. Dit is belangrik om daarop te let dat wanneer hierdie resultate geïnterpreteer word, daar met omsigtigheid te werk gegaan moet word, aangesien hierdie indeks veranderlikes behels soos die aantal mense, die aantal huishoudings ens., en daarom kan negatiewe gevolge (soos 'n verhoogde misdaadvoorkoms) met 'n besondere streek geassosieer word soos die streek se bevolking toeneem.

Die tien topstreke in 2004 om in te bly, soos bepaal deur die geografiese lewensgehalte-indeks, was Calvinia, Gordonias, Namakwaland, Kenhardt, Carnarvon, Ubombo, Williston, Hlabisa, Ceres en Ingwavuma. Hierdie geografiese indeks meet 'n streek se natuurlike skoonheid, wat volgens Wey (2000) positief bydra tot 'n mens se persepsie van lewensgehalte.

Wanneer veranderinge in nie-ekonomiese lewensgehalte-indekse vanaf 1996 tot 2004 in ag geneem word, kan die gevolgtrekking gemaak word dat die Suid-Afrikaanse regering daarin geslaag het om tot 'n sekere mate iets te doen aan nie-ekonomiese lewensgehalte. Sosiale beleide soos gesondheidsorg, opvoeding, behuising, water en sanitasie het blykbaar 'n positiewe uitwerking gehad op mense se persepsie van nie-ekonomiese lewensgehalte in gebiede wat in 1996 taamlike ontberings moes verduur.

Sluitelwoorde: Lewensgehalte, nie-ekonomiese maatstawwe, sub-nasionale ongelykheid, Menslike Ontwikkelings Indeks, veelvuldige proksies, Suid-Afrika.

JEL-klassifikasiekodes: O15, O16, O18, O55, R11, R00, C01, C33, C43.

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CHAPTER 1

INTRODUCTION AND PROBLEM STATEMENT

1.1 INTRODUCTION

Well-being¹ is a multidimensional concept and the importance of the non-income dimensions of well-being attainment and of population heterogeneity is increasingly acknowledged. Non-economic or non-monetary measures of quality of life have increasingly dominated the discussion on the meaning of quality of life since the concept's evolution from the 1950s (McGillivray and Shorrocks, 2005: 194).

Many of the recent advances in the measurement of the non-economic quality of life have focused on the national level, and on cross-country differences in non-economic quality of life (see e.g. McGillivray, 2005). A shortcoming has been in the measurement of the non-economic quality of life within a country, and the identification of country-wide differences in the quality of life. Kanbur and Venables (2005) recently pointed out that there are growing concerns about spatial inequality within countries. In transition/developing economies such as South Africa, Mexico, Russia, India, China and most others, there has been a growing concern that spatial and regional disparities are on the increase, meaning that people within a particular country are faced with different levels of quality of life and thus human development. It is argued that increases in within-country inequalities may be slowing down poverty reduction in the world (Kanbur, Venables & Wan, 2005).

According to Kanbur and Venables (2005) these inequalities in quality of life/well-being, set in motion by spatial and regional disparities, should be of acute importance to policymakers of transition/developing economies for two reasons. Firstly, it should be noted that inequality between a country's regions is one component of overall national inequality across all its individuals. If spatial inequality is – as being predicted – on the increase between various regions, this means that the particular country's inequality as a whole is also on the

¹ For the purpose of this thesis, the terms quality of life, well-being and standard of living will be used synonymously.

increase. Secondly, inequality between a country's regions is, in itself, problematic and of concern, especially when the geographical regions align with language, ethnic, religious, or political divisions.

In this thesis, the central objective is to measure the non-economic quality of life on a sub-national level in a developing/transition country, in this case South Africa. South Africa is a country where there have been many concerns about alleviating poverty and improving human well-being over the past decade. However, as described by Naudé & Krugell (2006) the country is characterised by significant spatial inequalities in terms of the economic quality of life. Whether these economic inequalities also translate into similar inequalities in non-economic aspects, is therefore a further objective of this thesis.

This chapter is structured as follows: section 2 will discuss the thesis' problem statement. Section 3 clarifies the motivation for this particular thesis. The research question is stated in section 4, and section 5 provides the specific objectives of this thesis. In section 6, this thesis' hypothesis is discussed, whereas in section 7 the methodology to be used will be explained. Section 8 provides a layout of the rest of this thesis.

1.2 PROBLEM STATEMENT

The South African population is characterised by distinct economic and social contrasts, not only in the material gaps between particular racial groups, but also in comparing the economic quality of life between magisterial districts/regions.

The question is: how does one determine a magisterial district/region's non-economic quality of life? (without taking income per capita and subjective indicators into account). The answer is important for the development of human life on country level and can play a major role in government policy pertaining to the provision of social amenities enabling them to reduce inequalities in the quality of life across all regions.

1.3 MOTIVATION FOR THIS THESIS

The motivation for this thesis can be summed up as follows:

1. the state of human underdevelopment in the world;
2. human underdevelopment is not only relevant between countries, but also within countries; and
3. the spatial inequality of human development is causing rising concern.

The correct measurement of economic as well as non-economic dimensions of human development/well-being is important, not just on country level, as has been done recently in the work of McGillivray (2006) and others, but also on a sub-national level. The contribution of this thesis lies in extending McGillivray's contribution to a sub-national level. Furthermore, this thesis will attempt to improve on the methodological aspects most commonly used in constructing human well-being indices in three respects. The first is by making use of variation in index values unexplained by income, as proxies for various dimensions of non-economic quality of life. This thesis bases this on the methodology proposed by McGillivray (2006) but extends the analysis in two ways by considering the sub-national dimensions and considering three dimensions of non-economic quality of life: demographic quality, geographic quality and human development quality. Secondly, this thesis considers the implications of recent econometric advances pertaining to the use of multiple proxies. Thirdly, this thesis uses the knowledge obtained throughout this investigation and ranks South Africa's 354 magisterial districts according to their individual quality of life indices from best to worst and discuss some of the policy implications.

1.4 RESEARCH QUESTION

The primary research question is twofold: how does quality of life compare across all 354 magisterial districts in South Africa for the period 1996-2004, and what does this imply concerning the government's selected policies as implemented since the 1994 democratic elections?

These questions may be answered by answering two secondary research questions:

- How does one construct a quality of life index when using non-economic variables to determine the non-economic quality of life?
- Have the 354 magisterial districts improved their perceived quality of life from 1996 to 2004 and, if so, why?

1.5 OBJECTIVES OF THIS THESIS

The primary objective is to construct an index of the non-economic quality of life that can be applied to determine spatial inequalities in non-economic (non-monetary) aspects of the quality of life.

This may be achieved through a number of secondary objectives:

- To discuss the concept of quality of life and distinguish between economic and non-economic quality of life;
- To measure the non-economic quality of life in South Africa's metropolitan regions, as well as in all 354 magisterial districts;
- To rank the various cities and towns in South Africa in terms of non-economic quality of life;
- To determine the changes in the non-economic quality of life over time;
- Critique the use of principal components analysis in deriving indices; and
- Make conclusions and recommendations for further research into non-economic quality of life as well as into evolving the nature of the non-economic quality of life in South Africa.

1.6 HYPOTHESIS

The central working hypothesis of this thesis is that when measuring the non-economic quality of life within a particular country one will find that it can differ significantly from one magisterial district/region to the next. It has long been accepted that one need not only use income per capita in determining how good or bad an individual's life may be. Thus it is

expected that the use of non-economic quality of life indices can help a county to develop human life as a whole.

1.7 METHODOLOGY

Each research question will be investigated by means of a literature survey as well as by an empirical analysis using data from the Regional Economic Focus compiled by Global Insight (Pty) Ltd as well as data from Statistics South Africa. The methods used are principal components analysis (chapter 4) and multiple proxies analysis (chapter 5).

1.8 OUTLINE OF THIS THESIS

This thesis will be compiled as follows. Chapter 2 will discuss the theory of quality of life, in that it will explain the evolution of this multidimensional concept as well as discuss the two main platforms for research on quality of life: subjective and objective studies. Certain major role players in the aforementioned platforms will also be discussed.

In chapter 3, the thesis will address the objective of determining the non-economic quality of life for South Africa's six metropolises. Chapter 4 develops the initial train of thought outlined in chapter 3 further when it constructs, through the use of principal components analysis, two new quality of life indices. These are demographic quality and geographical quality, which are then combined with the widely used human development index to determine the non-economic quality of life for South Africa's 354 municipal districts and then uses their individual indices to rank them from best to worst according to their performance in social amenities.

Chapter 5 accommodates the new method introduced by Lubotsky and Wittenberg (2006) for compiling an index; known as the multiple proxies analysis. The chapter compares the outcome of the three indices determined by principal components analysis (chapter 4) to those obtained by making use of the Lubotsky and Wittenberg argument, reports on the differences in their respective outcomes, and concludes by showing which one of these

methods this thesis indicates to be the superior empirical methodology when determining and interpreting quality of life indices.

CHAPTER 2

THE QUALITY OF LIFE

2.1 INTRODUCTION

“Given that improving quality of life is a common aim of international development, the long-term future of humanity lies in a better understanding of factors that may have had or will have an impact on the quality of life” (Rahman, Mittelhammer & Wandschneider, 2003 : 1).

In chapter 1, it was emphasised that income inequality is on the increase in many countries – not only at the country level, but also at sub-national level. It was also stressed that the concerns about increases in income inequality should take into account that income inequality could be part of much broader changes in the quality of life that people enjoy. In chapter 1, it was also pointed out that quality of life (also referred to as human well-being) is a multidimensional concept consisting not only of an income (economic) component, but also an important non-economic component. To measure the non-economic quality of life (non-economic well-being) of residents remains a challenge facing policymakers in their quest for improving human well-being across the world.

The measurement of the non-economic quality of life has traditionally been done using subjective indicators. There is a large movement that focuses on the subjective measurement of quality of life (see Cummins, 1996; Sen, 1996; Narayan *et al.*, 2000 & Møller, 1999; 2000; 2003). Although there has been less of a focus on objective indicators to measure the non-economic quality of life, there is a growing dissatisfaction with the Human Development Index (HDI), the most widely use single objective index of human well-being and non-economic quality of life.

In this chapter, the concept and literature discussion and controversy surrounding the quality of life and its objective measurement is discussed. Further methodological issues pertaining to understanding and measuring the quality (and quantity) of life are also set out in chapters

3 and 4, whilst chapter 5 provides a further methodological critique of the compilation of single quality of life indices.

This chapter is laid out as follows: section 2.2 will provide a background on the development of the concept of the quality of life as well as providing a brief summary on some of the best known quality of life indices. Section 2.3 will discuss the train of thought for the construction of the concept for developing human life as a whole, discussing in particular Sen's capabilities approach as well as Griffin's well-being approach. Section 2.4 discusses some of the role players in the development of subjective quality of life indices. Section 2.5 discusses the various economic quality of life measures with specific focus on the Human Development Index. Section 2.6 discusses the existing literature on the non-economic (but not subjective) quality of life indices. Section 2.7 focuses on the quality of life studies undertaken for South Africa. Section 2.8 concludes.

2.2 BACKGROUND

Since the 1970s, quality of life/ well-being has been the subject of extensive theoretical and empirical research. Some of the most important role players in developing this concept have been Nussbaum (1988; 2000) (to be discussed in section 2.4), Cummins (1994; 1996) (to be discussed in section 2.4), Qizilbash (1996) (to be discussed in section 2.3), Narayan *et al.* (2000) (to be discussed in section 2.4), Griffin (1991) (to be discussed in section 2.3.2) and Alkire (2002) (to be discussed in section 2.4). The person who has made the most significant contribution to the development of the concept of what is perceived as quality of life is Sen (1984; 1993; 1996; 2000) with his capabilities approach, which will be discussed in section 2.3.1.

The evolution of the concept of quality of life /well-being from the Second World War onwards, which has been shaped by the established framework and practice of development can be seen in table 2.1 constructed by Sumner (2003).

Table 2.1: Evolution of the concept of quality of life/well-being (1950s-2000s)

Period	Meaning of quality of life/well-being	Measurement of quality of life/well-being
1950s	Economic well-being	GDP growth
1960s	Economic well-being	GDP per capita growth
1970s	Basic needs	GDP per capita growth + basic goods
1980s	Economic well-being	GDP per capita but rise of non-monetary factors
1990s	Human development/capabilities	Human development and sustainability
2000s	Universal rights, livelihoods, freedom	The Millennium Development Goals and 'new' areas: risk and empowerment

Source: Sumner (2003).

According to Sumner (2003), the evolution of the meaning and measurement of poverty and quality of life/well-being in each decade has been influenced by the position of development economics within development studies, and the tension between 'economic imperialism' and multidisciplinary. Since development economists have moved away from a pure economic pursuit towards multidisciplinary approaches, so the concept of quality of life/well-being has been broadened from a concern about income towards a multidimensional understanding of well-being, wherein it is recognised that material well-being, as measured by Gross Domestic Product (GDP) per capita, cannot alone explain the broader quality of life in a country.

Many of the quality of life indices (whether subjective or objective) that will be discussed in sections 2.4, 2.5 and 2.6 are seen as improvements on explaining and measuring human well-being but they are still considerably limited by their inability to capture diverse domains of quality of life, the use of arbitrary weights, data being used which are not subjected to empirical testing and arbitrary selection of variables. One weakness of quality of life indices currently being used is that they are limited to the socioeconomic aspects of life; the political and civil aspects are kept separate.

In choosing the most effective well-being or quality of life indicator, Sumner (2003) argues that the following criteria need to be satisfied: (1) the measure should be relevant to policymakers; (2) it must be a direct and unequivocal measure of progress; (3) it should be specific to the phenomena; (4) it should be valid at all times; (5) it should be reliable; (6) it

should be consistent; (7) it should be measurable; (8) it should be user friendly; (9) it should not easily be manipulated; (10) it should be cost effective and (11) it should be up to date at all times.

Table 2.2 gives a brief summary of some of the quality of life indices that will be discussed later on in this thesis together with the various domains covered by them.

Table 2.2: Various domains covered by quality of life indices

Domains of quality of life indices	Physical Quality of Life Index (Morris, 1979)	Human Development Index (UNDP, 1990)	Quality of Life Index (Dasgupta & Weale, 1992)	Comprehensive Quality of Life Survey (Cummins, 1994)	Index of Economic well-being (Osberg & Sharpe, 2000)	Quality of Life Index (Narayan <i>et al</i>, (2000)
Social well-being						X
Emotional well-being				X		
Health	X	X	X	X		X
Material well-being		X	X	X	X	X
Work and productivity				X	X	
Feeling part of one's local community	X	X	X	X		
Personal safety				X	X	X
Quality of environment						
Freedom of choice and action						X
Psychological well-being						X

Source: Adapted from Rahman, Mittelhammer and Wandschneider, 2003.

What is important in table 2.2, is that none of the quality of life indices currently being used has the ability to completely capture the multidimensional nature of quality of life nor do any of them capture the domain consisting of the environmental quality, even though researchers such as Perrings (1998) and Wey (2000) have found a positive correlation between quality of place with quality of life, which can be based on the supposition that the physical location and surroundings play a deterministic role in the quality of life.

2.3 ARGUMENTS FOR DEVELOPMENT OF HUMAN LIFE

According to Qizilbash (1996) the main reason that development economists have moved their emphasis away from economic development in terms of growth in per capita Gross National Product (GNP) or GDP is because such growth may fail to translate into general increases in human well-being. This failure can be due to it being inequitable and/or consistent with constant or rising levels of absolute poverty and relative deprivation among the poorer half of a nation.

Taking the above difficulties into consideration, some researchers (some of whom will be discussed in 2.3.1 and 2.3.2) have tried to develop new concepts of human development which consider human beings as 'the ends rather than the means' of development. Development can be perceived as the improvement in the quality of human lives that is equitable and consistent (Qizilbash, 1996).

Anand and Sen (2000) argue that if human beings are seen as the 'primary ends' of the process of development, emphasis should be placed on what people get from development, not only what they put into it. To recognise the importance of human qualities in the promotion and sustaining of economic growth tells nothing about the reasons for seeking economic growth in the first place. It also sheds no light on the fact that quality of life can vary greatly between countries with much the same level of per capita GNP and real income, nor on the great disparities in quality of life within a particular country.

Anand and Sen (2000: 84) use the example of education to illustrate their point. If the expansion of education facilities or of health care has the effect of increasing productivity

and thus the income level, the approach of 'human capital' would give it an immediate and superior status. But, if these changes in educational and health facilities make one live longer and be more fulfilled, and directly add to one's ability to avoid preventable diseases and unhappiness without necessarily changing labour productivity or increasing commodity production, then that achievement would simply not get the recognition it deserves in the accounting of 'human capital'. As a result, they argue that something is amiss even in the broadened perspective of development that emphasises 'human capital'. To obtain the missing link, they state that a broader notion of development is needed: one that concentrates on the enhancement of human lives / quality of life and freedoms (Anand & Sen, 2000). Herein Sen's capability approach has been influential.

2.3.1 Sen's capability approach

Sen (1984) defined the process of economic development as "an expansion of people's capabilities, and development is seen as a process of emancipation from the enforced necessity to 'live less and be less'".

Herein, human development consists of its functioning and its eventual capability. "Functioning represents parts of the state of a person – in particular the various things that he/she manages to do or be in leading a life. The capability of a person reflects the alternative combinations of functions the person can achieve, and from which he or she can choose one collection. The approach is based on a view of living as a combination of various 'doings and beings', with the quality of life to be assessed in terms of the capability to achieve valuable functionings" (Sen, 1996).

Sen's (1996) capability approach can be summarised as follows:

1. capabilities are seen, amongst other things, as the vital space for the assessment of the quality of life and development;
2. people's capabilities capture the extent of their positive freedoms;
3. development is thought of as capability expansion; and
4. development is a liberation, a growth in freedom from necessity.

2.3.2 Griffin's well-being approach

Griffin (1991) states that every person's life is covered by what he calls 'core' prudential values (such as the avoidance of pain) and that the recognition of these values is crucial for people to see others as human beings. Griffin (1991) says the following about the idea of prudential value: "to see anything as prudentially valuable, we have got to see it as enhancing life in a generally intelligible way, in a way that pertains to human life".

Griffin (1991) argues that prudential deliberation leads people to a list of prudential values, which he describes as: (1) accomplishment, (2) the components of a characteristically human existence, (3) understanding, (4) enjoyment, and (5) deep personal relations. Although Griffin (1991) concedes that not everyone may agree with his list, it does initiate a promising account of well-being as an approach to human development. One may conclude that Griffin's account concentrates on values that make a distinctively human life 'go well'.

From the two approaches discussed above, it is clear that there is a subjective side to understanding and quantifying human well-being or quality of life. The following section will discuss some of the most critical subjective quality of life studies and indicators.

2.4 SUBJECTIVE QUALITY OF LIFE INDICES

Subjective quality of life refers to the well-being as declared by a particular individual. It is based on the declaration by a person and can be seen as a measure that incorporates all life events, aspirations, achievements, failures and emotions (Rojas, 2003).

According to Cummins (1996), subjective quality of life can be defined and measured according to two basic approaches. One regards the construct as a single, unitary entity, while the other considers it to be composed of distinct domains.

Alkire (2002) states that the primary reason for a serious depiction of dimensions/domains is to give secure epistemological² and empirical footing to the multidimensional objective of human development. The second reason is of a practical nature and relates to the need for effective methodologies for communities to evaluate tradeoffs. A multidimensional approach to development (such as Sen's capability approach in section 2.3.1) requires many more value choices to be made unambiguously rather than relying on the market. Alkire (2002) states that the third reason for the use of dimensions/domains are that a set of dimensions/domains can help groups to identify unintended impacts. The final reason for the implementation of dimensions/domains relates to the political economy of ideas: theories that are not comprehensible do not spread.

An early example of the single unitary entity approach has been incorporated into one of the most popular measurement instruments. Created by Andrews and Withey (1976), it consists of a single question "How do you feel about your life as a whole?" with respondents using a Likert scale of life satisfaction/dissatisfaction. If one wishes to compare population samples, this approach to subjective quality of life measurement has proved very useful, but when one wishes to compare smaller groups, it has been found that this measurement has limited utility since it provides only a global measure of supposed well-being (Cummins, 1996).

Cummins, McCabe, Romeo and Gullone (1994) have provided both empirical and theoretical argument in the development of their Comprehensive Quality of Life Survey which collects subjective and objective indicators in the specified seven domains below when measuring an individual's quality of life:

1. material well-being,
2. health,
3. productivity,
4. intimacy,
5. safety,
6. community; and
7. emotional well-being.

² Epistemology is the branch of Western philosophy that studies the nature and scope of knowledge and belief.

Narayan *et al.* (2000), did a groundbreaking study on the individual values of poor people when they used data collected from over 60 000 individuals, many of them across countries, whom were asked, among other questions, to define well-being or what they considered to be a good/bad quality of life. A careful analysis of the various answers led Narayan *et al.* (2000), to identify the following domains of quality of life or well-being:

1. material well-being;
2. bodily well-being;
3. social well-being;
4. security;
5. freedom of choice and action; and
6. psychological well-being.

Alkire (2002) argues that dimensions/domains have three characteristics; firstly, they are found to be incommensurable. Put another way, all of the desirable qualities of one are not present in any other. Secondly, they are irreducible, which means that the list of domains can not be made any shorter and that there is no single denominator to which they can be completely reduced. A third characteristic of dimensions/domains is that they are non-hierarchical, which means that at one time any of these dimensions/domains can seem the most important – they can not be arranged in any permanent hierarchy.

Following on the works of Sen's capability approach, Nussbaum (1988) developed a neo-Aristotelian account of collective values as a foundation for "basic political principles that should underwrite constitutional guarantees". Her account expresses human prosperity in terms of capabilities, which are the set of valuable beings and doings that a person or society has a real possibility of enjoying. Nussbaum (2000) identifies an incomplete list of human capabilities that have value and which are necessary for a dignified human existence.

Nussbaum (2000) identifies her list of central human functional capabilities under the following domains:

1. life;
2. bodily health;
3. bodily integrity;
4. senses, imagination, thought;
5. emotions;
6. practical reason;
7. affiliation;
8. other species;
9. play; and
10. control over one's environment.

2.5 ECONOMIC QUALITY OF LIFE INDICES

Most of the commonly used indicators to date are still the GDP per capita, the dollar a day poverty measure, and national poverty lines. Why is this? Economic measures of quality of life are widely accepted – especially amongst policymakers – because they are useful when sudden, rudimentary, short run, aggregate inferences are required to make an assessment. Economic measures of quality of life are seen as being more receptive, changing much faster than non-economic social data that sometimes suffers a time lag. These measures are also perceived as being cheaper and less complex to collect than non-economic poverty data (Sumner, 2003).

Sumner (2003) argues that the supremacy of economic measures of quality of life is, in addition to the reasons already mentioned above, due to the presumption that economic measures are more adaptable to quantification as they are tangible. In contrast, non-economic measures of quality of life are somewhat less adaptable to quantification and rely on more unsubstantiated and subjective proxies. It is perhaps assumed what is more adaptable to quantification is more objective.

This section will now continue with the discussion of the best known measure of human development and will conclude with brief discussion of various other economic measures of quality of life.

2.5.1 Human Development Index

The first Human Development Report (1990) identified three key features of the quality of life of people, to be enhanced by the process of development: longevity, education and “command over resources to enjoy a decent standard of living” or as it is more readily called, the income level of an individual. These three aspects are known as the Human Development Index (HDI).

The purpose of including income in the HDI is to note that there are many capabilities which are critically dependent on one’s economic circumstances, i.e. economic quality of life. The income level enjoyed, especially close to the poverty line, can be very crucial information on the contributory past history of basic human capabilities (Anand & Sen, 2000).

Furthermore, the inclusion of the income level of an individual in the HDI is strictly as a residual containing something of other basic capabilities not already incorporated in the measures of longevity and education. As already mentioned in section 2.2, the use of the GNP or GDP per capita alone as indicator of an individual’s quality of life may fail to translate a country’s achievements in health and survival, seeing as much depends on how national resources are used, such as the extent of social amenities. But, after taking note of longevity and education, there still remain some basic concerns that have to be captured in any accounting of elementary capabilities. It is, in this sense, that the income component of the HDI has been used – as an indirect indicator of some capabilities not well reflected, directly or indirectly, in the measures of longevity and education (Anand & Sen, 2000).

Since its first appearance in the 1990 Human Development Report, the HDI has been surrounded by much controversy. Anand and Sen (1992) can be quoted as saying “Income, commodities (basic or otherwise), and wealth do of course have instrumental importance but they do not constitute a direct measure of the living standard itself”. Some researchers such

as McGillivray (1991), McGillivray and White (1993) and Cahill (2005) have found that other development index statistics are so closely correlated with GDP or GNP per capita, that they are redundant in forming an index.

Cahill (2005) found that the statistics used in the HDI are so closely correlated with one another that indistinguishable alternative indices can be created from the same statistics with different weights. Cahill (2005) found that an index that consists of a 58% weight on adjusted GDP, 24% on the education component and 19% on the life expectancy component is statistically indistinguishable from the original HDI.

These results are important since Cahill (2005) suggests that they can be interpreted in two ways. One view can be supportive of the HDI in that it can be seen as robust to a wide variety of index weights. That is, one can render the debate over the relative weighting scheme as being largely irrelevant. One can therefore come to the conclusion that the end results of the HDI cannot be dismissed on the basis that the relevant weights bias the results towards favouring a particular aspect of development. This is of importance seeing as several studies³ have suggested that the HDI weighting scheme is subjective, or even random. The second interpretation can be a critical view in that adding a second or third statistic to the HDI renders only a relatively small amount of information about development to any one statistic.

2.5.2 Other economic quality of life indices

One of the basic problems pertaining to developing an alternative economic quality of life index as a replacement for the HDI, is that once a set of indicators of well-being or quality of life such as literacy rate, life expectancy, per capita income etc. are chosen, the problem is restricted through translation of these indices in such a way that would signify the success or failure of a country in the provision of quality of life (so-called achievement indices) and how this provision has improved over time (improvement indices) (Zaim, Färe & Grosskopf, 2001).

³ See, for example, Noorbakhsh, F. (1998). A Modified Human Development Index. *World Development*, March, pp. 517-528. And, Ravallion, M. (1997). Good and Bad Growth: The Human Development Reports. *World Development*, May, pp. 631-638.

The construction of indices such as those mentioned above is subject to critical analysis. One important question to ask when working with achievement indices is one against which benchmark achievement should be measured. Should this benchmark be a biological benchmark, as in the case of a biological maximum longevity for the indicator “life expectancy at birth”, or should the achievement be measured with respect to a country which is taken as a baseline. Another question to be kept in mind is whether a non-linear relationship between the achievement index and values of indicators is a preferred property over a linear relationship (Zaim *et al.*, 2001).

Aggregation over individual indices is another issue that still remains unresolved. Disagreements on the specific weights that should be assigned to each individual component of an index still prevail and no conformity can be foreseen. Zaim *et al.* (2001) have proposed an alternative index called the “microeconomic approach to index number theory”, which relies heavily on the assumptions of optimising behaviour and which can measure the well-being or quality of life of individuals in different countries or geographical regions. This proposed achievement index get its stronghold in the theory of quantity indices whose self-evident properties are well established. After careful analysis of the distribution functions of achievement indices over the years (1977-1980), in conjunction with the results obtained from improvement indices, they found evidence of convergence in quality of life in their sample countries.

When considering the Quality of Life Index composed by the Economist Intelligence Unit (2005), it can be seen that they used nine quality-of-life domains: material well-being (as measured by GDP per person at PPP \$); health (measured as life expectancy at birth); political stability and security (measured as political stability and security ratings); family life (measured as divorce rate – per 1000 population – converted into an index of 1 (lowest divorce rate) to 5 (highest)); community life (measured as a dummy variable taking value 1 if the country has either a high rate of church attendance or trade-union membership, zero otherwise); climate and geography (using latitude, to distinguish between warmer and colder climates); job security (measured by the percentage unemployment rate); political freedom (an average of indices of political and civil liberties are used – scale of 1 (completely free) to 7 (not free)) and gender equality (measured by a ratio of average male and female earnings).

According to the Economist Intelligence Unit (2005), one strand of the economic literature has tried to adjust GDP by quantifying features that are omitted by the GDP measure – various non-market activities and social ills such as environmental pollution. But the approach has faced insurmountable difficulties in assigning monetary values to the various factors and intangibles that comprise a wider measure of socio-economic well-being.

Dasgupta and Weale (1992) argue that the indices used by the World Bank and the United Nations Development Program (UNDP) are more concentrated on the “socioeconomic sphere of life”, and in being so fail to pay attention to the “political and civil spheres”. They therefore constructed a measure of quality of life that included per capita income, life expectancy at birth, adult literacy rate, and indices of political rights and civil liberties.

Morris (1979) proposed the Physical Quality of Life Index (PQLI) as an alternative to per capita GDP for measuring the well-being of people. The PQLI is a function of life expectancy at age one, infant mortality rate and literacy rate.

More recently, Osberg and Sharpe (2000) developed the Index of Economic Well-Being (IEWB). Their index is based on the view that the economic well-being of society depends on:

1. the level of consumption flows through the average flow of current income;
2. aggregate accumulation of productive stocks;
3. inequality in the distribution of income and poverty, and
4. insecurity in the anticipation of future incomes.

Osberg and Sharpe’s (2000) logical reasoning behind choosing these four components or domains of well-being is that they identify both trends in average outcomes and in the diversity of outcomes, now and in the future.

Considering economic well-being or economic quality of life in the sense of “command over resources”, then both present and future command over resources are relevant to current economic well-being. Both the future consumption of the current generation and the well-

being of future generations depend on the accumulation of productive assets, broadly conceived to include natural and human resources as well as physical capital stock (Osberg & Sharpe, 2005).

It should also be mentioned that the idea that a society's economic well-being depends on total consumption and accumulation, as well as on the individual inequality and insecurity that surround the distribution of macroeconomic aggregates is consistent with a variety of theoretical perspectives (Osberg & Sharpe, 2005).

In reviewing their IEWB, Osberg and Sharpe (2005) state that their approach is more of an "economic" one. This is both because they emphasise the logical link between indicators, and because the theme of resource availability is the central concept in all four dimensions or domains of economic well-being. They do not argue that society's well-being is a single, objective number but that it should be considered as each individual in the society making a subjective evaluation of objective data in coming to a personal conclusion about the quality of life or well-being of that particular society. As already mentioned in section 2.5, quality of life or well-being are perceived as having multiple dimensions and individuals differ in their subjective valuation of the relative importance of each dimension of well-being.

Individuals often have to come to a comprehensive decision – meaning that they have to find a way to add everything together across domains that are conceptually disparate. Looking from this perspective, the purpose of an index construction should be to assist individuals (for example, as voters in elections and as bureaucrats in policy making) in thinking systematically about national outcomes and public policy, without automatically presuming that all individuals have the same values (Osberg & Sharpe, 2005).

2.6 NON-ECONOMIC QUALITY OF LIFE INDICES

McGillivray and Shorrocks (2005) point out that social science research has increasingly recognised that well-being is a multidimensional concept and that the importance of the non-income dimensions of well-being achievement and of population heterogeneity has been acknowledged.

Non-economic or non-monetary measures of quality of life have increasingly dominated the discussion on the meaning of quality of life. Researchers define and measure quality of life with some referral to Sen's (1984) capability approach (see section 2.3.1).

One might ask what, if any, comparative advantage does measuring quality of life hold in terms of non-economic indicators (instead of economic measures)? Non-economic measures of quality of life can be seen as being more useful than economic measures when a medium or long-term evaluation is required, because these type of measures more directly address the outcomes of policy for the development of human life in as much that people are seen as 'the ends rather than the means' or inputs to these policies. Given that non-economic measures are slower to react and more expensive to obtain than economic data, they have the additional benefit of being adaptable to disaggregation, making them instructive for distributional impacts of policy changes (World Bank, 2001a).

There are at least two noteworthy restrictions to using non-economic measures to determine quality of life as put forward by Sumner (2003): (1) the availability and quality of the data for indicators selected, and (2) difficulties in the accurate measurement and capturing of the stated social phenomena or capability. For example, if one intends to measure the quality of education, one may be misled by an indicator such as enrolment as this indicator does not indicate whether attendance in school is high or whether students receive a proper quality of teaching.

Three of the most used and respected United Nations Development Programme's indices are the Human Development Index (HDI), the Gender Development Index (GDI) and the Human Poverty Index (HPI). The problem with the HDI and the GDI is that they classify people on little more than their income per capita – which is considered as an economic measure of quality of life. The only index using purely non-economic indicators is the HPI, but this index is used to determine the extent of the population to be classified as being poor and not to determine their individual quality of life.

In the course of developing measures for non-economic or non-monetary quality of life, many of the standard and extensively used indicators have been subject to criticism. As has been shown by McGillivray (1991), McGillivray and White (1993) and Cahill (2005), most of the measures were found to correlate highly with 'command over resources to enjoy a decent standard of living' or, as it is more widely known, income per capita. As such, they have been judged "at worst to be empirically redundant or at best to reveal insufficient new information vis-à-vis income per capita".

There have been numerous attempts to construct alternative, non-monetary indices of social and economic well-being by combining a variety of different factors that are thought to influence quality of life into a single statistic. The main problem with all these measures is selection bias and arbitrariness in the factors that are chosen to assess quality of life and in assigning weights to different indicators to come up with a single man-made measure.

To date, the most progress in determining the true non-economic quality of life has been made by McGillivray (2005). He extracted, by means of principal component analysis, the maximum possible information from various standard national non-economic quality of life achievement measures. McGillivray (2005) then empirically identified the variation in this extraction not accounted for by variation in income per capita, which he named μ_i . This variable was then defined as being the residual yielded by cross-country regression of the extraction on the natural log of Purchasing Power Parity (PPP) GDP per capita. The variable μ_i can be interpreted *inter alia* as a measure of non-economic human well-being/quality of life achievement, in the sense that it captures well-being achieved independently of income.

2.7 QUALITY OF LIFE IN SOUTH AFRICA

According to the Economist Intelligence Unit's (2005) Quality of Life Index, South Africa is ranked at 92 out of 111 countries with a score of 5.245 (on a scale from 1 to 10). But, when South Africa is ranked only by using GDP per capita at PPP \$, it moves up to number 50

out of the same 111 countries. With a difference in ranking of 42, one can thus see that it is imperative to look beyond monetary values when ascertaining a country's quality of life.

In this discussion of quality of life studies in South Africa, it should be noted that only a few studies have been done. Most of these have been mainly subjective in nature as well as being predominantly the work of one researcher.

As was argued by Møller and Schlemmer (1983), quality of life studies have an immediate and obvious significance in South Africa because the society is discernible by social contrasts, which are defined not only by the material gap between various racial groups, but also by cultural meanings and socio-political perspectives. In this sense, systematic attempts through research to describe and quantify the depth and outline of social inequalities are of great importance. It was this groundbreaking study that led to the development of the South African Quality of Life Project, which can be seen as an effort to balance South Africa's objective indicator tradition with systematic studies of trends of life satisfaction, happiness and expectations of future life satisfaction or optimism.

Møller (1999) used data obtained by the MarkData survey in 1997, which were commissioned for the Quality of Life Trends Project, in which South Africans were asked "if their lives were getting better or worse" and "how they felt about future opportunities and prospects" to determine what South Africans perceived as quality of life. She found that there was a significant difference between the ways black and white South Africans felt about their lives. Black South Africans were found to be the most optimistic about the future and white South Africans were found to be the most pessimistic. It was also found that twice as many black than white South Africans felt that life was getting better and 43% of black South Africans compared to only 28% of white South Africans felt happy about future opportunities and prospects. Since an individual's quality of life is influenced by how one feels about one's life, it is not surprising that white South Africans' perceived quality of life is on the decrease.

Respondents who took part in the MarkData survey were asked "what would make you feel happier with your life?" and black and white South Africans proposed dissimilar

interventions. Møller (1999) found that black South Africans indicated that one's livelihood and the amount of services provided were the most important interventions that would help them achieve a higher level of happiness/quality of life. Access to income through job creation, better jobs as well as better paid jobs were also seen to promote happiness. White South Africans' focus was more on safety and security issues and, in particular, in a reduction in crime and violence. They were also found to be worried about reverse discrimination, language and group rights. The economic situation was found to contribute negatively to their happiness/quality of life.

Møller and Devey (2003) used results obtained from Statistics South Africa's (SSA) October Household Survey (OHS), which was then the only known database that included both objective as well as subjective indicators, in order to determine whether older black South African households have made any material gains and received any increase in their perceived quality of life since democracy, seeing as the African National Congress' (ANC) 1994 election manifesto promised 'a better life for all'. Although they did not expect dramatic changes in any of the social indicators used over their analysis period 1995-1998, they found that government intervention seemed to have already paid some dividends by 1998. Møller and Devey's (2003) results showed that material well-being has been improving somewhat for South Africa's older households which can also be interpreted as showing a slight increase in their quality of life.

From the above, it is obvious that South Africa represents a special case when determining a particular country's quality of life. There always has been, and will be for the foreseeable future, a gap in different races' observable idea of the quality of life. Some of the most probable explanations for the South African quality of life assemblage are the huge gap in living standards – not just between black and white South Africans, but also between the rich and poor black South Africans.

Møller (2000) argued that South Africa can learn valuable lesson from Reunited Germany. Whereas white South Africans and West Germans both agreed of their own accord to a power-sharing, the West Germans went one further and agreed to annual monetary transfers in order to help the East Germans with their economic and social transformation which, in

turn, has helped them achieve greater life satisfaction as well as material well-being. The German situation differs from the South African situation in that living conditions for all black South Africans have not improved dramatically since 1994.

When discussing the similarities between Reunited Germany and South Africa, one should note that in both Reunited Germany as well as South Africa, the convergence trends are due to a gradual decline in happiness and life satisfaction/quality of life of the richer group as well as an increase in happiness and life satisfaction/quality of life of the poorer group who seem to be catching up. Similar to Reunited Germany, black and white South Africans' priorities for well-being reflect the gap between material and post-material (Møller, 2000).

Clark (2003) conducted a field study in 1998 on how ordinary people in a rural village and urban township viewed human development. He conducted interviews in both Murraysburg (rural village) and Wallacedene (urban township) and a total of 157 people over the age of 12 years took part in the study. After the results of the questionnaires were pooled, the top four of the 10 aspects for increasing their human development and thus contributing to their quality of life were objective in nature. The top 10 aspects were: (1) attaining a job, (2) receiving better housing, (3) receiving a quality education, (4) attain an adequate or regular income, (5) having a good family, (6) living a religious life, (7) having good health, (8) having enough food to eat, (9) happiness/joy, and (10) love for each other.

2.8 CONCLUSIONS

This chapter started by looking at the history of the concept of quality of life and how it evolved over the past five and a half decades. After studying the various components associated with one's quality of life it could be seen that there are two very distinct approaches towards the computation of quality of life. They are respectively subjective and objective in nature.

Subjective quality of life is determined by asking the respondent either one specific question such as, 'how do you feel about your life?' or by letting him/her choose and rank a series of domains such as job creation, education, and emotional needs.

In measuring one's objective quality of life the emphasis is placed more on the amount of money one has to better his/her quality of life and thus the most widely used indicators in determining one's economic quality of life are for example, income per capita and number of people living below \$1 a day (absolute poverty).

Most sociologists believe that the optimum combination is to combine subjective as well as objective indicators when creating a quality of life index for fear that leaving one of them out might distort the picture.

The chapter showed that there is a considerable amount of literature on the subjective quality of life for individuals as well as on the economic quality of life. Despite this, there remains a huge gap to be filled when discussing the relatively new concept of the non-economic quality of life (which is objective in nature). This gap in the literature about true non-economic quality of life can therefore be considered as the catalyst for the various studies undertaken in the rest of this thesis.

CHAPTER 3

THE QUALITY OF METROPOLITAN CITY LIFE IN SOUTH AFRICA

3.1 INTRODUCTION

Democratic governments throughout the world generally aim to raise the quality of life of their citizens. In South Africa, the first democratically elected government brought issues of the quality of life of all citizens to the fore, after decades of racially discriminating policies left the country with high levels of inequality and serious overall poverty (see May, 1998). Indeed, the South African Constitution (adopted in 1996) states explicitly that it is guided by the imperative to “improve the quality of life of all citizens”.

This imperative is to be seen against the background of a country that is rapidly urbanising. The rate of urbanisation, at 4% per annum, is one of the highest in the world, and at least double that of other developing countries in Latin America and Asia. By 2001, 32% of the country's population resided in only six metropolitan cities. These trends are not confined to South Africa, but are shared by other countries in Africa. The implication is that the quality of life in Africa's cities, including South Africa's cities, will increasingly depend on the quality of life its cities can offer. As remarked by May (1998) more than half (55%) of the population of South Africa now lives in urban areas, and so the urban policy context is of vital significance for addressing poverty and inequality.

Despite significant urbanisation in South Africa, little rigorous or objective analysis of the quality of life in metropolitan areas has been done. Most commentators, policy makers and the popular media have been warning against the “problems” of urbanisation (see e.g. Hartleb, 2005). Scientific studies on the quality of life in South Africa's cities and the impact of urbanisation on the quality of city life remain relatively few⁴ and have focused on subjective indicators of quality of life. For instance Møller and Pillay (1998) measured the

⁴ In South Africa, the “Quality of Life Trends Project” was started in the early 1980s to track changes in the way South Africans perceive the quality of their lives (the website can be accessed at http://www.ru.ac.za/institutes/iser/research/20_further.html). The project uses 35 subjective indicators of quality of life, but does not, per se, focus on urban areas. For the various reports from this project see Møller (1989;1992b, 1994, 1995c). See also Møller & Schlemmer (1983;1989); Møller, (1998, 1999); and Møller, Dickow & Harris (1999).

quality of life in eThekweni (Durban) in 1998, using a number of subjective indicators of quality of life.

In this chapter, this thesis focuses on the quality of life in South Africa's six metropolitan cities, measuring it through a number of objective indicators. These six cities are Johannesburg, Ekurhuleni (East Rand), Tshwane (Pretoria), eThekweni (Durban), Nelson Mandela Metro (Port Elizabeth) and Cape Town. In measuring the quality of life in these cities objectively, the thesis recognises that it is a multidimensional concept that needs to encompass both economic and non-economic qualities of life (see e.g. McGillivray, 2005) as well as the quantity of life (Becker, Philipson & Soares, 2005). As far as non-economic quality of life is concerned, this thesis includes a number of measures of the quality of the environment in the various cities and, in doing so, this thesis contributes to the small but growing literature that aims to incorporate environmental indicators into the measurement of human well-being (see Zaim, 2005). This chapter considers the quantity of life in South Africa's cities and it attempts to measure the degree to which economic and non-economic indicators of quality of life are correlated in South Africa's cities. Finally, following McGillivray (2005) this thesis compiles (in this chapter) an additional ad hoc non-economic measure or index of quality of life for the people of South Africa's cities. It does this using the variation in the Human Development Index (HDI) as well as an own index of the non-economic quality of life for the various cities where quality of life is not explained by per capita income.

This chapter is structured as follows. Section 2 discusses the history and the challenges faced by South Africa's metropolitan cities. Section 3 formulates the methodology to be used in determining the economic and non-economic quality and quantity of life for South Africa's six metropolitan cities. In sections 4, 5 and 6, the various indicators to be used for economic, non-economic and quantity of life in South Africa's cities will be discussed. Section 7 will clarify the relationship between the economic and non-economic indicators in determining the quality of life in South Africa's cities. Quality of life over time (1996-2004) and its improvement will be discussed in section 8. Section 9 summarises and concludes.

3.2 SOUTH AFRICA'S METROPOLITAN CITIES: CONTEXT AND CHALLENGES

3.2.1 Location

South Africa has six metropolitan municipalities, which are its six largest cities. These are the City of Cape Town, eThekweni (Durban), Ekurhuleni (East Rand), the City of Johannesburg, the Nelson Mandela Metropolis (Port Elizabeth) and the City of Tshwane (Greater Pretoria). The locations of these six cities are shown in the map in figure 3.1.

Figure 3.1: Geographical location of South Africa's six metropolitan cities



Source: Map drawn for this paper by Giscoe (Pty) Ltd, Potchefstroom.

In figure 3.1, South Africa's cities are shown in relation to basic national and international transport infrastructure (national roads, international airports, and harbours). Four agglomerations can be made out and shown as the grey shaded areas: a large agglomeration almost in the centre of the country, which consists of three metropolitan cities close

together (Johannesburg, Ekurhuleni, Tshwane) and then three smaller agglomerations on the coast (Cape Town, Nelson Mandela Metro and eThekweni Metro).

3.2.2 Historical perspective

The historical factors that determined the location and development of South Africa's cities are discussed in greater detail from an economic perspective in Naudé & Krugell (2003a). For the present purpose, it may be useful to provide a brief background to the geographical location of the country's cities. The inland agglomeration of Johannesburg, which together with the City of Tshwane (formerly Pretoria) can be seen as South Africa's prime city (Naudé & Krugell, 2003b) which has been the result of the discovery of significant gold and platinum deposits, the mining and distribution of which were energy and transport intensive, creating favourable infrastructure for manufacturing development. Apart from the inland agglomeration around the Johannesburg-Tshwane complex, the remainder of South Africa's metropolitan areas are located at the coast. These coastally located cities, predating the establishment of the Johannesburg-agglomerations, have been the result of the maritime nature of the country's European colonisation. Thus cities such as Cape Town, the Nelson Mandela Metro and eThekweni (Durban) owe their existence to their locations in facilitating ocean transport between Europe and the East. Even today, these cities retain an important influence on the South African economy, as South Africa counts amongst the top 12 maritime nations in the world (Chasomeris, 2005).

3.2.3 Current urban challenges: a literature review

The academic literature on cities in South Africa is made up of divergent contributions from urban and regional planners, economic geographers and economists.

Firstly, there are the studies that do not focus specifically on cities, but examine different topics at sub-national level. The topics include issues of agriculture, manufacturing, tourism, infrastructure, employment, poverty and inequality at a provincial or local level and the work has a strong development focus. For example, on the topic of infrastructure, Le Roux Booysen (2003a) examined provincial disparities in progress on reconstruction and

development. He found that provinces that are more urbanised have advantages over the more rural provinces in the delivery of infrastructure, the facilitation of demographic transition and the improvement of standards in secondary education. At a local level, Smith and Hanson (2003) examined the related development issue of access to water for the urban poor, specifically in Cape Town. They found that commercialisation and the current “basic needs” approach are creating territorial variation in service delivery and widespread water cut-offs. In another example of work linking “delivery” and spatial issues, a study of housing delivery in the Free State by Marais and Krige (2000) showed that cities in the province have been neglected in terms of housing investment. They find evidence that the majority of beneficiaries of housing subsidies fall in the lowest income category. On the topic of housing and urban development, Harrison, Huchzermeyer and Mayekiso (2003) published a compilation of papers exploring fragmentation in urban areas in post-apartheid South Africa. The work examines topics such as planning approaches, HIV/Aids, housing, integrated urban development and the compact city debate.

The second strand of research focuses on demographics and issues of employment poverty and inequality at the level of cities and towns. Posel (2003) examined the collection of national household survey data in South Africa and concluded that questions of labour migration have received too little attention in recent revisions of the surveys. In related work examining migration patterns in post-apartheid South Africa, Posel (2004) found that temporary internal labour migration appears to have increased, particularly because of the rise in female migration. In a study of the Western Cape, Oosthuizen and Nieuwoudt (2003) found that the poor are most often located in urban areas; they have low levels of education and live in relatively large households that are often headed by women. Cornwell and Inder (2004) focused on rural-urban migrants and found that they do well at finding formal employment.

Opposed to this broad cross-section of topics that are addressed at a sub-national level, a third category includes work that looks at rural issues and questions of the urban-rural divide. For example, there is a range of articles discussing rural economies from the perspective of land reform (see Bernstein, 2003). Robinson (2003) examined rural settlement patterns in the Eastern Cape and found that the land tenure system and risk-spreading

strategies of households are keeping people on the land, although their existence is not subsistence-based but linked to the urban economy. Le Roux Booysen (2003b) found that urban-rural inequalities in access to health care services persist and discriminate against the poor.

Fourthly, it is possible to group together studies that focus specifically on cities. There are studies of urban vulnerability (Nomdo & Coetzee, 2002), social justice (Visser, 2001), urban empowerment (Lotter, 2002), quality of life (Møller, 2001a; Møller & Devey, 2003) and poverty (Rogerson, 2001a). Here, too, the focus is on issues of households, poverty and inequality, but specifically within the urban context of cities and towns. A related part of this literature addresses mostly planning and management issues. For example, Buthelezi and Dollery (2004) provided an exploratory analysis of local government failure, and Cameron and Sewell (2003) looked at performance management in the Cape Town municipality.

This work also fits in with the efforts of the South African Cities Network (SACN). The SACN is a network of South African cities and partners that encourage the exchange of information, experience and best practices on urban development and city management (see www.sacities.net). The SA Cities Network Economic Development Programme, which is based on a partnership between cities and the Department of Trade and Industry (DTI), has identified a number of strategic issues for South African cities:

- The role of global city regions in the global, regional and national economy, and the implications for co-ordination of the South African regional and urban policy agenda;
- The notion of 'globally competitive cities' within the context of global inequalities and the limitations of promoting inward investment through place marketing and competitive bidding wars;
- Re-conceptualising local economic development (LED) policies and strategies;
- Re-conceptualising the economic development function of municipalities;
- The development of explicit social cohesion and poverty eradication strategies as part of economic development policies, both locally and nationally, to promote equity, socio-spatial integration, participation and inclusion within cities.

These strategic issues are also reflected in the fifth strand of the literature that examines local governments from the perspective of fiscal decentralisation and local economic development initiatives. The fiscal decentralisation literature provides the public economics perspective on the devolution of decision making and the challenges facing provinces and local government in South Africa. Niksic (2004), for example, re-examined the decentralisation strategy specifically from the perspective of local governments, and Ntsebeza (2004) looked at the dilemmas of traditional authorities and land administration. Related literature has studied the financial aspects of decentralisation from the perspective of sub-national taxation, specifically local property taxes. Here, a volume of articles entitled "Property taxes in South Africa: Challenges in the post-apartheid era" (Bell & Bowman, 2002), provides a useful overview of the literature.

Together with the above public economics approach to fiscal and financial questions of provinces and local governments, there is further literature on their economic development challenges. The focus is specifically on Local Economic Development (LED) initiatives and the Integrated Development Planning (IDP) processes currently being undertaken in South Africa. Here Nel has contributed a number of key papers. He provided a review and assessment of the status of LED initiatives (Nel, 2001), reviewed the policy and legal developments (Nel & Binns, 2001) and provided three case studies of the LED and IDP processes (Binns & Nel, 2002). Much of this work has recently been published in book form (Nel & Rogerson, 2005). In this compilation entitled "Local economic development in a developing world" Nel and Binns show how towns and cities in South Africa are putting developmental local government into practice. Rogerson discusses inner-city revitalisation and the case of the Johannesburg clothing industry, and Nel outlines local economic development in Midrand. Nel also reviews local economic development in small towns.

In conclusion, it can be said that the literature shows that cities and towns in South Africa face a number of different challenges in economic development, job creation, poverty alleviation and service delivery. With such a wide field of enquiry, the rest of this chapter focuses specifically on issues of the quality of life in the metropolitan cities.

3.3 METHODOLOGY

3.3.1 The concept of quality of life

According to Veenhoven (2004:6) “human well-being” can be seen as synonymous with “quality of life”. Therefore, in this chapter as well as for the rest of this thesis the foremost concern is with measures of human well-being, both economic and non-economic. The measurement and interpretation of measures of the quality of life have been rather elusive. One of the difficulties in measuring quality of life is its multidimensional nature, which seems to have resisted attempts to compile overall measures or indices of human well-being (see Veenhoven, 2004). As a result of this difficulty, many researchers bypass the objective measurement of quality of life, opting instead for asking people directly how satisfied they are with life (see e.g. Møller, 1998). Veenhoven (2004) contains a good overview of subjective measures of human well-being. Despite the usefulness of taking such subjective measurements of quality of life (which are not without their own conceptual and interpretative difficulties) it remains necessary to keep appropriate objective indicators. The need for appropriate objective indicators of the quality of life is due to (a) the often close correspondence between subjective and objective indicators (see e.g. Møller, 2004), and (b) the need for information about the “actual state of problems and the effects of attempts to solve these” (Veenhoven, 2004:21).

Recently, Becker, Philipson and Soares (2005:277) stressed that quality of life depends on both material and non-material aspects, including the quantity of life as reflected in health outcomes and life expectancy. McGillivray (2005) emphasises the difference between economic well-being and non-economic well-being and points out that various countries all have different degrees with which economic well-being correlates with non-economic well-being.

The accurate measurement of both economic and non-economic quality of life is complicated by the interrelationship between these aspects. For instance, one of the most widely used objective measures of the quality of life, the Human Development Index (HDI) of the United Nations have been recently described as being “redundant” since a purely

material measure of well-being such as per capita income tends to very highly correlated with the HDI (McGillivray, 2005: 338). In addition, as Veenhoven (2004: 1) points out, compiling the HDI is methodologically akin to “adding oranges and apples”. Furthermore, interpreting material measures of well-being⁵ (such as per capita income) in a society marked by great income inequality remains problematic. In a recent survey of these issues, McGillivray and Shorrocks (2005:194) remarked that “research questions concerning inequality and well-being remain open”.

3.3.2 Economic indicators of the quality of life

In this section, this thesis will not attempt to settle the debate on the usefulness or the strengths and weaknesses of the various indicators and measures of human well-being. However, given the discussion in 3.1, this thesis emphasises the importance of assessing both economic and non-economic well-being, and of caution in constructing overall or summary indices of total well-being. In the sections that follow, the thesis reports on various economic and non-economic indicators of well-being in the six metropolitan cities of South Africa.

As far as the selected economic indicators are concerned, table 3.1 shows the economic indicators and their expected relationship with quality of life, as well as the data sources, that will be used in the determination of the degree of economic well-being in the six metropolitan cities:

⁵ Osberg and Sharpe (2005) propose that material (economic) measures for well-being should include measures that represent average consumption (e.g. per capita income), aggregate national accumulation of productive assets, and income distribution as well as economic security.

Table 3.1: Economic indicators used in this chapter

Economic indicators	Relationship with quality of life	Sources of data
Population	Positive	Census Data form Statistics South Africa
Density	Positive	Census Data form Statistics South Africa
Poverty rate	Negative	Census Data form Statistics South Africa
Unemployment rate	Negative	Census Data form Statistics South Africa
Average household disposable income	Positive	Census Data form Statistics South Africa
Gini coefficient	Positive	Regional Economic Focus data from Global Insight
Average annual economic growth rate, 1996-2001	Positive	Census Data form Statistics South Africa
Wage per worker, 2001	Positive	Census Data form Statistics South Africa
Average annual change in real wage per worker, 1996-2001	Positive	Census Data form Statistics South Africa
Human Development Index, 2001	Positive	Regional Economic Focus data from Global Insight
Average house price, 2001	Negative	ABSA, www.absa.co.za

The indicators contained in table 3.1 are, to a large degree, standard variables used in measuring economic welfare. Income, and growth in income (as measured through wages per worker, disposable household income and changes in wages per worker), are measures that are widely used with respect to economic well-being. Economic theory posits a positive relationship between income and human well-being. The poverty rate is a measure that is determined by the income variable, and the Gini coefficient measures the distribution of income amongst the population. Higher inequality is widely seen to be associated with lower overall human well-being or happiness in the literature of both economics and psychology (see e.g. Frey & Stutzer, 2002: 11-12). In addition to these income-dominated measures, this thesis also considers population and population density, as these reflect opportunities for human interaction and agglomeration advantages (e.g. economies of scale, positive

externalities). This thesis generally posits a positive relationship between these and human well-being. Since the relationship between urbanisation and per capita income is a generally positive one (Freire & Polese, 2003) it is also possible that congestion, crime, and negative externalities (e.g. pollution and environmental degradation) associated with higher population and density levels may lower human well-being past some point (Fay & Opal, 2000). Finally, this thesis also considers house prices, as these indicate the cost of living in a particular city and also reflect the demand for housing relative to supply. In such a sense, it is posited to be negatively related to human well-being. However, this thesis acknowledges that higher house prices might reflect the desirability of a location and, as such, be positively related to human well-being (Rappaport & Sachs, 2003).

3.3.3 Non-economic indicators of the quality of life

The economic indicators of the quality of life discussed in the previous section tend to be dominated by income-related measures. As pointed out by Gasper (2004:3) these have ignored “large areas of well-being”. In contrast, non-economic measures of the quality of life tend to be more diverse, reflecting the richness of human life. A selection of measures had to be made to report on for South Africa’s cities. This selection was determined by the availability of data. Table 3.2, shows the non-economic indicators, their expected relationship with quality of life, as well as the data sources that will be used in the determination of the degree of human well-being in the six metropolitan cities.

It can be seen that in this selection of non-economic indicators of quality of life, this thesis follows the lead of a number of internationally reported measures such as literacy rate, life expectancy, and crime rates. This thesis also includes a number of environmental and climate measures, taking it as a point of departure that a good quality of the natural environment and climate increases human well-being (Rappaport & Sachs, 2003).

Table 3.2: Non-economic indicators used in this chapter

Non-economic indicators	Relationship with quality of life	Sources of data
Crime rate	Negative	South African Police Service Data, www.saps.gov.za
Vehicle count	Negative	Census Data form Statistics South Africa
Vehicles per person	Negative	Census Data form Statistics South Africa
Literacy rate	Positive	Census Data form Statistics South Africa
Forests, water bodies & wetlands	Positive	Regional Economic Focus data from Global Insight
Degraded land	Negative	Regional Economic Focus data from Global Insight
Built-up land: residences	Positive	Regional Economic Focus data from Global Insight
Built-up land: commerce	Positive / negative	Regional Economic Focus data from Global Insight
Mines	Negative	Regional Economic Focus data from Global Insight
Average annual rainfall	Positive	Regional Economic Focus data from Global Insight
Average annual temperature	Positive	Regional Economic Focus data from Global Insight
Variation in annual mean temperature	Negative	Regional Economic Focus data from Global Insight
Coastal	Positive	Regional Economic Focus data from Global Insight
Proportion of population older than 75 years of age	Positive	Regional Economic Focus data from Global Insight

These environmental measures include average temperatures (more balmy temperatures are preferred), variations in annual temperatures (more stable temperatures seem to be preferred), and measures relating to land use (such as land degradation, built-up land, and bodies of forests and water). The choice of these variables for this thesis is led by data availability. It is common in indices of environmental quality to include CO₂ emissions (Zaim, 2005) which are not available on the city-level.

3.3.4 Indicators of the quantity of life

In section 3.3.1, this thesis cited Becker, Philipson and Soares (2005:277) who recently stressed that human well-being depends on both material and non-material aspects, including the quantity of life as reflected in health outcomes and life expectancy. In this thesis, three variables are used which are widely seen as reflecting the quantity of life, namely the proportion of the population older than 75 years of age, the life expectancy at birth, and the HIV/AIDS prevalence rate (the latter is strongly associated with declining life expectancy). Table 3.3 shows the indicators, their expected relationship with quality of life, as well as their data sources, which are used to determine the quantity of life in the six metropolitan cities:

Table 3.3: Quantity of life indicators

Indicators of quantity of life	Relationship with quantity of life	Sources of data
Population >75	Positive	Regional Economic Focus data from Global Insight
Life expectancy	Positive	States of Cities Report, 2004
HIV prevalence rate	Negative	South African Cities and HIV/AIDS: Challenges and Responses Report, 2004

3.4 ECONOMIC INDICATORS OF QUALITY OF LIFE IN SOUTH AFRICA'S CITIES

In table 3.4, some basic socio-economic indicators of economic well being in South Africa's six cities are shown. Before discussing the contents of table 3.4, a word on the data used is in order. In tables 3.1 - 3.3 above, most data used in this chapter were obtained from the 1996 and 2001 Census data of Statistics South Africa. The latter date is of the most recent census in South Africa. Little reliable and consistent data on a city level, at least for all the cities under focus here, is available for subsequent periods. Data on house prices were obtained from ABSA's house price indicators (see www.absa.co.za) and data on non-economic indicators of well being such as the HDI, Gini coefficient and environmental profiles were obtained from Global Insight's Regional Economic Focus (REF). HIV/AIDS data were obtained from the South African Cities Network (www.sacn.co.za).

Table 3.4: South Africa's cities in 2001: socio-economic status

City (metropolitan government)	Population	Density	Poverty rate	Unemployment rate	Average household disposable income	Gini coefficient
City of Cape Town	2,954,774	582.91	23.0%	25.0%	R 63,300	0.58
eThekweni Metropolitan (Durban Unicity)	3,077,928	1,095.50	32.2%	37.8%	R 56,811	0.60
Ekurhuleni Metropolitan (East Rand)	2,448,131	926.58	30.3%	38.1%	R 47,207	0.58
City of Johannesburg	2,672,006	2,016.50	25.9%	30.9%	R 85,560	0.60
Nelson Mandela Metropolitan (Port Elizabeth)	1,078,477	242.81	39.6%	42.8%	R 17,474	0.57
City of Tshwane (Greater Pretoria)	2,294,632	410.51	30.6%	29.7%	R 60,783	0.60
Total	14,525,948				R 331,134	
As % of South Africa	31.94%				51.30%	

From table 3.4, it can be seen that, in 2001, 14.5 million people (about 32% of the total) resided in South Africa's six cities. The city with the largest population is Durban (the eThekweni Metro) with just over 3 million people, followed by Cape Town with 2.9 million people. Although these coastal cities individually contain the highest numbers of people, the map in figure 3.1 indicated a significant interior concentration of people consisting of three interlinking cities of Johannesburg, East Rand and Pretoria. Table 3.4 shows that 7.2 million people reside in this area which, if taken as a single socio-economic agglomeration, would constitute South Africa's prime city.

As far as density is concerned, table 3.4 shows that, although Johannesburg may not be the largest in terms of population, it has by far the greatest population density, with more than

2000 persons per km². This is almost twice the density of the second most densely populated city, Durban.

In terms of economic wealth, table 3.4 shows that Cape Town and Johannesburg have the lowest poverty rates, with Johannesburg having the largest disposable income. However, the Nelson Mandela Metro (Port Elizabeth) has the lowest overall income inequality (as measured by the Gini coefficient) although it is the city with the highest poverty rate. It is also the city with the highest unemployment rate. Generally, table 3.4 suggests a close correlation between unemployment and poverty. The correlation coefficient between poverty and unemployment is the highest of the variables in the table, having a value of 0.88. This coefficient is the lowest in Cape Town and the highest in the Nelson Mandela Metro. Losing one's job or failing to find one in a South African city is therefore a straight path to poverty.

Table 3.5 contains some further indicators of economic well being in South Africa's cities. It also contains the Human Development Index (HDI), which is a composite of economic indicators such as income, with non-economic indicators such as life expectancy and literacy.

Table 3.5: Indicators of economic well-being in South African cities

City (metropolitan government)	Average annual economic growth rate, 1996-2001	Wage per worker in 2001	Annual average change in real wage per worker, 1996-2001	HDI, 2001	Average house price, 2001
City of Cape Town	2.41%	R 56 000	-0.16%	0.70	R 372 707
eThekweni Metropolitan (Durban Unicity)	3.16%	R 50 000	-2.02%	0.67	R 282 182
Ekurhuleni Metropolitan (East Rand)	2.17%	R 49 000	-0.81%	0.67	R 274 563
City of Johannesburg	4.60%	R 61 000	-0.88%	0.72	R 336 018
Nelson Mandela Metropolitan (Port Elizabeth)	4.58%	R 52 000	-0.61%	0.66	R 267 553
City of Tshwane (Greater Pretoria)	5.22%	R 55 000	-1.48%	0.70	R 357 299

Table 3.5 shows that, in 2001, Johannesburg enjoyed the highest HDI, as well as the highest wage per worker (R 61 000 per annum). Generally, wages in South Africa's coastal cities appeared to be lower than in the interior cities. In real terms, wages contracted in all these cities over the five years 1996 to 2001, with the largest contractions in Durban and Tshwane. The slowest contraction in wages was in Cape Town. Comparing the changes in real wage per worker with changes in unemployment, the thesis finds a positive correlation of 0.68. Indeed, the city with the highest rate of increase in unemployment was Cape Town (seeing a 28% increase in its unemployment rate) and the city with the lowest increase in unemployment was Tshwane, with an 11% increase.

Figure 3.2 contains a scatter diagram depicting the positive relationship between changes in unemployment and changes in wages per worker. This would clearly indicate that, in those cities where wage increases were contained, increases in unemployment were smaller.

Figure 3.2: Scatter diagram of relationship between changes in unemployment rates and wages per worker in South Africa's cities, 1996-2001

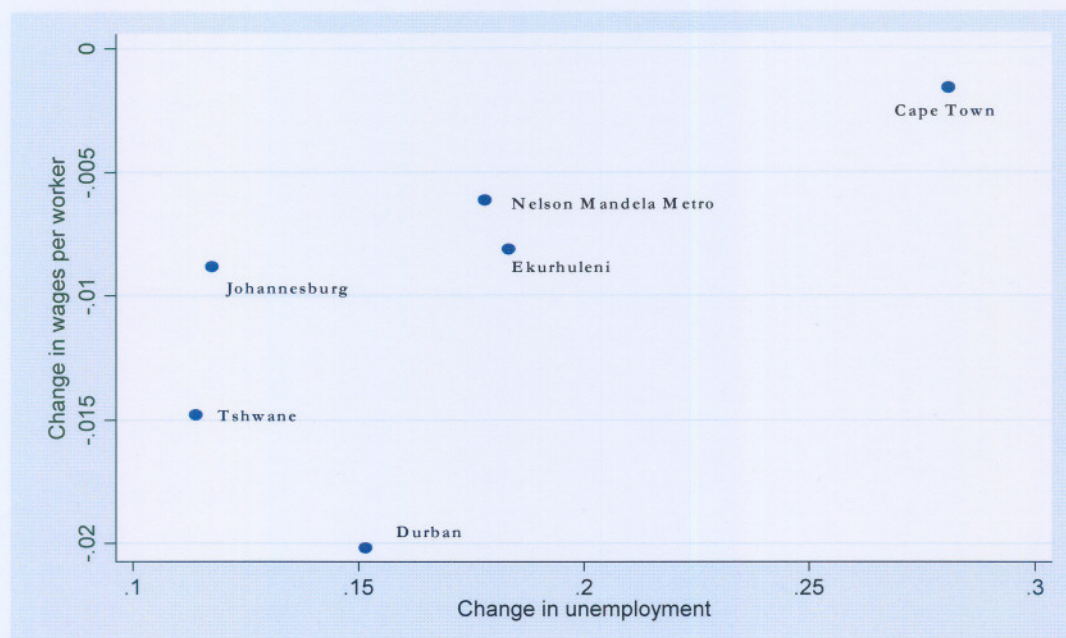


Table 3.5 also shows that the highest average annual economic growth rate over the period 1996-2001 was enjoyed by the City of Tshwane (Pretoria) with 5.22%, followed by Johannesburg and Nelson Mandela Metropolitan.

House prices often reflect the underlying quality of life of a city, as well as its economic importance or productivity (Rappaport & Sachs, 2003:8). Table 3.5 shows that, according to ABSA's House Price information, the highest average house price in 2001 was in the City of Cape Town (R373 707). This was followed by Pretoria and Johannesburg. Cape Town's relatively lower average wage coupled with higher house prices may reflect the fact that it enjoys a higher quality of life due, in part, to its coastal location. The argument is that people are willing to accept lower wages and pay higher prices for housing to be living in a coastal city (Stover & Leven, 1992; Rappaport & Sachs, 2003).

3.5 NON-ECONOMIC INDICATORS OF QUALITY OF LIFE IN SOUTH AFRICA'S CITIES

In the previous section, this thesis mentioned one non-economic indicator of quality of life, the HDI. According to this measure, Johannesburg, Cape Town and Pretoria (Tshwane) enjoyed the highest standards of living. However, this thesis has indirectly reported on another general indicator of the quality of life that reflects both on economic quality of life (such as due to higher productivity) as well as non-economic quality of life (such as scenery, climate, low crime, etc.). This is population density. According to Rappaport and Sachs (2003) population density within a country reflects the fact that, “people vote with their feet”. In the previous section, this thesis found that population density is highest in Johannesburg, Durban and Ekurhuleni. Given that population density is highest in South African cities with higher wages per worker, higher growth and generally being located in the interior, this thesis is led to the working hypothesis that this population density reflects high productivity (economic quality of life) rather than non-economic quality of life. In table 3.6, this hypothesis is investigated further.

Table 3.6: South Africa's cities in 2001: diverse non-economic indicators

City (metropolitan government)	Crime rate*	Vehicle count	Vehicles per person	Literacy rate	Population	Density
City of Cape Town	1.64%	831516	0.28	86.2%	2,954,774	582.91
eThekweni Metropolitan (Durban Unicity)	11.21%	449358	0.15	82.6%	3,077,928	1,095.50
Ekurhuleni Metropolitan (East Rand)	6.89%	686565	0.28	83.1%	2,448,131	926.58
City of Johannesburg	16.20%	880686	0.33	87.1%	2,672,006	2,016.50
Nelson Mandela Metropolitan (Port Elizabeth)	2.17%	190216	0.18	83.7%	1,078,477	242.81
City of Tshwane (Greater Pretoria)	5.96%	666339	0.29	82.9%	2,294,632	410.51
Total		3704680	0.26		14,525,948	
As % of South Africa	44.08%	51.70%			31.94%	

(The crime rate is the percentage of all murders, attempted murders and robberies that occurred in a city in 2001)

Table 3.6 contains some non-economic indicators of well-being, such as the crime rate, the number of vehicles per population (which can reflect congestion/productivity) and literacy rate. It shows that the crime rate is significantly lower in coastal cities such as Cape Town (with only 1.6% of the country's serious crime being reported there in 2001) and Nelson Mandela Metro, and significantly higher in Johannesburg and Ekurhuleni and Durban. In table 3.6, the population density has been included to illustrate that there is a positive correlation between population density and crime rates in South Africa's cities. This reflects the fact that density, or agglomeration, not only benefits businesses through increasing returns to scale, but also increases criminal activity.

The vehicle count, as expressed as the number of vehicles per unit of population, is clearly the highest in the Johannesburg, Ekurhuleni and Pretoria area, high in the Cape Town area, and much lower in the Durban and Nelson Mandela Metro area.

Table 3.7 contains further measures of non-economic quality of life in South Africa's cities relating to the quality of the natural environment. In particular, the percentage of a city's surface area covered by forests, water bodies and wetlands may be indicative of natural beauty. In contrast, the percentage of degraded land would indicate an absence of natural beauty. The percentage of built-up land in a city could also provide a proxy indicator for the availability of open spaces and access to nature. The percentage of residential buildings is also a proxy for the access to housing.

Table 3.7: Environmental quality: selected indicators for 2004

City (metropolitan government)	Size (km ²)	Forest, water bodies & wetlands	Degraded land	Built-up land: residences	Built-up land: commerce	Mines
City of Cape Town	5,069	4.2%	6.23%	11.28%	1.29%	0.15%
eThekweni Metropolitan (Durban Unicity)	2,810	2.3%	6.97%	20.60%	2.30%	0.07%
Ekurhuleni Metropolitan (East Rand)	2,642	3.5%	0.00%	23.45%	3.61%	4.49%
City of Johannesburg	1,325	2.3%	0.00%	55.81%	6.01%	4.10%
Nelson Mandela Metropolitan (Port Elizabeth)	4,442	1.4%	0.10%	4.59%	0.85%	0.12%
City of Tshwane (Greater Pretoria)	5,590	38.2%	17.41%	16.58%	1.07%	0.22%
Pretoria		22.8%	0.00%			

(Greater Pretoria's significant % of land cover consisting of forest is especially found in Wonderboom (51%) and Ga-Rankuwa (43%) areas.)

Source of Data: Global Insight Regional Economic Focus, November 2005

From Table 3.7, it can be seen that the Greater Pretoria (Tshwane) area is endowed with the largest percentage of forests, water bodies and wetlands than any city in South Africa. This is so even if the central area of Pretoria is taken on its own, without the outlying areas such as Wonderboom and Ga-Rankuwa. Apart from Pretoria, it can be seen that Cape Town has the highest percentage of forests, water bodies and wetlands in addition to being a coastal city. It also has one of the lowest percentages of built-up land, only lagging Nelson Mandela Metro in this regard.

If the percentage of land area covered by mining operations can be judged to have a negative impact on the environmental quality and quality of life, then from table 3.7, it can be seen that Ekurhuleni and Johannesburg are the most disadvantaged in this regard. The

latter two cities are also the most densely built-up, with over 60% of Johannesburg's land area covered by residential and commercial buildings.

Finally, table 3.8 contains information on the climatic conditions in South Africa's cities. Quality of life is generally regarded as better in cities with higher rainfall and less variable annual temperature.

Table 3.8: South Africa's cities in 2001: climate

City (metropolitan government)	Annual average rainfall (mm)	Average annual temperature (Degree Celsius)	Variation in annual mean temperature	Coastal (Yes/No)
City of Cape Town	683	17	3.03	Yes
eThekweni Metropolitan (Durban Unicity)	939	21	2.77	Yes
Ekurhuleni Metropolitan (East Rand)	703	16	3.99	No
City of Johannesburg	655	16	3.81	No
Nelson Mandela Metropolitan (Port Elizabeth)	502	18	3.07	Yes
City of Tshwane (Greater Pretoria)	450	19	4.25	No

Table 3.8 indicates that climatic conditions are generally more favourable in South Africa's coastal cities than in the non-coastal cities. For instance, rainfall in Cape Town and Durban tends to be higher than in most inland cities except Ekurhuleni. Also, average annual temperatures are marginally higher along the coast and the variations in annual temperature (between highest and lowest average temperatures) are much less in coastal cities such as Durban, Cape Town and the Nelson Mandela Metro.

3.6 INDICATORS OF THE QUANTITY OF LIFE IN SOUTH AFRICA'S CITIES

Section 3.3.4 discussed the various commonly used measures of the quantity of life. In essence, quantity of life is determined by life expectancy. Low life expectancy can be considered as one of the demographic determinants that have contributed to slow economic growth in most developing countries (Bloom & Sachs, 1998).

In South Africa's cities, one of the most significant threats to life expectancy, and therefore human well-being, is the HIV/AIDS pandemic (van Donk, 2002). Indeed, as stressed by van Donk (2002), the rates of HIV/AIDS infection are higher in South Africa's urban areas than in rural areas.

There is also a linkage between HIV/AIDS and economic measures of well-being, since poor households affected by HIV/AIDS are likely to be pushed into deeper poverty; whereas households which are on the brink of the poverty line will lose the fragile security they had and end up below the poverty line. As a result, social divisions and inequality will be reinforced (van Donk, 2002).

Table 3.9 contains various indicators of the quantity of life in South Africa's cities. In the second column, the table contains the HIV prevalence rate for the six metropolitan cities. Due to a lack of information, neither eThekweni nor Ekurhuleni has submitted an HIV prevalence rate.

Table 3.9: Indicators of the quantity of life in South African cities

City (metropolitan government)	HIV prevalence rate, total (% of population aged 15-49) in 2004	Life expectancy in 2003 (total)	Percentage of population > 75 years in 1996	Percentage of population > 75 years in 2001
City of Cape Town	13%	62	1.8	1.9
eThekweni Metropolitan (Durban Unicity)	Na	45	1.3	1.4
Ekurhuleni Metropolitan (East Rand)	Na	52	1.1	1.2
City of Johannesburg	29.8%	52	1.6	1.7
Nelson Mandela Metropolitan (Port Elizabeth)	26%	52	1.5	1.6
City of Tshwane (Greater Pretoria)	11.4%	52	1.5	1.7

Source of data: South African Cities and HIV/AIDS: Challenges and Responses (2004) and State of Cities Report 2004, published by the South African Cities Network, www.sacn.co.za

Table 3.9 shows that, in 2004, the City of Johannesburg had the highest incidence of HIV, at 29.8% followed by the Nelson Mandela Metro (26%). HIV prevalence in the City of Cape Town and Tshwane (Greater Pretoria) was much lower, at 13% and 11.4% respectively.

The HIV-prevalence data in table 3.9 should be read in conjunction with the data on life expectancy in the various cities. The third column of table 3.9 shows that, in 2003, the City of Cape Town (which had a lower HIV-prevalence rate) had a much higher expectancy at birth (namely 62 years) than any of the other metropolitan cities. It is also noticeable that eThekweni (Durban) has a significantly lower life expectancy (45 years) than any of the other South African cities.

Finally, in the fourth column of table 3.9, the proportion of the population older than 75 years of age in the various cities is depicted for both 1996 and 2001. It can be seen that in all of the six cities, the number of people older than 75 years has grown. Another noticeable

feature is that the city with the highest number of older population is Cape Town with 52872. This shows that Cape Town attracts the retired older generation.

From this analysis, it seems that the city that offers the best quantity of life is Cape Town, which leads in terms of life expectancy and the number of elderly. It also has one of the lowest HIV incidences in the country. With regard to other coastal cities, the situation is mixed. eThekweni has a large number of old people, but a low (lowest) life expectancy and although the HIV prevalence rate is not known, it is probably high. Similarly, the other coastal city, Nelson Mandela Metro, contains the lowest number of people above 75 years and has a high HIV prevalence rate (the second highest) and life expectancy in the middle range (52 years).

3.7 RELATIONSHIP BETWEEN THE ECONOMIC AND NON-ECONOMIC INDICATORS OF THE QUALITY OF LIFE IN SOUTH AFRICA'S CITIES

3.7.1 Relationship between HDI and per capita income

As was pointed out in the introduction, there is agreement in the international literature that human well-being is a multidimensional concept, encompassing both economic and non-economic dimensions. As recently documented by McGillivray (2005:337-338) there has been a long history of efforts to focus attention away from established economic (or monetary) measures of well-being, such as per capita income, towards measures to better capture non-economic (non-monetary) dimensions of quality of life. The United Nations' Human Development Index (HDI), reported above, is one of the most widely used objective measures of non-economic quality of life in use today. A major shortcoming of such a measure is that it is more often than not highly correlated with per capita income. McGillivray (1991) finds a correlation coefficient of 0.89 between HDI and GNP per capita, and suggested that the HDI, as a true reflection of non-economic quality of life, may thus be redundant.

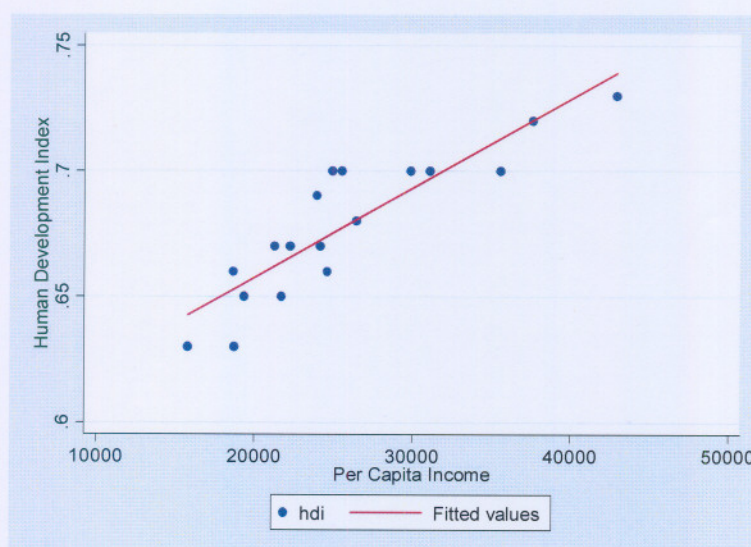
In the present case, there is a similarly high positive correlation of 0.84 between per capita income and HDI across South Africa's cities. A regression of the log of the HDI on the log of per capita income yielded the following estimates. Here Ordinary Least Squares were used.

Table 3.10: Regression results of HDI on per capita income across South Africa's six metropolitan cities (data pooled for 1996, 2001 and 2004); dependent variable lnHDI

Variable	Coefficient
Constant	-1.87 (16.8)***
Per capita income	0.146 (8.59)***
Adj. R ² = 0.81	

Figure 3.3 shows the relationship between HDI and per capita income in South Africa's six metropolitan cities (data for the years 1996, 2001 and 2004 pooled). The fitted regression line indicates the strong positive correlation between HDI and per capita income.

Figure 3.3: Relationship between HDI and per capita income in South Africa's six metropolitan cities, 1996, 2001 and 2004



To an extent, the positive relationship between HDI and per capita income is because per capita income is one component of the HDI – the other two being literacy and life expectancy.

3.7.2 An own indicator of non-economic quality of life

Given that the HDI is not an exclusive indicator of the non-economic quality of life, as it contains per capita income, this thesis has constructed an own non-economic quality of life index that does not directly contain income or any other monetary aspects of the quality of life. Due to data availability and ease of interpretation, this thesis followed the practice of Prescott-Allen (2001) by calculating a non-economic quality of life index as the equally weighted average of measures of life expectancy, literacy and income equality. To ensure scale equivalence the index values are expressed to range between 0 and 100.

$$Q_1 = \left(\frac{\text{Life expectancy} + \text{Literacy} + (1 - \text{Gini coefficient})}{3} \right) \quad (3.1)$$

In calculating equation 3.1, life expectancy is proxied by the percentage of the population in a city that is older than 75 years of age; the literacy rate is taken as the percentage of population older than 15 that is functionally literate, and equality is measured by subtracting the Gini coefficient from 1. In table 3.11, the index and its components are shown for the six cities for 2004.

Table 3.11: Index of the quality of life in South Africa's cities, 2004

City	Proportion of population older than 75 years of age	Gini coefficient	Literacy rate	Quality of Life Index (non-economic)
Cape Town	1.7%	0.58	88%	44
eThekweni (Durban)	1.4%	0.60	83%	41
Ekurhuleni (East Rand)	1.3%	0.58	86%	43
Johannesburg	1.8%	0.57	89%	45
Nelson Mandela Metro (Port Elizabeth)	1.7%	0.58	83%	42
City of Tshwane (Pretoria)	1.7%	0.59	84%	42

Table 3.11 above shows that, in 2004, the non-economic quality of life was highest in Johannesburg (45), Cape Town (44), and Ekurhuleni (43) and lowest in Durban (41).

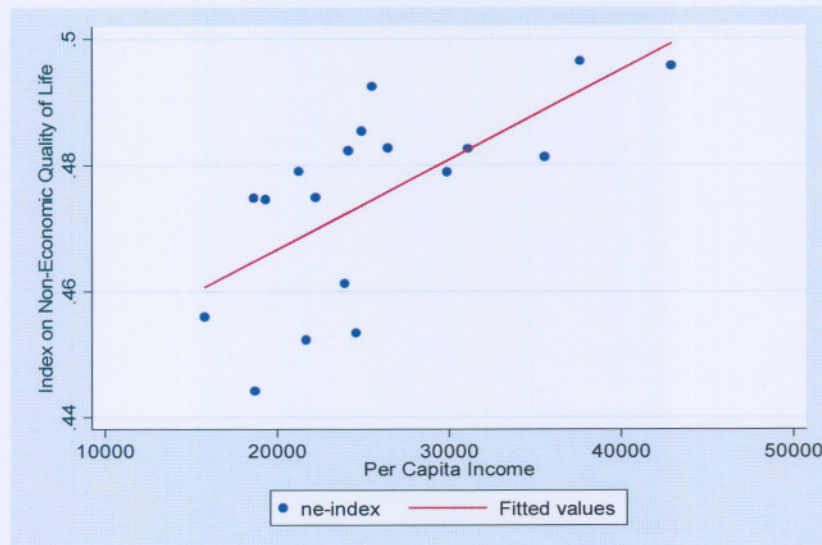
The correlation between this thesis' own index of the non-economic quality of life and per capita income is still positive with a correlation coefficient of 0.71. A regression (OLS) of the log of the own measure on per capita income yields the results depicted in table 3.12.

Table 3.12: Regression results of an Own Index of non-economic quality of life on per capita income across South Africa's six metropolitan cities (data pooled for 1996, 2001 and 2004); dependent variable logarithm of an Own Index

Variable	Coefficient
Constant	-1.32 (5.31)***
Per capita income	0.05 (1.85)***
Adj. R ² = 0.12	

Figure 3.4 depicts the relationship between per capita income and the own index of the non-economic quality of life in South Africa's six metropolitan cities.

Figure 3.4: Relationship between an Own quality of life Index and per capita income in South Africa's six metropolitan cities, 1996, 2001 and 2004



3.7.3 Residual estimates of the non-economic quality of life

Given that both the HDI and this thesis' own measure of the non-economic quality of life are correlated with per capita income, regression analysis is used in this section to obtain closer measures of the non-economic quality of life in South Africa's cities. These measures are obtained from the residuals from the following regression:

$$Q_{it} = \alpha + \beta y_{it} + \mu_{it} \quad (3.2)$$

Where Q_{it} is the measure of quality of life in city i in period t ($t=1996, 2001, 2004$); this thesis will alternatively use the HDI and its own index; and y_{it} is per capita income in city i in period t , with μ_{it} the residual term.

The residual term can be interpreted as the variance in Q (quality of life) that is not predicted by income per capita. It is therefore a more proper or independent measure of the non-economic quality of life in a city. McGillivray (2005:340) also shows that this residual

term can be interpreted as “a measure both of the success in converting economic well-being into non-economic well-being and of the non-economic well-being component”.

The results from estimating equation 3.2 with OLS using firstly HDI and secondly this thesis’ own measure of the quality of life are contained in tables 2.11 and 2.12. The residuals μ_{it} was, in each case, saved and used as an indicator. For the six cities, the various non-economic indicators of the quality of life (HDI, own indicator, HDI-residuals, own-residuals) as well as the economic quality of life (per capita income) is shown in table 3.13.

Table 3.13: Various non-economic indicators of quality of life and rankings for South Africa’s metropolitan cities, 2004

City (metropolitan government)	(1) HDI	(2) Own index	(3) HDI residuals	(4) Own Index residuals	(5) Per capita income	Ranking by (3)	Ranking by (4)
City of Johannesburg	0.73	0.4464	-0.009	0.011	R 42 940	5	2
City of Tshwane (Greater Pretoria)	0.70	0.4229	-0.013	-0.007	R 35 582	6	6
Ekurhuleni Metropolitan (East Rand)	0.68	0.4324	-0.001	0.010	R 26 478	2	3
City of Cape Town	0.70	0.4369	0.023	0.015	R 25 547	1	1
eThekweni Metropolitan (Durban Unicity)	0.67	0.4163	-0.003	-0.005	R 24 184	3	5
Nelson Mandela Metropolitan (Port Elizabeth)	0.65	0.4225	-0.005	0.005	R 19 373	4	4

In table 3.13, the HDI, this thesis' own index of the non-economic quality of life (consisting of the proportion of old age persons in the population, literacy and equality) as well as the residual estimates from equation 3.2 for HDI and this thesis' own index are shown. As indicated, the residuals can be interpreted as non-economic quality of life indices that are independent of income, as well as indicators of the success with which the various cities are converting economic quality of life into non-economic quality of life. In order to make easier comparisons, the cities in table 3.13 have been listed according to their per capita incomes. The final two columns in table 3.13 provide the ranking of the various cities in terms of the residuals from respectively HDI and this thesis' own index from equation 3.2. It can be seen from table 3.13 that, although Johannesburg was ranked first in 2004 in terms of economic quality of life (using per capita income), it was only ranked fifth in terms of the residuals from the HDI, and second in terms of the residuals from this thesis' own index. The City of Tshwane (Pretoria) is likewise "underperforming" in terms of the non-economic quality of life as measured both by the residuals from the HDI and this thesis' own index. Specifically, Tshwane is ranked the worst (sixth) according to both measures. In contrast, the City of Cape Town is ranked first in South Africa on both estimates of the non-economic quality of life, although in terms of per capita income it can only be ranked fourth in South Africa. Ekurhuleni (East Rand) and Durban's performances seem to be on average: their per capita income rankings place them respectively in third and fifth places, similar to their non-economic quality of life rankings.

Thus, from table 3.13, it can be concluded that Pretoria and Johannesburg fare worst when it comes to the non-economic quality of life, but best when it comes to the economic quality of life. They also tend to be less successful when it comes to translating economic quality of life into non-economic well-being. Cape Town, and to a lesser degree the Nelson Mandela Metro (Port Elizabeth) fare better in terms of the non-economic quality of life. They are also coastal cities. In section 3.5 this thesis found that crime rates in South Africa's cities were lowest in Cape Town and the Nelson Mandela Metro, and that average climate and rainfall were also better in these cities than elsewhere. The conclusion is thus that, as far as non-economic quality of life is concerned, the cities in South Africa that fare better are Cape Town and the Nelson Mandela Metro. These are cities that fall in the middle and bottom respectively as far as per capita income of cities in South Africa is concerned. The cities with

a relatively lower non-economic quality of life in South Africa are Tshwane (Pretoria), with one of the highest levels of per capita income, and Durban. In the next section it will be shown that the environmental achievement of these two cities is the lowest in South Africa.

3.7.4 Economic quality of life and environmental quality

In the previous sections, it was established that the economic quality of life in South Africa's cities is correlated with the usual measures of the non-economic quality of life such as the HDI and other measures such as equality, life expectancy and literacy. However, using finer methods to determine the non-economic quality of life independent of income, and estimating the extent to which economic quality of life was translated into non-economic quality of life, it was established that there is less of a strong relationship. Some cities, such as Tshwane, were found to perform much worse in terms of their non-economic quality of life than their per capita income would predict.

In these non-economic indicators (HDI, thesis' own indicator) the focus was on health and educational outcomes. It is, however, increasingly acknowledged that the quality of the environment is also an important component of the quality of life. In section 3.5, it was pointed out that a coastal location is often preferred by households due to its environmental qualities (see also Rappaport and Sachs, 2003). A number of indicators of the environmental quality in South Africa's six metropolitan cities were also discussed in section 3.5. In this section, this thesis explores the relationship between per capita income and these environmental indicators.

Table 3.14 contains the pairwise correlation coefficient between per capita income and a number of environmental indicators across South Africa's cities. The correlation coefficients in table 3.14 were calculated using data from all the magisterial districts (totalling 36 places) within a particular city, and not just the six cities alone.

Table 3.14: Correlation coefficients between per capita income and environmental quality across South Africa's cities in 2004

Measure	Correlation with per capita income
Percentage of land covered by forest and water	-0.175 (0.24)
Percentage of degraded land	-0.3698 (0.044)*
Percentage of land covered by urban residential buildings	0.3014 (0.0101)*
Average annual rainfall	0.0088 (0.9463)
Number of vehicles per population	0.3023 (0.1420)

Standard deviations in brackets

*A * indicates significance at the 5% level or better*

Table 3.14 shows that there is a negative relationship between land degradation and per capita income in South Africa's metropolitan city areas. This suggests that in South Africa's metropolitan areas, the poor tend to live in and around the more degraded land. The current analysis does not indicate the causality, i.e. whether raising incomes would improve the quality of land in an area (and vice versa) or whether higher incomes would lead to greater mobility of households who would migrate out of environmentally degraded areas into less degraded areas.

Table 3.14 also shows that there is a positive relationship between urban residential built-up land and per capita income. Although correlation does not imply causality, this could indicate that higher income households tend to demand more buildings and amenities for residential use than poorer households. Thus, table 3.14 suggests that the urban poor in South Africa tend to reside in areas where the natural environment is more degraded and less supplied with built residential land than where the more affluent reside.

In table 3.14 forest and water bodies are negatively correlated with per capita income and rainfall is positively correlated, but these relationships are not statistically significant.

The methodology used in the previous section can be used to determine whether a city's environmental status, as measured by the percentage of degraded land, is higher or lower than would be predicted by its economic development (as reflected in per capita income). Thus, this thesis estimated equation 3.2 using the proportion of degraded land in a city as the dependent variable and per capita income as the explanatory variable. The residuals from this equation were saved and interpreted as an indicator of the environmental performance of a city. For example, if the residual has a negative value, it indicates that its actual environmental status is better than its per capita income levels would have predicted. If it has a positive value, it indicates that the environmental status is worse than its per capita income levels would have predicted.

Table 3.15 contains the aggregate results as far as the six metropolitan cities are concerned.

Table 3.15: Index of environmental achievement, South Africa's metropolitan cities, 2004

City (metropolitan government)	Per capita income	% Degraded land	Degraded land residual	Ranking
Nelson Mandela Metropolitan (Port Elizabeth)	R19 373	0.24%	-0.05	1
Ekurhuleni Metropolitan (East Rand)	R26 478	0.00%	-0.05	2
City of Johannesburg	R42 940	0.00%	-0.01	3
City of Cape Town	R25 547	0.00%	0.00	4
eThekweni Metropolitan (Durban Unicity)	R24 184	3.55%	0.02	5
City of Tshwane (Greater Pretoria)	R35 582	0.00%	0.02	6

Table 3.15 shows that as far as the environmental achievement of the various cities are concerned, the Nelson Mandela Metro (Port Elizabeth), Ekurhuleni (East Rand) and Johannesburg fare the best. All have less degraded land given their per capita income. The City of Cape Town's environmental achievement is consistent with its per capita income,

whilst eThekweni (Durban) and Tshwane (Pretoria) has more degraded land than is to be expected from their levels of per capita incomes.

3.8 QUALITY OF LIFE OVER TIME

Since 1994, there have been great expectations that the newly elected democratic government would address the quality of life of South African citizens. Based on the 1996 and 2001 censuses conducted by Statistics South Africa, it is clear that there have been mixed improvements in the overall quality of life as measured by objective indicators such as those discussed in this chapter. For instance, although economic growth was positive and greater than 4% per annum in some cities between 1996 and 2001, average wages per worker declined in most cities. Unemployment and inequality in South Africa's cities also increased. On the other hand, there is recognition that service delivery, especially access to housing, water, sanitation and electricity, increased notably over the past decade. This, as well as greater access to health and education for the poor, has resulted in measures such as the HDI increasing consistently since 1996.

Table 3.16 contains a selection of economic and non-economic indicators of the quality of life in South Africa's cities for 1996 and 2001.

Table 3.16: Selected economic and non-economic indicators of the quality of life in South Africa's metropolitan cities, 1996 – 2001.

City (metropolitan government)	Per capita income		HDI		Gini coefficient		Unemployment	
	1996	2001	1996	2001	1996	2001	1996	2001
City of Johannesburg	29912	37654	0.70	0.72	0.60	0.60	27.6%	30.9%
City of Tshwane (Greater Pretoria)	24622	31132	0.66	0.70	0.57	0.60	26.6%	29.7%
Ekurhuleni Metropolitan (East Rand)	21719	22259	0.65	0.67	0.57	0.58	32.2%	38.1%
City of Cape Town	23958	24947	0.69	0.70	0.54	0.58	19.5%	25.0%
eThekweni Metropolitan (Durban Unicity)	18723	21304	0.63	0.67	0.56	0.60	32.9%	37.8%
Nelson Mandela Metropolitan (Port Elizabeth)	15797	18683	0.63	0.66	0.55	0.57	36.3%	42.8%

From table 3.16, it can be seen that per capita incomes and HDI have improved over time, but that inequality and unemployment have worsened. It is also noticeable that, although the improvements or worsening indicators are consistently so for the various cities, some cities have done better (or worse) than others. For instance, per capita incomes increased most sharply in Tshwane and Johannesburg (respectively by 26% and 25% over the period), whilst unemployment increased most sharply in the Nelson Mandela Metro and Ekurhuleni (respectively by 6.5% and 5.9%). These different performances of the various cities would have resulted in differences in their overall rankings in terms of quality of life.

The following three tables summarise the relative position of the metropolitan cities with respect to non-economic and economic measures of the quality of life over the period 1996 to 2004.

Table 3.17: Rankings by economic quality of life (using per capita income)

City	Rank 1996	Rank 2001	Rank 2004
Johannesburg	1	1	1
Tshwane	2	2	2
Cape Town	3	3	4
Ekurhuleni	4	4	3
eThekwinini (Durban)	5	5	5
Nelson Mandela Metro (Port Elizabeth)	6	6	6

Table 3.18: Rankings by non-economic quality of life (using residuals from HDI)

City	Rank 1996	Rank 2001	Rank 2004
Johannesburg	2	6	5
Tshwane	5	5	6
Cape Town	1	1	1
Ekurhuleni	4	4	2
eThekwinini (Durban)	6	2	3
Nelson Mandela Metro (Port Elizabeth)	3	3	4

Table 3.19: Rankings by non-economic quality of life (using residuals from an Own Index)

City	Rank 1996	Rank 2001	Rank 2004
Johannesburg	3	4	2
Tshwane	5	6	6
Cape Town	1	1	1
Ekurhuleni	4	3	3
eThekweni (Durban)	6	5	5
Nelson Mandela Metro (Port Elizabeth)	2	2	4

From tables 3.17, 3.18 and 3.19, it can be seen that where the economic quality of life is concerned, the various cities have roughly maintained their relative positions, with the exception of Ekurhuleni that has jumped up one place, displacing Cape Town from third position. As far as the non-economic quality of life indices are concerned, using the residuals from the HDI and this thesis' Own Index regressions (see equation 3.2 and table 3.19) it is noticeable that Cape Town has maintained its first position in both rankings, but that the relative position of the cities depends somehow on the index. For instance, as far as success in turning the economic quality of life into non-economic well-being as measured by the HDI, Johannesburg has declined from second position in 1996 to fifth position in 2004, Tshwane has declined from fifth to sixth position, and Durban and Ekurhuleni have improved their positions in the ranking.

As far as success in turning the economic quality of life into non-economic well-being is concerned, as measured by an index of aged population, literacy and equality, Johannesburg has improved its position from third place to second, Ekurhuleni from third to fourth, Durban from sixth to fifth, whilst the Nelson Mandela Metro's position declined from second to fourth place.

3.9 SUMMARY AND CONCLUSIONS

The quality of life is a significant field of study, from both societal and policymaking perspectives. The multi-dimensional nature of human well-being makes it difficult to compile measures or indices of the quality of life. This chapter considered the quality of life in South Africa's metropolitan cities, firstly because the South African population is rapidly urbanising and the quality of life is increasingly dependent on what the cities can offer. Also, according to Møller (2004), *“South Africa serves as a social laboratory for studying quality of life in developing countries. It is a nation characterised by varying levels of development, vast income inequalities, and cultural diversity in terms of language, religion, ethnicity and settlement patterns. It is this rich mix that lends itself to experimenting with the development of concepts and instruments to adequately capture the essence of quality of life and its measurement.”*

This chapter considered economic and non-economic indicators of the quality of life as well as indicators of the quantity of life. The relationship between the different indicators was explored, specifically the relationship between the human development index and per capita income. However, per capita income is a component in the compilation of the HDI and this results in a strong positive relationship between the two indicators. To control for this, an own indicator of the quality of life was constructed using life expectancy, literacy and the Gini coefficient, and used in regression analysis to calculate residual estimates of the non-economic quality of life. Economic quality of life was also compared with the environmental quality of South Africa's cities. In section 3.8, changes in the quality of life over time were examined.

The chapter confirms that it makes a difference whether the quality of life is measured from an economic or non-economic point of view. When economic quality of life measures are used, specifically per capita income, the ranking in 2004 was Johannesburg, Tshwane, Ekurhuleni, Cape Town, eThekweni (Durban) and the Nelson Mandela Metro (Port Elizabeth). The country's largest agglomeration and its manufacturing base deliver the highest per capita income. However, when other factors than income are considered, the coastal cities tend to offer a higher quality of life on average, although cities located in the interior such as Johannesburg and Ekurhuleni have been found to have started to catch up

with coastal cities in terms of quality of life. When residuals from the HDI are used as a measure of non-economic quality of life (i.e. the proportion of HDI not explained by variation in incomes), coastal cities tend to obtain generally higher rankings, with Cape Town ranked first, followed by Ekurhuleni, eThekweni (Durban), the Nelson Mandela Metro (Port Elizabeth) and then Johannesburg and Tshwane. An own composite index of non-economic quality of life constructed in this chapter obtained a similar ranking, but with the major difference of finding that Johannesburg ranks in second place behind Cape Town.

Finally, the findings reported in this chapter suggest that cities can play an important role in improving human quality of life in developing countries, and that population and urban dynamics in developing countries will cause changes in the relative quality of life between various cities. If the case of South Africa is anything to go by, coastal cities may have an especially important role to play in efforts to improve the quality of life in the developing world.

CHAPTER 4

THE NON-ECONOMIC QUALITY OF LIFE ON A SUB-NATIONAL LEVEL IN SOUTH AFRICA

4.1 INTRODUCTION

In chapter 3 an *ad hoc* index for South Africa's six metropolitan cities was compiled that consisted of both economic and non-economic quality of life indicators, including measures of the quality of the environment and of the quantity of life. By examining how that index and its components have changed over the period 1996 to 2001 (and in some cases 2004) this thesis was able to evaluate city quality of life objectively and distinguish between the economic and non-economic quality of life in the various cities. This thesis used regression analysis to determine the extent to which the various cities have been able to turn improvements in per capita incomes (economic well-being) into non-economic quality of life as reflected in a better environment, higher literacy and longer lives.

Following its move to a fully democratic and development state in 1994, South Africa has been faced with a growing need to measure progress in socio-economic development. Government departments throughout the country have been urged to develop "key performance indicators" at every level (Møller, 2001). Simultaneously, the decentralisation of powers and functions to local municipalities (who are primarily responsible for economic development in terms of the Constitution of 1996) has led to a growing need for objectively verifiable information on socio-economic conditions on a sub-national level, specifically the quality of life. The need for such information arises not only for local municipalities and their constituents to be able to track improvements in the quality of life, but also for comparisons to be made between various local municipalities. Indeed, as documented by Naudé and Krugell (2003; 2006) spatial inequality, as measured by per capita income, is significant in South Africa, and had shown no sign of diminishing since the advent of democracy. The question that this chapter will answer is what had happened with the non-economic (i.e. non per capita income) quality of life in South Africa on a sub-national level

over the past decade? This question is pertinent, given the generally significant spatial inequalities in South Africa not only in terms of income, but also of natural resources, infrastructure, and the environment. A substantial part of South Africa's government anti-poverty programmes since 1994 has been directed to provide households with what is known as the social wage: access to education, health services, water, sanitation, housing and the like. This is in preference to providing poorer households with direct income transfers (which is also important). As a result, although per capita income inequality (i.e. economic quality of life) has not improved since 1994, it may be that non-economic quality of life inequalities have improved (Naudé & Krugell, 2003; 2006).

The most widely used measure to summarise the non-economic quality of life in a country that allows comparisons to be made between countries, regions and periods is the Human Development Index (HDI) (see discussion in section 2.5.1). The HDI combines literacy, income (PPP) and life expectancy and was introduced by the United Nations Development Programme in the Human Development Report 1990. The HDI is currently the only single summary measure of the non-economic quality of life available on a sub-national level in South Africa.

Although useful and widely used, the HDI has also attracted significant criticisms over the years. There is no concurrence amongst social scientists on methods for combining social indicators to construct a quality of life index that is useful for public communication on social well-being and relevant policy issues (Hagerty & Land, 2006). Johansson (2002) and Erickson (1993) argue that there should never be a summary index calculated, citing two important objections. Firstly, they argue that the term "quality of life" is, in itself, too broad to be of any help at all⁶ and, secondly, they argue that quality of life should ideally be an amalgamated indicator whose components (e.g., crime rate, Gross Domestic Product, environmental focus) are not highly correlated, nor their causes identical (Hagerty & Land, 2006).

Quality of life indices (if specified correctly and the diverse components not combined) can be very useful to policymakers, who need to know the comparative role that each social

6 In chapter 3 the concept of quality of life as understood in this thesis is described.

indicator (e.g., unemployment rate, inflation rate etc.) plays on citizens' perceived well-being, so that they know which area to select for improvement when applying the majority of the country's budget (Hagerty & Land, 2006).

When it comes to the term "quality of life" there can be many different interpretations. For instance, it could include ideas of a good life, a valued life, a satisfying life and a happy life. Subjectively, this could also include a satisfaction with life when faced with both positive and negative influences (McCrea, Shyy & Simson, 2006).

In the previous chapter, it was shown that when comparing the non-economic quality of life over time (1996-2004) for the six metropolitan cities, Cape Town (a coastal city) came out on top. The rationale being that, although the city has a marginally lower wage rate as well as higher house prices, people are willing to allow this since they are compensated by living in a naturally beautiful city with the lowest crime rate (1.4%) of all the metropolises. Cape Town also had the highest percentage of population above 75 years of age which could be due to longevity of "people voting with their feet".

In this chapter, the purpose is to develop an index that can measure a person/city's quality of life on a sub-national level, for all 354 magisterial districts in South Africa. It will be interesting to see whether a coastal city/region will come out on top once again or to see whether, when one considers all the cities and regions in South Africa that the initial thought of a coastal city adding positively to one's quality of life will be disproved. While the quality of life index used in chapter 3 was ad hoc, in this chapter principal components will be used to construct indices through which the 354 magisterial districts can be ranked in terms of various aspects of their non-economic quality of life.

This chapter is structured as follows. Section 2 will discuss what is entailed in the various concepts of economic and non-economic quality of life/well-being. Section 3 discusses the variables selected for the construction of the intended indices as well as explaining the methodology to be used. In section 4, this thesis interprets the results obtained from the indices. Section 5 summarises and concludes.

4.2 ECONOMIC WELL-BEING vs. NON-ECONOMIC WELL-BEING

4.2.1 Economic well-being

In 1980, the American people were asked a rather uncomplicated question by Ronald Reagan: “Are you better off today than you were four years ago?” To his surprise, the answer was “No”. If an increase of 7.6% in per capita disposable real income since 1976 did not lead the American people to feeling ‘better off’, the question has to be asked: “What constitutes economic well-being, and how can it be determined whether society as a whole is ‘better off’? (Osberg, 1985)

In the mid-1980s, Lars Osberg created the well known Index of Economic Well-being (IEWB) for the MacDonald Commission to help with Canadian labour and social policy implementations based on the belief that indicators of economic welfare such as Gross Domestic Product (GDP) per capita did not reflect the actual trends in economic well-being (Osberg & Sharpe, 2001).

Although GDP can be seen as the combined income of a country as a whole, per capita income does not reveal where one stands to gain personally in the opulence of the average and it does not take into consideration what legacy this generation will leave for the next. Osberg (1985) defined four dimensions of economic well-being:

1. “Effective per capita consumption flows – consumption of marketed goods and services, and effective per capita flows of household production, leisure and other unmarketed goods and services;
2. Net societal accumulation of stocks of productive resources – net accumulation of tangible capital, housing stocks and consumer durables, net changes in the value of natural resources stocks, environmental costs, net change in level of foreign indebtedness, accumulation of human capital and research and development investment;
3. Income distribution – the intensity of poverty (incidence and depth) and the inequality of income;

4. Economic insecurity – economic security from job loss and unemployment, illness, family break up, changes in the annual inflation rate and poverty in old age.”

Osberg (1985) specified that the level of economic well-being engendered by a given total of consumption will be less: (i) if it is obtained at the cost of the impoverishment of future generations; (ii) the greater is the poverty of low income groups and the degree of economic inequality; and (iii) the more unstable or insecure are individuals’ year-to-year income flows. Economic well-being, according to Osberg (1985), can be calculated as follow:

$$\begin{aligned} \text{Economic well-being index} = & a_1 \text{ (effective per capita consumption flows)} \\ & + a_2 \text{ (net accumulation for future generations)} \\ & + a_3 \text{ (poverty + inequality of current generation)} \\ & + a_4 \text{ (insecurity of income flows)} \end{aligned}$$

4.2.2 Non-economic well-being

A key aim of social indicator research is to create an all-inclusive measure of quality of life in countries that is akin to Gross National Product (GNP) in economic indicator research (Veenhoven, 1996).

The problem with non-economic well-being quality of life indices is that most of them are subjective by nature, or they are objective but contain an income measure of some sort. Table 4.1, shows most of the standard measures of quality of life being used and it can be seen that most of them are either subjective of nature or where they are objective of nature they include an income measure. This impedes this thesis since the aim is to build an objective index that eliminates the impact of income on the proposed results. Diener and Diener (1995) found through cross-national studies of quality of life that increases in income levels tend to have a greater role to play in perceived well-being at lower than at higher levels of development. The quantity of literature is sporadic but, in order to provide further background on what is seen as non-economic well-being or quality of life, this thesis will now discuss a few of the studies undertaken.

Urban quality of life studies has gained significant popularity and interest because most cities around the world are moving towards the realisation of the goal of becoming a 'good city' or 'liveable city' (for further information see Seik *et al.*, 2000) (Møller, 2001).

Wey (2000) made a particularly relevant argument pertaining to this thesis, which states that since there is a lack of consensus about what quality of life implies, an argument can be made to correlate quality of place with quality of life. This can be based on the supposition that the physical location and surroundings play a deterministic role in one's quality of life. Proxy indicators of the quality of place approach are used to infer quality of life. The aim of using such indicators is to determine which elements within a particular city/region/location contribute the most to individuals' perceived quality of life. Indicators can be, for example; average climate, rainfall and natural beauty of the city/region/location.

Quality of life researchers make a significant distinction between objective and subjective indicators, which is matched by the abovementioned two approaches. Objective indicators can be seen as physical facts that can be readily observed and subjective indicators can be perceived as personal judgements of objective surroundings (Møller, 2001).

McCrea *et al.*(2006), attempted to determine the relationship, if any, between objective and subjective measures of quality of life in the urban environment. The reason being that it is vital for urban planners to know what residents recognise as satisfactory and how they could help increase people's perceived quality of life. Their results showed that there is no strong link between the underlying objective and subjective measures of the urban environment and they thus conclude that when studying both objective and subjective elements, a great deal of care should be exercised in interpreting those results.

However, in a project headed up by Møller and Schlemmer (1983; 1989) called the 'South African Quality of Life Trends Project', they found that subjective social indicators score perfectly with their objective equivalents. In 1980, they found that South Africans whose material living conditions were the least satisfying were also those people who scored the lowest on their perceived judgement of their living standards.

Thus, as can be seen from the aforementioned discussion, although a significant amount of literature exists when it comes to subjective quality of life, there still remains a gap in the available literature pertaining to objective and non-economic quality of life.

Table 4.1: Standard measures of quality of life

Criteria for QoL studies	Examples of Quality of Life indices					
	Index of Social Progress (ISP) (Estes, 1984)	Index of well-being (Kacapyr, 1996)	Quality of Life Index (Narrol, 1984)	Human Development Index (HDI) (UNDP, 1995)	Happy Life Expectancy (HLE) (Veenhoven, 1996)	Demographic and Geography Index (Rossouw & Naudé, 2006)
Economic affluence	X	X		X		
State welfare	X		X			
Education	X		X	X		X
Public health	X		X	X	X	
Social equality	X			X		X
Peacefulness	X	X	X			X
Physical habitability	X	X				X
Social stability	X		X			
Cultural diversity	X		X			
Life style		X			X	X
Majority of variables are either objective/ subjective	Subjective	Objective	Subjective	Objective	Subjective	Objective

Source: Adapted from Veenhoven, 1996

4.3 THE INDICES

Following the *ad hoc* index that was constructed for South Africa's six metropolitan cities in chapter 3, it was decided to assemble a more logical index for the whole of South Africa's 354 magisterial districts. The data used for the indices were obtained from Global Insight's Regional Economic Focus (REF). It is important to note that the trends in the calculated indices are determined by the choice of variables included as well as by trends in those variables. Since the aim was to construct a non-monetary index (and that this thesis was faced with data challenges), the following variables were selected for this thesis.

Table 4.2: Variables used in the quality of life indices

Variable	Focus area ⁷	Expected influence on quality of life
Size of the population (total)	Demographic focus	Positive/Negative
Population growth rate	Demographic focus	Negative
The number of households in the municipality region	Demographic focus	Negative
Population older than 75 years of age (total)	Demographic focus	Positive
Population between the years 70-74 (total)	Demographic focus	Positive
Number of people in poverty (total)	Development focus	Negative
Number of people living on less than \$1 a day (total)	Development focus	Negative
Highest level of education for population older than 15 years of age: no schooling.	Development focus	Negative
Highest level of education for population older than 15 years of age: matric only	Development focus	Positive
Highest level of education for population older than 15 years of age: matric and bachelor's degree	Development focus	Positive
Highest level of education for population older than 15 years of age: matric and doctors degree	Development focus	Positive

⁷ The focus area is the grouping of various variables under a common theme.

Urbanisation rate	Development focus	Negative
Number of economically active population (total)	Labour focus	Positive
Number of economically active population as percentage of total population	Labour focus	Positive
Number of people unemployed (total)	Labour focus	Negative
Urban/built-up land: residential (km ²)	Environment focus	Negative/Positive
Urban/built-up land: commercial (km ²)	Environment focus	Negative/Positive
Urban/built-up land: industrial/transport (km ²)	Environment focus	Negative/Positive
Mines and quarries (km ²)	Environment focus	Negative/Positive
Size of the area (km ²)	Environment focus	Positive
Forest and woods (km ²)	Environment focus	Positive
Forest (km ²)	Environment focus	Positive
Herbland (km ²)	Environment focus	Positive
Forest plantations (km ²)	Environment focus	Positive
Waterbodies (km ²)	Environment focus	Positive
Wetlands (km ²)	Environment focus	Positive
Barren rock (km ²)	Environment focus	Negative
Dongas and sheet erosion scars (km ²)	Environment focus	Negative
Average annual rainfall	Weather focus	Positive
Average annual temperature	Weather focus	Positive
Average annual hours of sunshine	Weather focus	Positive

Following the selection of variables (which were led by data availability) the data were divided into two distinct groups following the argument of Johansson (2002) and Erickson (1993) as discussed in section 4.1. The first group consists of variables pertaining to man and

everything man made (called hereafter demographic) and the second group is purely geographical features (called hereafter geography).

After the selection was completed, principal components analysis was applied. It was found that if this thesis were to use the first three components of demographic (must have an eigenvalue above 1) it would explain 77, 64% of the variation, and the first four components of geography would explain 58, 91% of its variance.

Each variable's factor loading was also determined and this showed that in the group demographic, the variables that had the highest loadings (variables that were chosen had a factor loading more than 0.6) were population (total), number of households (total), population between 70-74 years of age (total), number of people with matric, number of economically active population (total), number of people in poverty, number of people with no schooling, urbanisation rate, economically active population as percentage of total population and mines and quarries (km³). It is important to note here that some of the variables have a negative value from one year to the next, thus indicating negative growth/influence.

The variables that had the highest factor loading in the group geography was the size of the area (km²), wetlands (km²), average annual hours of sunshine, forest and plantation (km²), average annual rainfall, waterbodies (km²) and herbland (km²).

The original index specified for place i at year t ($t=1996-2004$) was:

$$QoL_{it} = \alpha_{it} + households_{it} + urbanrate_{it} + mines_{it} + size_{it} + rain_{it} + waterbody_{it} + herbland_{it} + \mu_{it} \quad (4.1)$$

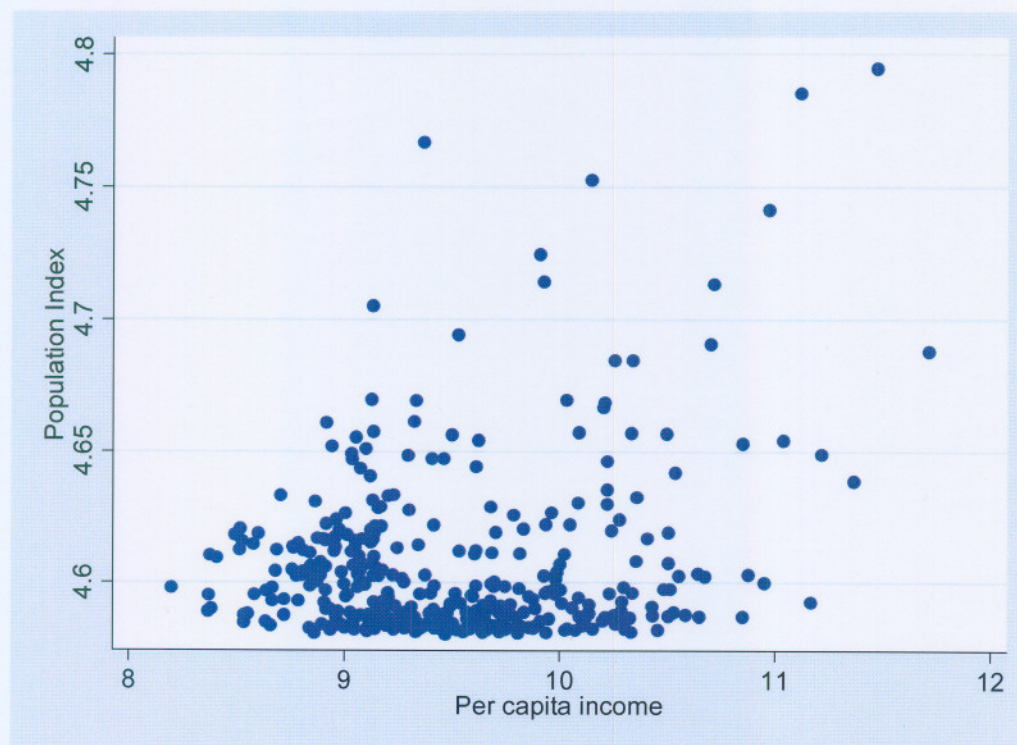
Where:

households = variable 1 from group demography;
urbanrate = variable 2 from group demography;
mines = variable 3 from group demography;

size = variable 1 from group geography;
rain = variable 2 from group geography;
waterbody = variable 3 from group geography;
herbland = variable 4 from group geography and
 μ = residual.

To compile an index from these seven components, different weights had to be appointed to each one. This thesis did not have a proxy to use for the selection of weights and it is not statistically correct to apply equal weights to each of the components. Thus, it was left with the alternative of taking only the first component of each group (seeing as the first principal component accounts for the most variance and the components are ordered in size as they are extracted) and compiling separate indices. These indices can then be used to rank the 354 magisterial districts based on these two indices, hereafter called the Demographic Index and the Geographical Index. The actual values obtained through the principal components method were transformed so that every value ranged between one and zero, thus making it easier to rank the magisterial districts.

Figure 4.1: Relationship between per capita income and Demographic Index; 2004



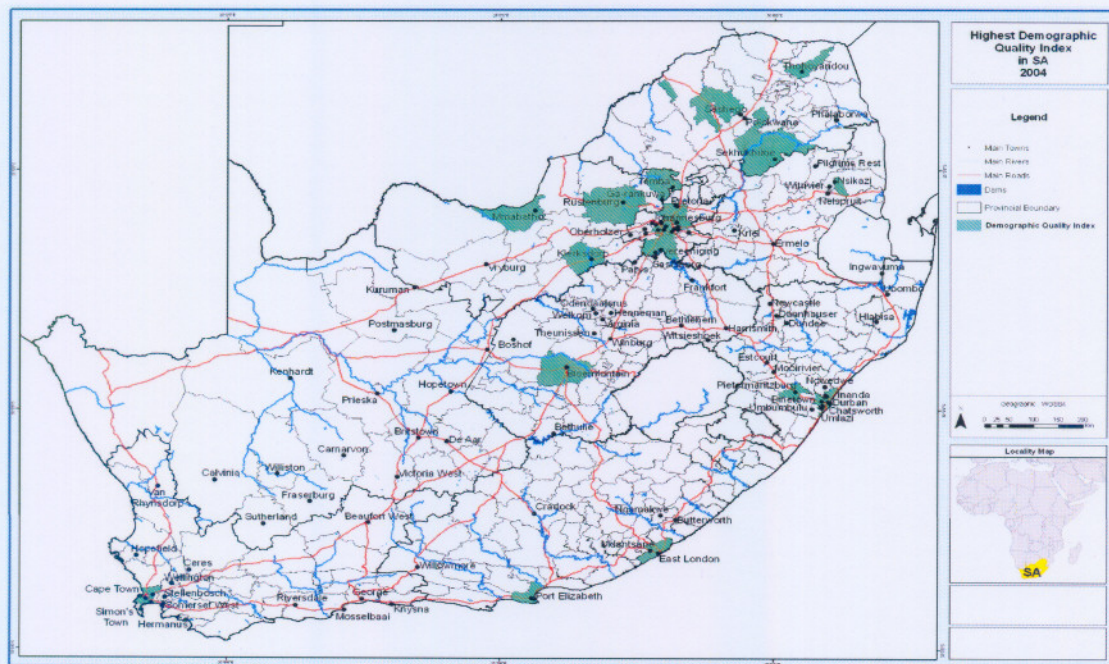
From figure 4.1, one can see the relationship between the Demographic Index and per capita income. Although there seems to be a somewhat positive relationship, the important point to notice is that from 1996 to 2004, a number of the magisterial districts have moved up, indicating that although their income per capita has not increased, some of the social policies implemented by government have succeeded. (The figure representing the relationship between per capita income and the Demographic Index 1996 can be seen in the appendix). The magisterial districts that fall in the upper half of the diagram are those represented by the top ten regions in the index.

Table 4.3: Demographic Index ranking; 1996 and 2004 (out of 354 municipal districts)

Place	Ranking for 1996	Ranking for 2004
Pretoria	1	1
Johannesburg	2	2
Durban	3	5
Port Elizabeth	4	4
Soweto	5	3
Inanda	6	6
Wynberg	7	8
Pietermaritzburg	8	7
Randburg	9	12
Pinetown	10	11

In table 4.3, it can be seen that, when using the Demographic Index, Pretoria is ranked first in the years 1996 and 2004. It is not surprising to see Soweto and Inanda under the top ten cities as Soweto alone has over 1,100,000 people and as size of population, number of households is used as determining factors.

Figure 4.2: Highest demographic quality of life in South Africa; 2004



Source: Map drawn for this chapter by Giscoe (Pty) Ltd, Potchefstroom

Figure 4.2 shows where the clusters with the highest quality of life, according to the Demographic Index, are located. Many of the magisterial districts with a higher quality of life can be found in and around the Greater Tshwane Region (Pretoria), Ekurhuleni, and the City of Johannesburg metropolises.

Figure 4.3: Relationship between per capita income and Geography Index; 2004

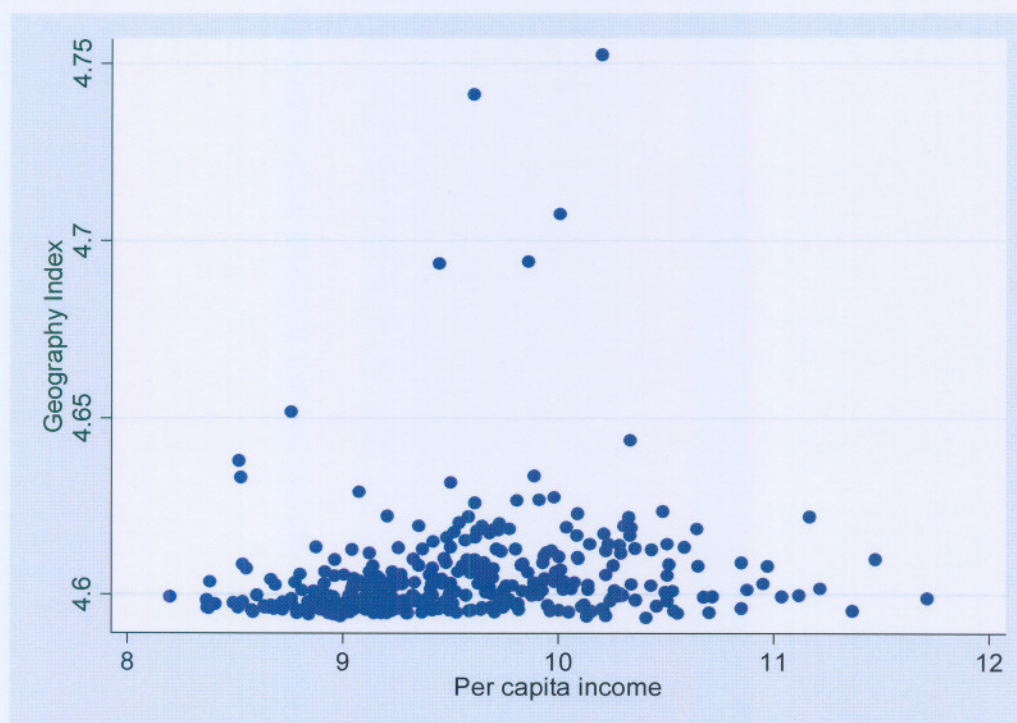


Figure 4.3 represents the relationship between the Geography Index and income per capita. It can be seen that there is no relationship between income per capita and the Geography Index. (The figure depicting the relationship between per capita income and the Geography Index for 1996 is contained in the appendix). The magisterial districts in the upper half of the diagram are the top ten ranked geographical regions according to the index.

Table 4.4: Geography Index ranking; 1996 and 2004 (out of 354 municipal districts)

Place	Ranking for 1996	Ranking for 2004
Calvinia	1	1
Gordonia	2	2
Namaqualand	3	3
Carnarvon	4	5
Kenhardt	5	4
Ubombo	6	6
Williston	7	7
Hlabisa	8	8
Ingwavuma	9	10
Ceres	10	9

When the Geography Index is used, the outcome of the rankings has radically changed. As can be seen from table 4.4, the magisterial district that is ranked first is Calvinia, both in 1996 as well as in 2004. What can be seen from this table is that most of the top ten magisterial districts are in the Northern/Western Cape Province, which has the second highest km² of forest and waterbodies, which can be indicative of the province's natural beauty thus enhancing and contributing positively to quality of life (see chapter 3).

Figure 4.4: Highest geographical quality of life in South Africa; 2004



Source: Map drawn for this chapter by Giscoe (Pty) Ltd, Potchefstroom

Figure 4.4 shows the magisterial districts with the highest quality of life according to the Geography Index. As already mentioned, many of these districts fall in the Northern/Western Cape Province as well as in the Northern Province. These areas are known for their wildlife and natural beauty.

Figure 4.5: Relationship between per capita income and HDI; 2004



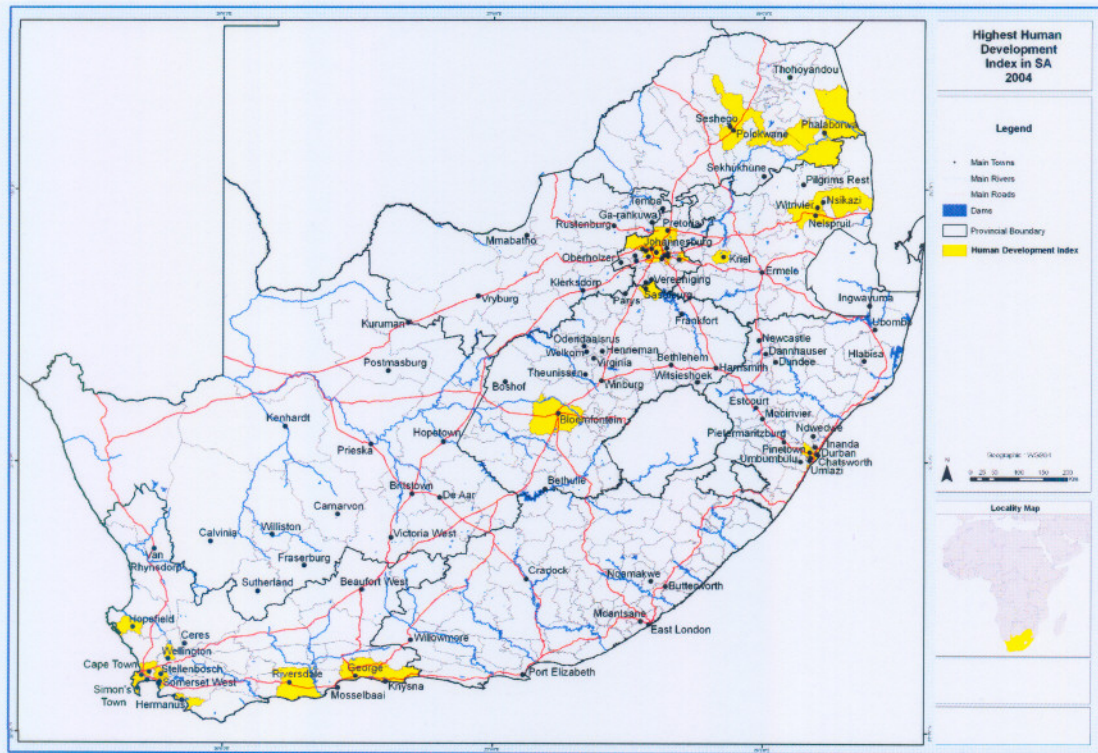
The positive relationship between the HDI and per capita income is depicted in figure 4.5. This is as expected, since income per capita forms one of the HDI's three components. (The figure representing the relationship between per capita income and the HDI for 1996, can be seen in the appendix). The regions in the upper-right hand side of the graph are those of the top ten regions according to the HDI.

Table 4.5: HDI ranking; 1996 and 2004 (out of 354 municipal districts)

Place	Ranking for 1996	Ranking for 2004
Cape Town	1	3
Germiston	2	2
Pretoria	3	1
Randburg	4	4
Simonstown	5	7
Bellville	6	6
Johannesburg	7	5
Durban	8	9
Somersetwest	9	11
Roodepoort	10	8

In table 4.5, it can be seen that the ranking order has not changed very much over the nine year period. Cape Town, Germiston and Pretoria have stayed in the top three positions although Cape Town and Pretoria have changed rankings.

Figure 4.6: Highest human development in South Africa; 2004



Source: Map drawn for this chapter by Giscoe (Pty) Ltd, Potchefstroom

Figure 4.6 shows the various magisterial districts with the highest Human Development Index ranking. There seem to be quite a few in the Western Cape Province, the Ekurhuleni metropole and, once again, in the Northern Province.

In order to use the same technique presented in chapter 3, a regression analysis has to be done in order to determine the residual values of the indices as developed in this chapter as well as for the HDI since this index is the most widely used and acknowledged. The three equations specified are as follows:

$$HDI_{it} = \alpha_{1it} + \beta_{1it} \text{percapita}_{it} + \mu_{1it} \quad (4.2)$$

$$DEMQoL_{it} = \alpha_{2it} + \beta_{2it} \text{percapita}_{it} + \mu_{2it} \quad (4.3)$$

$$GEOQoL_{it} = \alpha_{3it} + \beta_{3it} \text{percapita}_{it} + \mu_{3it} \quad (4.4)$$

The above three equations simply mean that the part of the quality of life index that cannot be explained by income per capita is the true non-economic quality of life.

Before a regression analysis could be run on the above three equations, the dependent as well as the independent variables had to be transformed into their natural logs. Since the actual values of the three indices had to be used, this thesis had a problem with negative values in the Demographic and Geography Indices. To eradicate this problem, an amount of 100 was added to each value thus cancelling out the negative values but not changing the variance between each value. Thus the final equations are:

$$\ln HDI_{it} = \alpha_{1it} + \beta_{1it} \ln \text{percapita}_{it} + \mu_{1it} \quad (4.5)$$

$$\ln DEMQoL_{it} = \alpha_{2it} + \beta_{2it} \ln \text{percapita}_{it} + \mu_{2it} \quad (4.6)$$

$$\ln GEOQoL_{it} = \alpha_{3it} + \beta_{3it} \ln \text{percapita}_{it} + \mu_{3it} \quad (4.7)$$

After the analysis was completed for equations 4.5, 4.6 and 4.7, the following results were obtained.

Table 4.6: Residual value rankings for Demographic Index, Geography Index and the HDI; 1996 (independent variable: log of per capita income)

Place	Ranking by proportion of Demographic Index not predicted by income	Ranking by proportion of Geography Index not predicted by income	Ranking by proportion of HDI not predicted by income
Pretoria	1 (1)	163 (82)	99 (3)
Johannesburg	2 (2)	340 (201)	110 (7)
Soweto	3 (5)	328 (352)	1 (86)
Port Elizabeth	4 (4)	56 (49)	6 (31)
Durban	5 (3)	177 (99)	56 (8)
Inanda	6 (6)	246 (187)	19 (59)
Pietermaritzburg	7 (8)	229 (170)	41 (58)
Wynberg	8 (7)	338 (220)	49 (11)
Mitchellsplain	9 (12)	306 (290)	2 (85)
Vanderbijlpark	10 (13)	261 (197)	42 (71)

(Actual index values in brackets)

Table 4.6 shows that, according to the rankings deduced from the various indices not predicted by income, the top ten regions according to the Demographic Index in 1996 were Pretoria, Johannesburg, Soweto, Port Elizabeth, Durban, Inanda, Pietermaritzburg, Wynberg, Mitchellsplain and Vanderbijlpark. But according to the Geography Index, Pretoria is ranked 163rd, Johannesburg 340th, Soweto 328th, Port Elizabeth 56th etc. According to the HDI, Pretoria is ranked 99th, Johannesburg 110th, Soweto 1st, Port Elizabeth 6th etc.

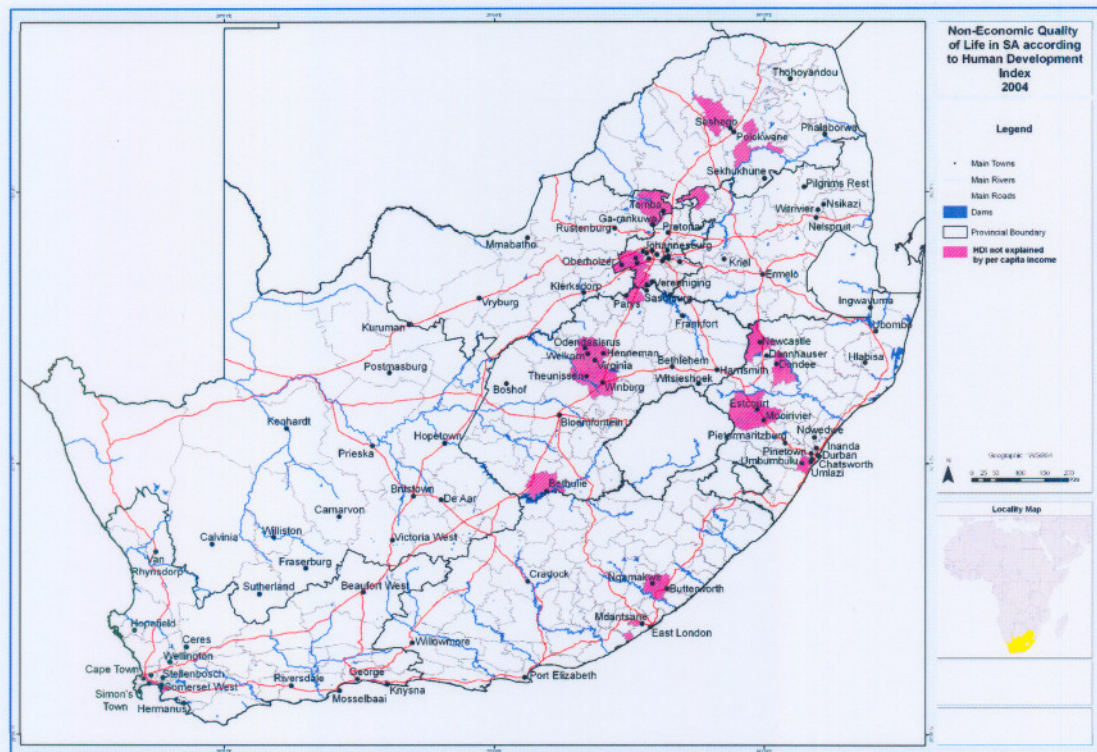
Table 4.7: Residual value rankings for Demographic Index, Geography Index and the HDI; 2004 (independent variable: log of per capita income)

Place	Ranking by proportion of Demographic Index not predicted by income	Ranking by proportion of Geography Index not predicted by income	Ranking by proportion of HDI not predicted by income
Pretoria	1 (1)	193 (70)	307 (1)
Soweto	2 (3)	316 (338)	2 (89)
Johannesburg	3 (2)	345 (191)	262 (5)
Port Elizabeth	4 (4)	55 (44)	63 (40)
Durban	5 (5)	178 (84)	212 (9)
Inanda	6 (6)	268 (186)	38 (54)
Mitchellsplain	7 (9)	288 (325)	1 (113)
Pietermaritzburg	8 (7)	231 (164)	65 (60)
Wynberg	9 (8)	333 (201)	138 (10)
Vanderbijlpark	10 (10)	324 (337)	11 (83)

(Actual index values in brackets)

In 2004, the top ten regions according to the Demographic Index have not changed very much. When one looks at the Geography Index, all but four of the regions have decreased their rankings. Pretoria fell 30 places from 163rd to 193rd place. According to the HDI, Pretoria fell from 99th place to 307th place. This is clearly an indicator that Pretoria's social policies are in place and that income plays a very important role.

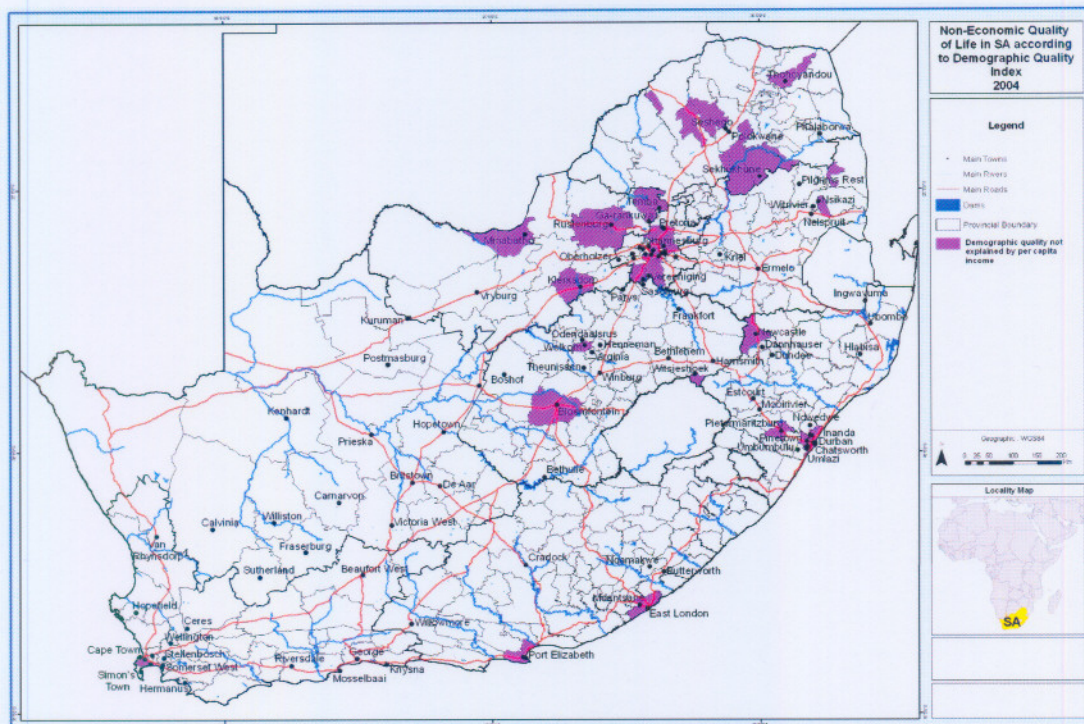
Figure 4.7: Non-economic quality of life according to the HDI; 2004



Source: Map drawn for this chapter by Giscoe (Pty) Ltd, Potchefstroom

Figure 4.7 shows the clustering of magisterial regions that have a relative high index value after equation 4.5 was applied. These magisterial region-groupings show that, when income per capita is taken out of the equation, these areas have showed significant improvement from 1996 to 2004 in the implementation of various social amenities.

Figure 4.8: Non-economic quality of life according to the Demographic Index; 2004



Source: Map drawn for this chapter by Giscoe (Pty) Ltd, Potchefstroom

Figure 4.8 shows the regions with the highest non-economic quality of life according to equation 4.6 where the Demographic Index was regressed by the natural log of income per capita and the residuals saved in order to determine the non-economic quality of life. It can be seen that region-groupings can be found in the Greater Tshwane region (Pretoria), Johannesburg, Ekurhuleni and the Northern Province.

Figure 4.9: Non-economic quality of life according to the Geography Index; 2004



Source: Map drawn for this chapter by Giscoe (Pty) Ltd, Potchefstroom

Figure 4.9 shows where the various magisterial districts are situated that have the highest non-economic quality of life according to the saved residuals as obtained by equation 4.7 where the Geography Index was regressed by the natural log of per capita income. As can be seen, most of them are located in the Northern/Western Cape – as well as in the Northern Province which is known for its natural beauty and even temperatures.

4.4 INTERPRETING THE INDEX RESULTS

Firstly, when contemplating the rankings from the Demographic Index (proportion not predicted by income) in table 4.7, it should be mentioned that the results are satisfactory and as envisaged. Since the size of the population, number of households etc. plays a significant role in this index, it is not surprising that five of the six Metropoles are ranked in the top ten. Pretoria (City of Tshwane) is ranked first followed by Soweto, which constitutes part of the

Ekurhuleni Metropole. Third is Johannesburg, followed by Port Elizabeth (Nelson Mandela Metropole) and in fifth place is Durban (the eThekweni Metropole). In these five magisterial districts alone (which do not include their neighbouring municipal districts which make up the whole of the Metropole), more than 4, 300, 000 people reside. This constitutes approximately 9.27% of South Africa's total population in 2004.

Although the index ranks these magisterial districts as the top five, it does not imply that they are the best to live in. People migrate to these cities in an attempt to secure higher paying employment as well as to take advantage of the various social amenities such as schools, hospitals etc. The more people there are in a specific location, one would also expect a higher crime rate impacting negatively on one's quality of life. Of South Africa's total crime rate (the crime rate is the percentage of all murders, attempted murders and robberies that occurred in a city in 2001), 42.44% originated in the aforementioned five Metropolises. This clearly indicates that the higher a city is ranked in the Demographic Index, the more caution should be taken when interpreting it as a positive impact on quality of life.

When interpreting the rankings from the Geography Index (proportion not predicted by income) in table 4.7, it should be remembered that, in its essence, the Geography Index ranks magisterial districts according to their natural beauty which positively affects one's quality of life. Although Pretoria, Soweto, Johannesburg, Port Elizabeth, Durban, Inanda, Mitchellsplain, Pietermaritzburg, Wynberg and Vanderbijlpark are ranked the top ten according to the Demographic Index, it can clearly be seen that they did not fare as well when ranked according to their natural and environmental beauty. All, with the exception of Port Elizabeth (which is a coastal city and therefore has some form of appeal) were ranked from 178th (Durban) to 345th (Soweto) out of a total of 354 magisterial districts. The variables such as built-up land: commercial, industrial and residential as well as percentage of degraded land and mine quarries play a significant negative role in the quality of life according to the Geography Index.

The non-economic quality of life rankings using the Human Development Index as dependent variable (proportion not predicted by income) in table 4.7 shows once again the important impact income has on a specific magisterial district. Seeing as income is

eliminated, the rankings show that magisterial districts such as Mitchellsplain (first) and Soweto (second) is, to a large degree, dependent on income and social policies such as education and health. Cities such as Pretoria (307th), Johannesburg (262nd) and Durban (212th) are ranked very low, which seems to indicate that they are fulfilling their potential to grow and that they already have policies in place for improving quality of life.

4.5 CONCLUSIONS

4.5.1 Methodological conclusions/implications

Since there is no clear consensus about the relationship between subjective and objective indicators (see section 4.2.2), it was the aim of this chapter to develop an index that was purely objective and did not contain an economic measure (e.g. income per capita) seeing as per capita income is considered the variable that has the most influence on a person's perceived quality of life.

The first thing to note is that when one is working with indices, a rational analysis of the variables should be done. Following the arguments of Johansson (2002) and Erickson (1993), one should take care not to “combine and compare apples and oranges”. This chapter followed their example and made a split between purely geographical variables and variables pertaining to man and everything man-made. This resulted in two reported indices, namely a Demographic Index and a Geography Index.

Secondly, it should be noted that one needs some form of a proxy against which the indices can be measured. In order to develop an index, one needs certain weights to attribute to the various components that were calculated through the principal components analysis. Since there was no such proxy for the purpose of this chapter, it was decided to use the first component of each index because the application of equal weights to the various components cannot be statistically justified.

4.5.2 Conclusions on quality of life in South Africa

As each index has a different focus, conclusions will be drawn for each.

Taking into account the monetary and thus the economic quality of life, the top ten regions in South Africa to live in, in 2004 are as follows: Pretoria, Germiston, Cape Town, Randburg, Johannesburg, Bellville, Simonstown, Roodepoort, Durban and Wynberg.

When considering the non-economic quality of life a distinction should be made between the Demographic and Geography Indices. According to the Demographic Index, the top ten regions in 2004 are as follows: Pretoria, Johannesburg, Soweto, Port Elizabeth, Durban, Inanda, Pietermaritzburg, Wynberg, Mitchellsplain and Vanderbijlpark. When interpreting these results, one should be cautious because variables such as number of people, number of households etc. are included in this index and as a region grows in population size the more negative consequences, such as a higher crime rate etc. can be associated with that particular region.

According to the Geography Index the top ten regions to reside in, in 2004 are: Calvinia, Gordonia, Namaqualand, Kenhardt, Camarvon, Ubombo, Williston, Hlabisa, Ceres and Ingwavuma. The Geography Index measures a region's natural beauty which, according to Wey (2000), contributes positively to one's perceived quality of life.

4.5.3 Policy implications

The World Bank's (1999) new urban strategy for cities in the Third World focuses on liveability, competitiveness, good governance and bankability - four characteristics that are essential in promoting the welfare of its residents. Poverty and quality of life indices can be seen as an objective measure to assist society/government in identifying regions for policy interventions.

Considering changes in non-economic quality of life indices as found in this chapter between 1996 and 2004, the conclusion can be drawn that the South African government has been

successful to a degree in addressing the non-economic quality of life. Social policies such as health care, education, housing, water and sanitation appear to have had a positive effect on people's perceived non-economic quality of life in areas that were relatively deprived in 1996.

4.5.4 Contribution

This chapter set out to construct an objective non-economic quality of life index for South Africa's 354 magisterial districts. This construction of an objective non-economic quality of life index is the first of its kind for sub-national regions and the constructed indices have helped to contribute to the "unanswered questions" on what can be perceived as non-economic quality of life. In this case, it was found that variables such as the size of the population, the number of households, the percentage of population older than 75 years of age, number of population who have completed their high school education, number of economically active people, number of unemployed people, size of the area, the percentage of the specific region dedicated to waterbodies and wetlands as well as herbland together with average annual rainfall, temperature, and hours of sunshine can be seen as being an integral part of what people perceive as their non-economic quality of life.

Future research should be aimed at collecting data over a longer period to construct not only an index for specific regions, but also to determine how the quality of life has changed within a specific region. One can also construct similar quality of life indices (using the same variables) for other developing countries and determine how differences in internal policies and external circumstances can influence spatial inequalities in the non-economic quality of life.

CHAPTER 5

RE-ASSESSMENT OF THE NON-ECONOMIC QUALITY OF LIFE USING MULTIPLE PROXIES

5.1 INTRODUCTION

In the previous chapters, the construction of quality of life indices used principal components analysis. Although principal components is the most widely used, accepted and recognised method for extracting information from a variety of variables, recent methodological advances have proposed a possible alternative method.

In this chapter, such an alternative method is explored. Recently, Lubotsky and Wittenberg (2006) proposed that a regression with multiple proxies may provide better results than that of principal components.

This chapter is structured as follows. In section 2, the basic critique against principal components analysis by Lubotsky and Wittenberg (2006) is set out. In section 3, a brief description of how the methodology used in the previous chapters will be updated is provided. Section 4 contains a comparison between the rankings of non-economic quality of life in South Africa based on principal components analysis and based on the multiple proxies proposals of Lubotsky and Wittenberg (2006). Section 5 concludes.

5.2 THE LUBOTSKY – WITTENBERG ARGUMENT

Principal components analysis attains a distinctive breakdown, but does so by the method of identifying the common factor with the linear combination of proxies that maximises the explained variance (Lubotsky & Wittenberg, 2006).

The objective of principal component analysis is to be able to estimate the correlation matrix and this can be done by finding the characteristic equation of the matrix. This requires two sets of values:

- The characteristic vectors of the matrix, also called latent vectors or eigenvectors – a vector is simply a column or row of numbers in a matrix.
- Characteristic roots, also called latent roots or eigenvalues (Kline, 2002).

The main objection to principal components analysis is that there is an infinity of mathematically equivalent solutions. A second objection is that principal component analysts frequently disagree as to what are the most important factors in the field. The third objection is that it is difficult to reproduce principal components analysis, although with sound methodology this problem can be overcome. It is sometimes said that with principal components analysis 'you only get out what you put in' so that it is difficult to see how the method can be useful (Kline, 2002).

Several other approaches can be used to construct and interpret indices. Many researchers use a single summary measure, which was determined from their own specific set of proxy variables in the elected regressions. For example, Glaeser *et al.* (2000) standardised (subtracting the mean and dividing by the standard deviation) responses to various survey questions and then simply added them together in order to derive an index of trust. Mauro (1995) uses the average of indices - such as political and labour stability, corruption, terrorism etc. – and then uses this average as a regressor in models of growth and investment across countries and to determine institutional efficiency and corruption. He deems his strategy as correct because many of these indices measure the same fundamental trend.

Several considerations underlie the above authors' strategies to summarise the proxies in a single, new variable. Firstly, by taking some form of linear combination of the proxies, the problem of the measurement error might be reduced. Secondly, many researchers may be worried about multicollinearity. Thirdly, the coefficient of a single summary of the proxies may be more readily interpreted (Lubotsky & Wittenberg, 2006).

Lubotsky and Wittenberg (2006), believe that the methods discussed above are generally impromptu and that they can hardly ever be the most advantageous. They propose a measure in which all the proxy variables are entered into a regression and then by combining each proxy variable's coefficient, a summary measure of their effect can be determined. Their procedure is best thought of as a method to interpret rather than estimate the coefficients in a regression under the null hypothesis that the variables are all generated by a common latent factor.

This thesis will now discuss Lubotsky and Wittenberg's (2006) argument in depth. For fear of misinterpreting their numeric argument this thesis will now make use of direct citation.

Firstly, Lubotsky and Wittenberg (2006:550) highlight the circumstances under which their theory is built by the following equations:

$$y = \beta x^* + \varepsilon, \quad (5.1)$$

$$x_1 = x^* + u_1, \quad (5.2)$$

$$x_2 = \rho_2 x^* + u_2, \quad (5.3)$$

“where β , relating y and x^* in equation 5.1 is the parameter of interest. Lubotsky and Wittenberg (2006:550) assume “that x^* is unobserved, but that they have two observed proxies x_1 and x_2 . They further assume that x^* is uncorrelated with ε , and u_1 and u_2 are uncorrelated with x^* and ε . That is, the proxy variables do not have independent effects on y . These assumptions are routinely imposed when researchers assume they have classical measurement error. Finally, they allow the covariance between u_1 and u_2 denoted by σ_{12} , to be unrestricted”.

When Lubotsky and Wittenberg (2006:551) “regress y on the first proxy, they have the well-known case of attenuation bias. The OLS estimator b or β will converge asymptotically to

$$b = \beta \frac{\sigma_x^2}{\sigma_x^2 + \sigma_1^2},$$

where $\sigma_x^2 = \text{var}(x^*)$ and $\sigma_1^2 = \text{var}(u_1)$. The parameter β is not identified”.

Lubotsky and Wittenberg (2006:552) “make use of an arbitrary number of available proxies for x^* (which is the parameter of interest) and the proxies may have different degrees of correlation with x^* ”. They begin their demonstration by stating that “although β is generally not identified, attenuation bias would be minimised by including the proxy variables separately in a regression analysis and then constructing a weighted sum of the coefficients of each proxy variable, where an estimate of ρ_j is the weight given to coefficient j ”.

Lubotsky and Wittenberg (2006) further assume that they have k proxies, with

$$x_j = \rho_j x^* + u_j$$

for $j=1, \dots, k$. They assume further that $\text{cov}(u_j, \varepsilon) = 0, \text{cov}(u_j, x^*) = 0$ for all j , but they assume that the covariance matrix of the u_j ’s is unrestricted; that is

$$\Sigma_{uu} = E(U'U) = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \cdots & \sigma_{1k} \\ \sigma_{12} & \sigma_2^2 & \cdots & \sigma_{2k} \\ \vdots & \vdots & \ddots & \vdots \\ \sigma_{1k} & \sigma_{2k} & \cdots & \sigma_k^2 \end{bmatrix}$$

where $U = [u_1 u_2 \dots u_k]$.

Lubotsky and Wittenberg (2006:552) “note that the coefficients ρ_j are not yet identified. The same observations of y and the x_j s would be consistent with appropriately rescaled vectors ρ and β . Consequently, they adopt the normalization that $\rho_1 = 1$. This amounts to fixing the scale of the latent variable x^* in terms of the observable x_1 ”.

The scale is important when comparing the magnitude of estimates across models. Therefore, Lubotsky and Wittenberg (2006:553) “rescale their estimates to make a valid comparison with those that have appeared in the literature. Their estimated covariance matrix is:

$$\Sigma_{ZZ} = E(Z'Z) = \begin{bmatrix} \beta^2 \sigma^2 + \sigma_\epsilon^2 & \beta \sigma_x^2 & \beta \rho_2 \sigma_x^2 & \cdots & \beta \rho_k \sigma_x^2 \\ \beta \sigma_x^2 & \sigma_x^2 + \sigma_1^2 & \rho_2 \sigma_x^2 + \sigma_{12} & \cdots & \rho_k \sigma_x^2 + \sigma_{1k} \\ \beta \rho_2 \sigma_x^2 & \rho_2 \sigma_x^2 + \sigma_{12} & \rho_2^2 \sigma_x^2 + \sigma_2^2 & \cdots & \rho_2 \rho_k \sigma_x^2 + \sigma_{2k} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \beta \rho_k \sigma_x^2 & \rho_k \sigma_x^2 + \sigma_{1k} & \rho_2 \rho_k \sigma_x^2 + \sigma_{2k} & \cdots & \rho_k^2 \sigma_x^2 + \sigma_k^2 \end{bmatrix}$$

where $Z = [y x_1 x_2 \dots x_k]$.

There are altogether $k(k+1)/2$ unknown parameters in Σ_{UU} , $k-1$ parameters in ρ , and the parameters β, σ_x^2 and σ_ϵ^2 . Because there are altogether $(k+1)(k+2)/2 + 1$ unknown parameters in Σ_{ZZ} , but only $(k+1)(k+2)/2$ pieces of observable information, they find that they are short one restriction in order to identify the parameter β .

Lubotsky and Wittenberg (2006:553) identify the vector ρ from the covariance between the dependent variable y and the proxies:

$$\rho_j = \frac{\text{cov}(y, x_j)}{\text{cov}(y, x_1)}.$$

Lubotsky and Wittenberg (2006:553) note that there are several ways through which to achieve identification of β : “any restriction on the covariance matrix of $X = [x_1 x_2 \dots x_k]$ will do so in principle. Zero restrictions on any σ_{1j} allow them to use x_j as an instrument for x_1 . More generally, a zero restriction on σ_{jh} allows them to use x_h as an instrument for x_j , but the resulting estimate would need to be rescaled to take account of the fact that x_j is not on the same scale as the latent variable x^* ”. Because Lubotsky and Wittenberg (2006:553) have an estimator for ρ_j they can easily achieve this. They have:

$$\beta = \frac{\text{cov}(y, x_h) \text{cov}(y, x_j)}{\text{cov}(x_j, x_h) \text{cov}(y, x_1)}.$$

According to Lubotsky and Wittenberg (2006:553) “the first factor is the instrumental variables estimator; the second is the GMM estimator of ρ_j ”. They now assume that no plausible restrictions apply and turn to the issue on how to optimally use the information contained in the proxies in order to minimise the attenuation bias.

Lubotsky and Wittenberg (2006:553) start by introducing some additional notation. Let

$$x^\delta = X\delta$$

be any linear combination of the proxy variables, where $X = [x_1 x_2 \dots x_k]$. By construction

$$X = x^* \rho' + U,$$

where $\rho' = [1 \rho_2 \dots \rho_k]$. It follows that

$$x^\delta = x^* \rho' \delta + U\delta,$$

and hence the structural model in equation 5.1 can be written as

$$y = \frac{\beta}{\rho' \delta} x^\delta + \varepsilon - \frac{\beta}{\rho' \delta} U\delta.$$

Lubotsky and Wittenberg's (2006:553) two-variable example above assumes that $\rho_1 = \rho_2 = 1$ and $\delta_1 + \delta_2 = 1$, which implies $\rho' \delta = 1$. In general, there is no reason why one might expect that $\rho' \delta = 1$. One could interpret a value of $\rho' \delta = \kappa \neq 1$ as a rescaling of the latent variable x^* or, equivalently, of the parameter β . In the presence of attenuation bias this rescaling could exacerbate or reduce the attenuation bias. In the absence of additional information, however, the direction of the impact is unknowable.

Lubotsky and Wittenberg's (2006:553) main result is “that simply including the proxy variables separately in a regression and then aggregating their coefficients produces the estimate with the minimum attenuation bias among the class of composite proxy variables in which $\rho' \delta = 1$. Other combinations of proxy variables in which $\rho' \delta = \kappa \neq 1$ may do better or worse, but it is not possible to characterise the bias without additional assumptions. However, they can map all these composites into the set where $\rho' \delta = 1$ ”.

A benefit of this procedure is its transparency. If it so happens that the null hypothesis is not true, then the regression is not invalid per se, only some of the assumptions that can be drawn from it. By contrast, data manipulation done before the regression can clearly not be undone by a doubtful reader (Lubotsky & Wittenberg, 2006).

5.3 METHODOLOGY

In order to compare principal component analysis to the multiple proxies proposal of Lubotsky and Wittenberg (2006), this thesis will use the following steps: the variable log Gross Domestic Product per capita income will firstly be regressed by all the variable proxies and then it will be regressed by the various indices (thus the single new variable for each of the three indices) as calculated in chapter 4. The only amendment this thesis makes to the multiple proxies interpretation analysis is that, as a substitute, this thesis will continue to use the residual value of each regression analysis rather than use the interpretation of the various coefficients, in light of simplicity for comparison needs. The general equations to be used are as follows:

$$\ln GDP_{percapita_{it}} = \alpha_{it} + \beta_{it}(\text{Proxies}_{it}) + \mu_{it} \quad (5.4)$$

$$\ln GDP_{percapita_{it}} = \alpha_{it} + \beta_{it}(\text{IndicesQoL}_{it}) + \mu_{it} \quad (5.5)$$

The reason for using multivariate analysis instead of univariate analysis is because, as was confirmed by Duclos, Sahn and Younger (2006), a set of univariate analyses done independently for each dimension of quality of life/well-being can conclude that the quality of life in for example, magisterial district A is lower than in magisterial district B while a multivariate analysis can conclude the opposite, and *vice versa*.

The key to these possibilities is the interaction of the various dimensions of well-being in the quality of life measure and their correlation in the sampled populations. Duclos, Sahn and Younger (2006) argue that a reasonable quality of life measure should allow the level of deprivation in one dimension to affect one's assessment of how much quality of life

improves if there is an improvement in another dimension. One-by-one comparisons of quality of life in the dimensions of education, health, natural beauty etc. cannot capture underlying interdependencies, whilst a multidimensional measure can.

5.4 COMPARISON BETWEEN PRINCIPAL COMPONENTS AND MULTIPLE PROXIES

In order to follow the same methodological route as that proposed by Lubotsky and Wittenberg (2006) transformation of the principal equation as estimated in section 4.4 (cited in this chapter as 5.5) is necessary. The transformation of this principal equation can be written as follows:

$$IndicesQoL_{it} = \alpha_{2it} + \beta_{2it} (\ln GDPpercapita_{it}) + \mu_{2it} \quad (5.6)$$

If one rearranges equation 5.6, it can be seen that:

$$IndicesQoL_{it} = (\ln GDPpercapita_{it}) / \beta_{1it} - (\alpha_{1it} + \mu_{1it}) / \beta_{1it} \quad (5.7)$$

Or, put another way:

$$IndicesQoL_{it} = \alpha_{3it} + \beta_{3it} (\ln GDPpercapita_{it}) + \mu_{3it} \quad (5.8)$$

This shows that the two equations are indeed the same with $\beta_{3it} = \beta_{2it} / \beta_{1it}$.

Tables 5.1, 5.3 and 5.5 are included in this chapter purely for completeness/supporting evidence and to indicate that the transformed equation 5.8 renders the same results as those obtained in section 4.4. The top ten magisterial districts for all three indices; demographic, geography and human development have remained the same.

Table 5.1: Ranking by Demographic Index; 1996 and 2004 (out of 354 magisterial districts)

Place	Ranking for 1996	Ranking for 2004
Pretoria	1	1
Johannesburg	2	2
Durban	3	5
Port Elizabeth	4	4
Soweto	5	3
Inanda	6	6
Wynberg	7	8
Pietermaritzburg	8	7
Randburg	9	12
Pinetown	10	11

Table 5.1 shows that when using the Demographic Index, Pretoria is ranked first in the years 1996 and 2004. As mentioned in chapter 4, the fact that Soweto and Inanda are under the top ten cities is as expected because Soweto alone has over 1,100,000 people and variables such as size of population, number of households etc. are used as determining factors in the index.

Table 5.2: Ranking by demographic variables according to multiple proxies analysis; 1996 and 2004 (out of 354 magisterial districts)

Place	1996 Ranking	2004 Ranking
Pretoria	1	1
Durban	2	4
Johannesburg	3	2
Wynberg	4	6
Randburg	5	3
Germiston	6	5
Cape Town	7	8
Roodepoort	8	7
Bellville	9	10
Port Elizabeth	10	9

Table 5.2 shows the top ten magisterial districts according to the multiple proxies analysis on the demographic variables. As can be seen, all ten of the magisterial districts that had the highest non-economic quality of life in 1996 still remain in the top ten in 2004, although they have changed their individual positions somewhat.

Table 5.3: Ranking by Geography Index; 1996 and 2004 (out of 354 magisterial districts)

Place	Ranking for 1996	Ranking for 2004
Calvinia	1	1
Gordonia	2	2
Namaqualand	3	3
Carnarvon	4	5
Kenhardt	5	4
Ubombo	6	6
Williston	7	7
Hlabisa	8	8
Ingwavuma	9	10
Ceres	10	9

Once again, when ranking the 354 magisterial districts according to the Geographical Index, the outcome of the rankings has radically changed. As can be seen from table 5.3, the magisterial district that is ranked first is Calvinia both in 1996 as well as in 2004. What is of interest here is to note that most of the top ten magisterial districts are in the Northern/Western Cape Province, which has the second highest km² of forest and waterbodies, which can be indicative of the province's natural beauty thus enhancing and contributing positively to quality of life (see chapter 3 and chapter 4 for further reference).

Table 5.4: Ranking by geographical variables according to multiple proxies analysis; 1996 and 2004 (out of 354 magisterial districts)

Place	1996 Ranking	2004 Ranking
Phalaborwa	1	1
Potgietersrus	2	3
Ellisras	3	2
Thabazimbi	4	5
Calvinia	5	4
Soutpansberg	6	6
Messina	7	7
Namaqualand	8	8
Giyani	9	231
Warmbad	10	63

Table 5.3 shows the top ten magisterial districts as depicted by multiple proxies analysis on the geographic variables used in the principal components analysis. As can be seen, eight of the top ten magisterial districts in 1996 remained in the top ten in 2004, although two magisterial districts, Giyani and Warmbad fell significantly in their individual rankings.

Table 5.5: Ranking by Human Development Index; 1996 and 2004 (out of 354 magisterial districts)

Place	Ranking for 1996	Ranking for 2004
Cape Town	1	3
Germiston	2	2
Pretoria	3	1
Randburg	4	4
Simonstown	5	7
Bellville	6	6
Johannesburg	7	5
Durban	8	9
Somersetwest	9	11
Roodepoort	10	8

In table 5.5, it can be seen that the ranking order has not changed very much over the nine year period. Cape Town, Germiston and Pretoria have stayed in the top three positions although Cape Town and Pretoria has changed rankings.

Table 5.6: Ranking by human development variables according to multiple proxies analysis; 1996 and 2004 (out of 354 magisterial districts)

Place	1996 Ranking	2004 Ranking
Cape Town	1	1
Pretoria	2	3
Kriel	3	6
Johannesburg	4	2
Durban	5	4
Bellville	6	9
Sasolburg	7	7
Germiston	8	10
Randburg	9	8
Nelspruit	10	11

Table 5.6 shows the top ten magisterial districts according to human development variables as obtained through multiple proxies analysis. All of the top ten magisterial districts except Nelspruit remained in the top ten positions over the period 1996-2004.

The results shown in tables 5.2, 5.4 and 5.6 were obtained by equation 5.4. Table 5.7, shows the comparison of the rankings (for 2004, the results of 1996 can be seen in the appendix) as determined by the Demographic Index and the rankings as determined by the multiple proxies analysis. The reason for presenting the following comparisons in terms of the results obtained through principal components (chapter 4) is to maintain a uniform presence throughout this thesis and is unbiased towards one or the other methodology.

Table 5.7: Comparison between residual value rankings by Demographic Index and residual for multiple proxies; 2004 (dependent variable: log of per capita income)

Place	Ranking by residual of Demographic Index	Ranking by residual of multiple proxies
Pretoria	1	1
Johannesburg	2	2
Soweto	3	30
Port Elizabeth	4	9
Durban	5	4
Inanda	6	229
Pietermaritzburg	7	247
Wynberg	8	6
Mitchellsplain	9	264
Vanderbijlpark	10	41

(For 1996's results see the Appendix)

Table 5.7 shows that five of the original top ten magisterial districts (determined through principal components analysis) are still considered as being amongst the top ten best districts to reside in when determined by the multiple proxies analysis. It is of interest to note that Pretoria is ranked first and Johannesburg second according to both methods. Port Elizabeth, Durban and Wynberg are also still in the top ten. Only three magisterial districts, namely Inanda, Pietermaritzburg and Mitchellsplain lost their place significantly and dropped in the rankings by an average of 214 places.

Table 5.8 shows only the magisterial districts that were ranked in the top ten according to both methodological methods.

Table 5.8: Regions both in the top ten as determined by the multiple proxies and principal components analysis for demographic quality of life; 2004

Multiple proxies (demographic variables)	Principal components (Demographic Index)
Pretoria	Pretoria
Johannesburg	Johannesburg
Port Elizabeth	Port Elizabeth
Durban	Durban
Wynberg	Wynberg

Table 5.9: Comparison between residual value rankings by Geography Index and residual for multiple proxies; 2004 (dependent variable: log of per capita income)

Place	Ranking by residual of Geography Index	Ranking by residual of multiple proxies
Calvinia	1	4
Gordonia	2	120
Namaqualand	3	8
Kenhardt	4	61
Carnarvon	5	48
Ubombo	6	244
Williston	7	210
Hlabisa	8	344
Ceres	9	23
Ingwavuma	10	104

(For 1996 results see the Appendix)

Table 5.9 shows the comparison between the Geography Index rankings (as determined through principal components analysis) and the rankings as determined by the multiple proxies analysis. It can be seen that there are only two magisterial districts, Calvinia and Namaqualand that can still be considered as being under the top ten districts to live in from a geographical perspective. The fact that these two regions have come out in the top rankings using both methods suggests that one can have confidence in concluding that these

two places do indeed offer a high non-economic quality of life from a geographical and environmental perspective in South Africa.

From table 5.9, it can also be seen that most of the original top ten magisterial districts can now be found in the lowest quarter of the rankings. This shows that use of the multiple proxies approach can lead to widely divergent results. Table 5.10 shows only those magisterial districts that obtained places in the top ten according to both methodological methods.

Table 5.10: Regions both in the top ten as determined by the multiple proxies and principal components analysis for geographic quality of life; 2004

Multiple proxies (geography variables)	Principal components (Geography Index)
Calvinia	Calvinia
Namaqualand	Namaqualand

Table 5.11: Comparison between residual value rankings by Human Development Index and residual for multiple proxies; 2004 (dependent variable: log of per capita income)

Place	Ranking by residual of HDI	Ranking by residual of multiple proxies
Pretoria	1	3
Germiston	2	10
Cape Town	3	1
Randburg	4	8
Johannesburg	5	2
Bellville	6	9
Somersetwest	7	51
Roodepoort	8	27
Durban	9	4
Wynberg	10	20

(For 1996 results see the Appendix)

Table 5.11 shows the rankings obtained from the residual of the Human Development Index as well as those obtained by making use of the multiple proxies analysis. Here it can be seen that a minimum of seven of the original top ten magisterial districts are still in the top ten, given that their individual rankings have been altered somewhat. Pretoria, Germiston, Cape Town, Randburg, Johannesburg, Bellville and Durban are still considered amongst the top ten magisterial districts to live in as far as the HDI is concerned, according to multiple proxies analysis. Table 5.12 shows those magisterial districts that obtained a place in the top ten of both methodological methods used.

Table 5.12: Regions both in the top ten as determined by the multiple proxies and principal components analysis for human development; 2004

Multiple proxies (human development variables)	Principal components (HDI)
Cape Town	Cape Town
Johannesburg	Johannesburg
Pretoria	Pretoria
Durban	Durban
Randburg	Randburg
Bellville	Bellville
Germiston	Germiston

5.5 CONCLUSION

5.5.1 Interpretation of results

In this chapter, the aim was to compare the results of the various quality of life indices obtained through making use of the principal components analysis as well as the new 'superior' multiple proxies interpretation analysis (as introduced by Lubotsky & Wittenberg, 2006).

After implementing both methods, it was found that when comparing the Demographic Index and the multiple variables pertaining to man and everything man-made, that Pretoria

came out on top, Johannesburg second and Port Elizabeth ninth. Durban (fourth) and Wynberg (sixth) were also in the top ten of the multiple proxies analysis.

When a comparison was made by using the Geography Index and the entire set of variables pertaining to the geographic beauty or attraction of a district, it was found that only two of the original top ten magisterial districts (determined by the principal component analysis) were still in the top ten of the multiple proxies analysis, namely Calvinia (fourth) and Namaqualand (eighth).

The results of the findings relevant to the Human Development Index and the multiple proxies analysis showed that no less than seven of the original top ten magisterial districts remained in the new top ten, given that their individual positions changed somewhat. The districts that remained in the top ten as determined by the multiple proxies analysis were Pretoria (third), Germiston, (tenth), Cape Town (first), Randburg (eighth), Johannesburg (second), Bellville (ninth) and Durban (fourth).

5.5.2 Conclusions

This chapter set out to explore a possible alternative measure, as introduced by Lubotsky and Wittenberg (2006), to principal components which were expected to render better and more accurate results than those obtained in chapter 4.

This chapter draws the conclusion that principal components analysis as well as the newly proposed multiple proxies analysis as introduced by Lubotsky and Wittenberg (2006) both render satisfactory results. Due to the robustness of the concept of quality of life, many multidimensional comparisons can be made.

As stated by Duclos *et al.* (2006:943) any index, whether it is the most popularly used HDI or any one of the indices discussed in chapter 2 and 4, “*requires a specific aggregation rule to sum up the components of the index, and any such rule is necessarily arbitrary. This leaves open the possibility that two equally valid rules for aggregating across several dimensions of well-being/quality of life could lead to contradictory conclusions about which groups have higher/lower quality of life*”.

Taking the above into consideration, and after viewing the results rendered by the comparison between both methodologies, three conclusions can be drawn:

- Firstly, when seeking demographic quality of life, the top magisterial districts to reside in are Pretoria, Johannesburg, Port Elizabeth, Durban and Wynberg.
- Secondly, when determining quality of life according to the geographical beauty and even climate, the two best magisterial districts to live in are Calvinia and Namaqualand.
- Thirdly, when using human development to determine the quality of life of a region, as measured by the HDI, the best magisterial districts to reside in are Cape Town, Johannesburg, Pretoria, Durban, Randburg, Bellville and Germiston.

CHAPTER 6

SUMMARY, CONCLUSIONS AND FURTHER RESEARCH

6.1 SUMMARY

Economic development is ultimately concerned about improvements in the quality of life. In this thesis, the non-economic quality of life on a sub-national (magisterial district) level in South Africa was measured, correlations between economic and non-economic quality of life noted, and changes in non-economic quality of life over time analysed.

This thesis began by providing an overview of the history of the concept of quality of life and how it has evolved over the past five and a half decades. After discussing the various components associated with quality of life, it was pointed out that there are two very distinct approaches towards the computation of quality of life. They are respectively subjective and objective in nature.

Subjective quality of life is measured by asking the respondent either one specific question such as, 'how do you feel about your life?' or by letting him/her choose and rank a series of domains such as job creation, education, and emotional needs.

In measuring one's objective quality of life, the emphasis is placed more on the amount of money one has to better his/her quality of life and thus the most widely used indicators in determining economic quality of life is, for example, income per capita, and number of people living below \$1 a day (absolute poverty).

There is considerable literature on the subjective quality of life for individuals as well as on the economic quality of life. Despite this, there remains a huge gap to be filled when discussing the relatively new concept of the non-economic quality of life (which is objective in nature). This gap in the literature on the non-economic quality of life was therefore considered to be the catalyst for the various studies that were undertaken in this thesis.

As South Africa's population is characterised by distinct economic and social contrasts, not only in the material gaps between particular racial groups, but also in comparing quality of life between magisterial districts/regions, it was the objective of this thesis to empirically construct a quality of life index that could be applied to determine the gap between, and rank South Africa's 354 magisterial districts' quality of life.

This was done by achieving a number of secondary objectives:

- In chapter 2, this thesis discussed the concept of quality of life and distinguished between economic and non-economic quality of life;
- In chapters 3 and 4, the non-economic quality of life in South Africa's metropolitan regions, as well as in all 354 magisterial districts were measured and compared;
- In chapter 4, the various cities and towns in South Africa in terms of non-economic quality of life were ranked from best to worst performers;
- In chapter 4, the changes in the non-economic quality of life over time was determined and discussed;
- Chapter 5 was devoted to critiquing the use of principal components analysis in deriving indices; and
- This chapter will provide conclusions and recommendations for further research into non-economic quality of life as well as into evolving the nature of the non-economic quality of life in South Africa.

6.2 CONCLUSIONS

In chapter 3, this thesis considered the quality of life in South Africa's metropolitan cities, firstly because the South African population is rapidly urbanising and the quality of life is increasingly dependent on what the cities can offer. Also, according to Møller (2004), "*South Africa serves as a social laboratory for studying quality of life in developing countries. It is a nation characterised by varying levels of development, vast income inequalities, and cultural diversity in terms of language, religion, ethnicity and settlement patterns. It is this rich mix that lends itself to experimenting with the development of concepts and instruments to adequately capture the essence of quality of life and its measurement.*"

Chapter 3 considered economic and non-economic indicators of the quality of life as well as indicators of the quantity of life. Chapter 3 also confirmed that it is important whether the quality of life is measured from an economic or from a non-economic point of view. When economic quality of life measures were used, specifically per capita income, the ranking in 2004 was Johannesburg, Tshwane, Ekurhuleni, Cape Town, eThekweni (Durban) and the Nelson Mandela Metro (Port Elizabeth). The country's largest agglomeration and its manufacturing base deliver the highest per capita income. However, when factors other than income are considered, the coastal cities tend to offer a higher quality of life on margin, although cities located in the interior such as Johannesburg and Ekurhuleni have been found to have started to catch up with coastal cities in terms of quality of life. When residuals from the Human Development Index (HDI) are used as a measure of non-economic quality of life (i.e. the proportion of HDI not explained by variation in incomes), coastal cities tend to obtain generally higher rankings, with Cape Town ranked first, followed by Ekurhuleni, eThekweni (Durban), the Nelson Mandela Metro (Port Elizabeth) and then Johannesburg and Tshwane. An own composite index of non-economic quality of life constructed in this particular chapter rendered a similar ranking, but with the major difference of finding that Johannesburg ranks in second place behind Cape Town.

Finally, the findings in chapter 3 suggest that cities can play an important role in improving human quality of life in developing countries, and that population and urban dynamics in developing countries will cause changes in the relative quality of life between various cities.

In chapter 4, this thesis constructed two own indices according to principal components analysis, which were purely objective and did not contain an economic measure of any sort. The first thing to conclude from this chapter is that when working with indices, a rational analysis of the variables should be done. Following the arguments of Johansson (2002) and Erickson (1993), care should be taken not to "combine and compare apples and oranges". Chapter 4 followed their example and made a split between purely geographical variables and variables pertaining to man and everything man-made. This resulted in two indices, a Demographic Index and a Geography Index.

As each of these indices has a different focus, the following conclusions can be drawn from each.

When monetary and thus economic quality were taken into account, the top ten regions in South Africa to live in, in 2004, were as follows: Pretoria, Germiston, Cape Town, Randburg, Johannesburg, Bellville, Simonstown, Roodepoort, Durban and Wynberg.

When the non-economic quality of life was considered, a distinction had to be made between the Demographic and Geography Indices. According to the Demographic Index, the top ten regions in 2004 were as follows: Pretoria, Johannesburg, Soweto, Port Elizabeth, Durban, Inanda, Pietermaritzburg, Wynberg, Mitchellsplain and Vanderbijlpark. It is important to note that care should be taken when interpreting these results because variables such as the number of people, number of households etc. are included in this index and as a region grows in population size the more negative consequences such as a higher crime rate can be associated with the particular region.

Finally, in chapter 4, when determining the quality of life according to the Geography Index the top ten regions in 2004 to reside in were: Calvinia, Gordonia, Namaqualand, Kenhardt, Carnarvon, Ubombo, Williston, Hlabisa, Ceres and Ingwavuma. The Geography Index measures a region's natural beauty which, according to Wey (2000), contributes positively to one's perceived quality of life.

In chapter 5, the aim was to compare the results of the various quality of life indices obtained through making use of the principal components analysis as well as the new 'superior' multiple proxies analysis (as introduced by Lubotsky & Wittenberg, 2006).

After implementing both methods, it was found that when comparing the Demographic Index and the multiple variables pertaining to man and everything man-made, that Pretoria came out on top, Johannesburg (second), Port Elizabeth (ninth), Durban (fourth) and Wynberg (sixth).

When a comparison was made by using the Geography Index and the entire set of variables pertaining to the geographic beauty or attraction of a district, it was found that only two of the original top ten magisterial districts (determined by the principal component analysis) were still in the top ten of the multiple proxies analysis, namely Calvinia (fourth) and Namaqualand (eighth).

The results of the findings relevant to the Human Development Index and the multiple proxies analysis showed that no less than seven of the original top ten magisterial districts remained in the new top ten, given that their individual positions changed. The districts that remained in the top ten as determined by the multiple proxies analysis were Pretoria (third), Germiston, (tenth), Cape Town (first), Randburg (eighth), Johannesburg (second), Bellville (ninth) and Durban (fourth).

It was the conclusion of chapter 5 that principal components analysis as well as the newly proposed multiple proxies analysis as introduced by Lubotsky and Wittenberg (2006) both render satisfactory results. Due to the robustness of the concept of quality of life many multidimensional comparisons could be made.

As stated by Duclos, Sahn and Younger (2006:943), any index, whether it is the most popularly used HDI or any one of the indices discussed in chapter 2 and 4, *“requires a specific aggregation rule to sum up the components of the index, and any such rule is necessarily arbitrary. This leaves open the possibility that two equally valid rules for aggregating across several dimensions of well-being/ quality of life could lead to contradictory conclusions about which groups have higher/ lower quality of life”*.

Thus, by taking the above into consideration and after viewing the results rendered by the comparison between both methodologies, three final conclusions could be drawn:

- Firstly, when seeking demographic quality of life, the top magisterial districts to reside in are Pretoria, Johannesburg, Port Elizabeth, Durban and Wynberg.
- Secondly, when determining quality of life according to the geographical beauty and even climate, the two best magisterial districts to live in are Calvinia and Namaqualand.

- Thirdly, when using human development to determine the quality of life of a region, as measured by the HDI, the best magisterial districts to reside in are Cape Town, Johannesburg, Pretoria, Durban, Randburg, Bellville and Germiston.

6.3 CONTRIBUTION AND FURTHER RESEARCH

The World Bank's (1999) new urban strategy for cities in the Third World focuses on liveability, competitiveness, good governance and bankability, four characteristics that are seen as being essential in promoting the welfare of its residents. Poverty and quality of life indices can therefore be seen as an objective measure to assist society/government in identifying regions for policy interventions.

Considering changes in non-economic quality of life indices between 1996 and 2004 as found in chapter 4 and 5, the conclusion can be drawn that the South African government has been successful to a degree in addressing non-economic quality of life. Social amenities such as health care, education, housing, water and sanitation appear to have had a significant positive effect on people's perceived non-economic quality of life in areas that were deprived in 1996.

This thesis set out to construct an objective non-economic quality of life index for South Africa's 354 magisterial districts. This construction is the first of its kind for sub-national regions and the constructed indices have helped to contribute to the "unanswered questions" on what can be perceived as non-economic quality of life.

In this thesis it was found that variables such as the size of the population, the number of households, the percentage of population older than 75 years of age, number of population who have completed their high school education, number of economic active people, number of unemployed people, size of the area, the percentage of the specific region dedicated to waterbodies, wetlands as well as herbland together with average annual rainfall, temperature and hours of sunshine can be seen as being an integral part of what people perceive of as non-economic quality of life.

Future research should be aimed at collecting data over a longer period in order to construct not only an index for specific regions, but also to determine how the quality of life has changed within a specific region. One can also construct similar quality of life indices (using the same variables) for other developing countries and determine how differences in internal policies and external circumstances can influence spatial inequalities in the non-economic quality of life. One can also combine the non-economic quality of life indices as constructed in this thesis with data on poverty or the deprivation indices of South Africa and developed and positively contribute to the field of spatial poverty traps in developing/transition countries.

APPENDICES

APPENDIX A: CHAPTER 4

Figure 4.10: Relationship between per capita income and Demographic Index; 1996

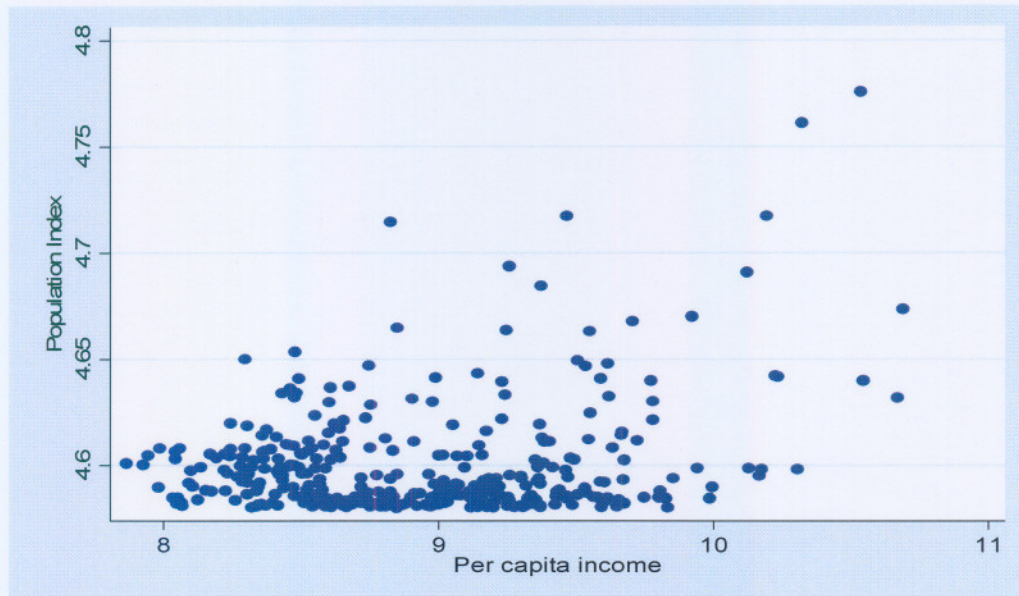


Figure 4.11: Relationship between per capita income and Geography Index; 1996

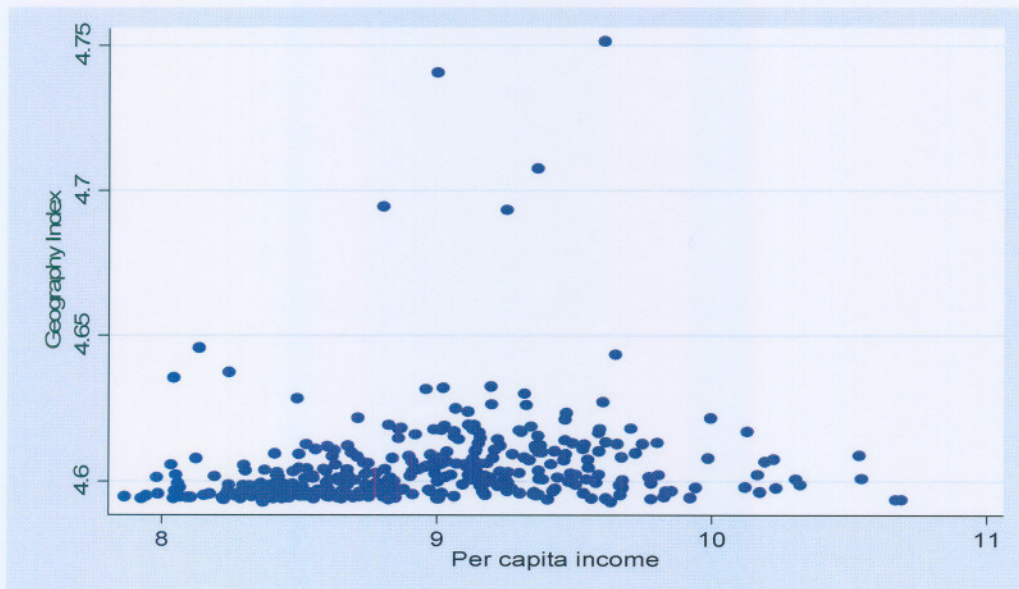
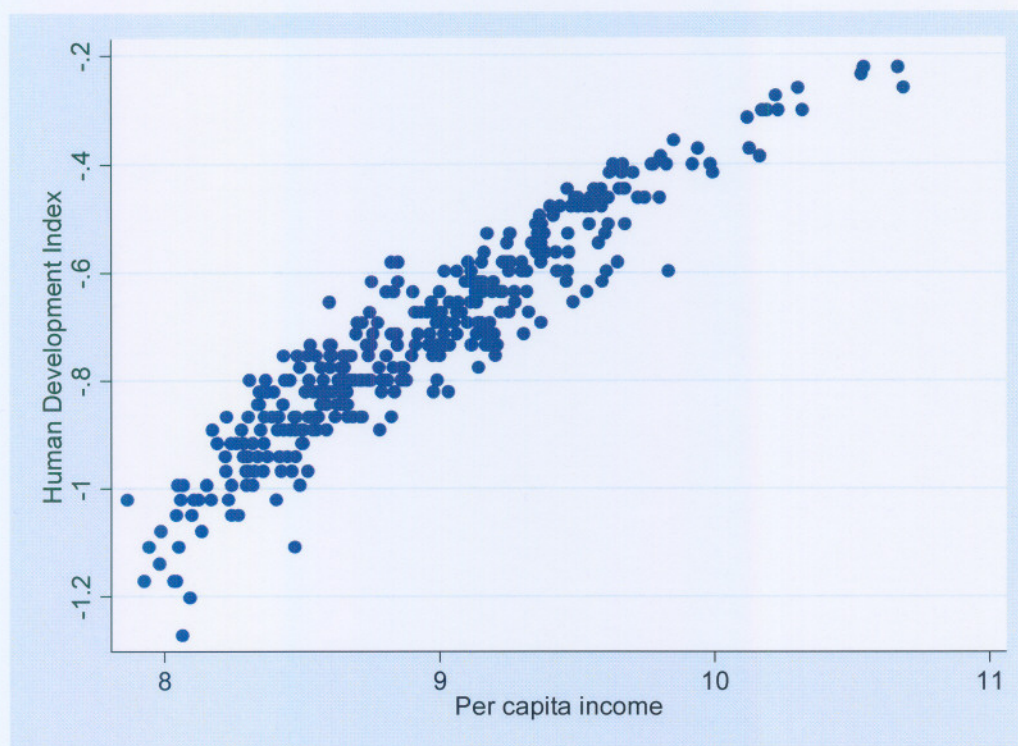


Figure 4.12: Relationship between per capita income and HDI; 1996



APPENDIX B: CHAPTER 5

Table 5.13: Comparison between residual value rankings by Demographic Index and residual for multiple proxies; 1996 (dependent variable: log of per capita income)

Place	Ranking by residual of Demographic Index	Ranking by residual of multiple proxies
Pretoria	1	1
Johannesburg	2	3
Durban	3	2
Port Elizabeth	4	10
Soweto	5	252
Inanda	6	237
Wynberg	7	4
Pietermaritzburg	8	199
Randburg	9	5
Pinetown	10	16

Table 5.14: Comparison between residual value rankings by Geography Index and residual for multiple proxies; 1996 (dependent variable: log of per capita income)

Place	Ranking by residual of Geography Index	Ranking by residual of multiple proxies
Calvinia	1	5
Gordonia	2	134
Namaqualand	3	8
Carnarvon	4	30
Kenhardt	5	77
Ubombo	6	354
Williston	7	271
Hlabisa	8	338
Ingwavuma	9	45
Ceres	10	57

Table 5.15: Comparison between residual value rankings by Human Development Index and residual for multiple proxies; 1996 (dependent variable: log of per capita income)

Place	Ranking by residual of HDI	Ranking by residual of multiple proxies
Cape Town	1	1
Germiston	2	8
Pretoria	3	2
Randburg	4	9
Simonstown	5	34
Bellville	6	6
Johannesburg	7	4
Durban	8	5
Somersetwest	9	28
Roodepoort	10	24

REFERENCES

- ALKIRE, S. 2002. Dimensions of human development. *World development*, 30(2):181-205.
- ANAND, S. & SEN, A. K. 1992. Human Development Index: methodology and measurement. New York: UNDP. (Background paper for Human Development Report, 1993.)
- ANAND, S. & SEN, A. K. 2000. The income component of the Human Development Index. *Journal of human development*, 1(1):83-106.
- ANDREWS, F. M. & WITHEY, S. B. 1976. Social indicators of well-being: Americans' perceptions of life quality. Plenum Press: New York.
- BECKER, G. S., PHILIPSON, T. J. & SOARES, R. R. 2005. The quantity and quality of life and the evolution of world inequality. *American economic review*, 95(1):277 – 291.
- BELL, M. E. & BOWMAN, J. H. 2002. Property taxes in South Africa: challenges in the post-apartheid era. Cambridge, Mass.: Lincoln Institute of Land Policy.
- BERNSTEIN, H. 2003. Land reform in Southern Africa in a world-historical perspective. *Review of African political economy*, 30(96):203-226.
- BINNS, T. & NEL, E. 2002. Devolving development: integrated development planning and developmental local government in post-apartheid South Africa. *Regional studies*, 36(8):921-932.
- BLOOM, D. & SACHS, J. 1998. Geography, demography and economic growth in Africa. *Brooking papers on economic activity*, 2:207-295.
- BUTHELEZI, A. & DOLLERY, B. 2004. An exploratory analysis of local government failure in South Africa. *Journal for studies in economics and econometrics*, 28(2):91-105.

CAHILL, M. B. 2005. Is the Human Development Index redundant? *Eastern economic journal*, 31(1):1-5.

CAMERON, R. & SEWELL, B. 2003. The implementation of performance management in the Cape Town municipality: 1996-2000. *South African journal of economic and management sciences*, 6(2):243-261.

CHASOMERIS, M. 2005. Assessing South Africa's shipping costs. *Journal of development perspectives*, 1(1):125-141.

CLARK, D. A. 2003. Concepts and perceptions of human well-being: some evidence from South Africa. *Oxford development studies*, 31(2):173-196.

CORNWALL, K. & INDER, B. 2004. Migration and unemployment in South Africa: when motivation surpasses the theory. *Monash econometrics and business statistics working papers*, 2(4):1-31.

CUMMINS, R. A., McCABE, M. P., ROMEO, Y. & GULLONE, E. 1994. The comprehensive quality of life scale: instrument development and psychometric evaluation on tertiary staff and students. *Educational and psychological measurement*, 54:372-382.

CUMMINS, R. A. 1996. The domains of life satisfaction: an attempt to order chaos. *Social indicators research*, 38:303-328.

DASGUPTA, P. & WEALE, M. 1992. On measuring the quality of life. *World development*, 20:119-131.

DE SWARDT, C., PUOANE, T., CHOPRA, M. & DU TOIT, A. 2005. Urban poverty in Cape Town. *Environment and urbanisation*, 17(2):101 – 112.

DIENER, E. & DIENER, C. 1995. The wealth of nations revisited: income and quality of life. *Social indicators research*, 36(3):275-286.

DUCLOS, J., SAHN, D. E. & YOUNGER, S. D. 2006. Robust multidimensional poverty comparisons. *The economic journal*, 116:943-968.

ECONOMIST INTELLIGENCE UNIT. 2005. The Economist Intelligence Unit's quality of life index. [Web:] <http://www.economist.com/media/pdf/QUALITYofLIFE.pdf> [Date of access: 14 April, 2006].

ERICKSON, R. 1993. Descriptions of inequality: the Swedish approach to welfare research. (In Nussbaum, M & Sen, A. The quality of life. Oxford: Clarendon Press. p 67-84.)

FAY, M. & OPAL, C. 2000. Urbanization without growth: a not so uncommon phenomenon. Washington, D.C.: World Bank. (*Policy research working paper 2412*.)

FREIRE, M. & POLESE, M. 2003. Connecting cities with macroeconomic concerns: the missing link? Washington D.C.: World Bank

FREY, B. S. & STUTZER, A. 2002. Happiness and economics. Princeton N. J.: Princeton University Press.

GASPER, D. 2004. Human well-being: concepts and conceptualizations. Helsinki: United Nations University. (*WIDER discussion paper, no. 2004/06*.)

GLAESER, E. L., LAIBSON, D. I., SCHEINKMAN, J. A. & SOUTTER, C. L. 2000. Measuring trust. *Quarterly journal of economics*, 115:811-846.

GRIFFIN, J. P. 1986. Well-being: its meaning, measurement and moral importance. Oxford: Clarendon Press.

GRIFFIN, J. P. 1991. Against the taste model. (*In* Elster, J. & Roemer, J. Interpersonal comparisons of well-being. Cambridge: Cambridge University Press. p 45-69.)

HAGERTY, M. R. & LAND, K. C. 2006. Constructing summary indices of quality of life: a model for the effect of heterogeneous importance weights. Chicago: Illinois. Paper presented at the American sociological association, August 16-19, 2006.

HARRISON, P., HUCHZERMEYER, M. & MAYEKISO, M. *eds.* 2003. Confronting fragmentation: housing and urban development in a democratising society. Lansdowne: University of Cape Town Press.

HARTLEB, T. 2005. Rapid urbanization a serious problem. Mail and guardian. [Web:] <http://www.mg.co.za> [Date of access: 14 October, 2006].

HORN, A. C. 2002. New perspectives on urban segregation and desegregation in post-resolution South Africa. (*In* Schnell, I. & Ostendorf, W., *eds.* Studies in segregation and desegregation. Ashgate: Aldershot. p. 247-284).

JOHANSSON, S. 2002. Conceptualizing and measuring quality of life for national policy. *Social indicators research*, 58:13-32.

KANBUR, R. & VENABLES, A. J. 2005. Rising spatial disparities and development. Helsinki: United Nations University. (*WIDER Policy brief, no. 3.*)

KANBUR, R., VENABLES, A. J. & WAN, G. 2005. Introduction to the spatial issue: spatial inequality and development in Asia. *Review of development economics*, 9(1):1-4.

KOTZE, N. J. & DONALDSON, S. E. 1998. Residential desegregation in two South African cities: a comparative study of Bloemfontein and Pietersburg. *Urban studies*, 35:467-477.

KLINE, P. 2002. An easy guide to factor analysis. Library of Congress Cataloguing in Publication Data, Great Britain, Padstow, Cornwall.

LE ROUX BOOYSEN, F. 2003a. The extent of, and possible explanations for, provincial disparities in progress on reconstruction and development in South Africa. *Development Southern Africa*, 20(1):21-48.

LE ROUX BOOYSEN, F. 2003b. Urban-rural inequalities in health care delivery in South Africa. *Development Southern Africa*, 20(5):659-674.

LOTTER, J. C. 2002. Urban economic empowerment in the greater Pretoria area: the continuation of history? *South African journal of economics*, 70(2):347-368.

LUBOTSKY, D. & WITTENBERG, M. 2006. Interpretation of regressions with multiple proxies. *The review of economics and statistics*, 88(3):549-562.

MARAIS, L. & KRIGE, S. 2000. Who received what, where in the Free State? an assessment of post-apartheid housing delivery and policy (1994-98). *Development Southern Africa*, 17(4):603-619.

MAURO, P. 1995. Corruption and growth. *Quarterly journal of economics*, 110(3):681-712.

MAY, J., ed. 1998. Poverty and inequality in South Africa. Report prepared for the office of the Executive Deputy President and the Inter-Ministerial Committee for Poverty and Inequality.

McCREA, R., SHYY, T. & STIMSON, R. 2006. What is the strength of the link between objective and subjective indicators of urban quality of life? *Applied research in quality of life*, 1:79-96.

McGILLIVRAY, M. 1991. The Human Development Index: yet another redundant composite development indicator? *World development*, 19(10):1461-1468.

McGILLIVRAY, M. 2005. Measuring non-economic well-being achievement. *Review of income and wealth*, 51(2):337-364.

McGILLIVRAY, M. 2006. Inequality, poverty and well-being. (*In* Inequality, poverty and well-being. Studies in development economics and policy, United Nations University, World Institute for Development Economics Research, Finland: Helsinki).

McGILLIVRAY, M. & SHORROCKS, A. 2005. Inequality and multidimensional well-being. *Review of income and wealth*, 51(2):193-199.

McGILLIVRAY, M. & WHITE, II. 1993. Measuring development? The UNDP's Human Development Index. *Journal of international development*, 5(2):183-192.

MØLLER, V. 1989. Can't get no satisfaction: quality of life in the 1980s. *Indicator South Africa* 7(1):43- 46.

MØLLER, V. 1992a. Applications of subjective well-being measures in quality of life surveys: South African case studies. Centre for social and development studies, University of Natal, Durban. (*CSDS Working Paper* 5.)

MØLLER, V. 1992b. A place in the sun: quality of life in South Africa. *Indicator South Africa* 9(4):101-108.

MØLLER, V. 1994. Post-election euphoria. *Indicator South Africa* 9(4):27-32.

MØLLER, V. 1995a. Indicators for Africa: the October household survey. *Indicator South Africa* 12(3):86-90.

MØLLER, V. 1995b. Voter education and older African first-time voters in South Africa's 1994 elections. *Southern African journal of gerontology* 4(1):3-12.

MØLLER, V. 1995c. Waiting for Utopia: quality of life in the 1990s. *Indicator South Africa* 13(1):47-54.

MØLLER, V., *ed.* 1996. Perceptions of development in KwaZulu-Natal: a subjective indicator study. Durban: Indicator Press.

MØLLER, V., *ed.* 1997. Quality of life in South Africa. Dordrecht, the Netherlands: Kluwer Academic Publishers.

MØLLER, V. 1998. Quality of life in South Africa: post-apartheid trends. *Social indicators research* 43(1- 2):27-68.

MØLLER, V. 1999. South African quality of life trends in the late 1990s: major divides in perceptions. *Society in transition*, 30(2):93-105.

MØLLER, V. 2000. Happiness trends under democracy: where will the new South African set-level come to rest? *Journal of happiness studies*, 2:33-53.

MØLLER, V. 2000. Measuring quality of life in Durban, South Africa. *School of building and real estate*, 2:518-530.

MØLLER, V. 2001a. Monitoring quality of life in cities: the Durban case. *Development Southern Africa*, 18(2):217-238.

MØLLER, V. 2004. Researching quality of life in a developing country: lessons from the South African case. Delmenhorst, Germany. Paper prepared for the Hanse workshop on researching well-being in developing countries, 2-4 July 2004. [Web:] <http://www.weldev.org.uk/news/hanse-summaries/bremen.htm> [Date of access: 15 June, 2006].

- MØLLER, V. & DEVEY, R. 2003. Trends in living conditions and satisfaction among poorer older South Africans: objective and subjective indicators of quality of life in the October household survey. *Development Southern Africa*, 20(4):457-476.
- MØLLER, V., DICKOW, H. & HARRIS, M. 1999. South Africa's "rainbow people", national pride, and happiness. *Social indicators research* 47(3):245-280.
- MØLLER, V. & HANF, T. 1995. Learning to vote. University of Natal. Durban: Indicator Press.
- MØLLER, V. & PILLAY, E. 1998. Living in Durban in 1998: perceptions of quality of life. Institute of social and economic research, Rhodes University and Medway Search, Durban.
- MØLLER, V. & SCHLEMMER, L. 1983. Quality of life in South Africa: towards an instrument for the assessment of quality of life and basic needs. *Social indicators research*, 12(3):225-279.
- MØLLER, V., SCHLEMMER, L. & DU TOIT, S.H.C. 1987. Quality of life in South Africa: measurement and analysis. Pretoria: Human sciences research council, report S-167.
- MØLLER, V. & SCHLEMMER, L. 1989. South African quality of life: a research note. *Social indicators research*, 21:279-291.
- MORRIS, A. 1999. Tenant-landlord relations, the anti-apartheid struggle and physical decline in Hillbrow, an inner-city neighbourhood in Johannesburg. *Urban studies*, 36:509-526.
- MORRIS, D. 1979. Measuring the conditions of the world poor, the Physical Quality of Life Index. New York: Pergamon Press.
- NARAYAN, D., CHAMBERS, R., SHAH, M. K. & PETESCH, P. 2000. Voices of the poor: crying out for change. Washington D.C.: World Bank.

- NAUDÉ, W. A. & KRUGELL, W. F. 2003a. An enquiry into cities and their role in Sub-national economic growth in South Africa. *Journal of African economies*, 12(4):476-499.
- NAUDÉ, W. A. & KRUGELL, W. F. 2003b. Are South African cities too small? *Cities: the international journal of urban policy and planning*, 20(3):175-180.
- NAUDÉ, W. A. & KRUGELL, W. F. 2005. City size and economic specialization in South Africa. University of Oxford, Oxford. Paper presented at the 4th global conference on business and economics, St Hugh's College, 27 June 2005.
- NAUDÉ, W.A. & KRUGELL, W.F. 2006. Sub-national growth rate differentials in South Africa: an econometric analysis. *Papers in regional science*, 85(3):443-457.
- NEL, E. 2001. Local economic development: a review and assessment of its current status in South Africa. *Urban studies*, 38(7):1003-1024.
- NEL, E. & BINNS, T. 2001. Initiating 'developmental local government' in South Africa: evolving local economic development policy. *Regional studies*, 35(4):355-362.
- NEL, E. & ROGERSON, C. M., eds. 2005. Local economic development in the developing world. London: Transaction Press.
- NIKSIC, G. 2004. Difficult but not impossible: The ANC's decentralization strategy in South Africa. *Development and change*, 35(2):353-374.
- NOMDO, C. & COETZEE, E. 2002. Urban vulnerability: perspectives from Southern Africa. Sterling, Va.: Stylus Press.
- NTSEBEZA, L. 2004. Democratic decentralization and traditional authority: dilemmas of land administration in rural South Africa. *European journal of development research*, 16(1):71-89.

NUSSBAUM, M. C. 1988. Nature, function and capability: Aristotle on political distribution. *Oxford studies in ancient philosophy, supplementary volume*, 6:145-184.

NUSSBAUM, M. C. 2000. Women and human development: the capabilities approach. Cambridge: Cambridge University Press.

OOSTHUIZEN, M. J. & NIEUWOUDT, L. 2003. A poverty profile of the Western Cape Province of South Africa. *Journal of studies in economics and econometrics*, 27(3):69-90.

OSBERG, L. 1985. The measurement of economic well-being. (In D. Laidler. Approaches to economic well-being. Research studies of the MacDonald commission, no. 26. Toronto; University of Toronto Press).

OSBERG, L. & SHARPE, A. 2000. International comparisons of trends in economic well-being. New York. Paper presented at the annual meeting of the American economic association, January, 2000.

OSBERG, L. & SHARPE, A. 2001. The index of economic well-being: an overview. Paper presented at the national conference on sustainable development indicators organised by the national round table on environment and the economy, March 27. Westin hotel, Ottawa, Ontario.

OSBERG, L. & SHARPE, A. 2002. An index of economic well-being for selected OECD countries. *Review of income and wealth*, 48(3):291-316.

OSBERG, L. & SHARPE, A. 2005. How should we measure the “economic” aspects of well-being? *Review of income and wealth*, 51(2):311-336.

OVERMAN, H. G. & VENABLES, A. J. 2005. Cities in the developing world. LSE, centre for economic performance. (CEP discussion paper no. 695.)

PERRINGS, C. 1998. Income, consumption and human development: environmental linkages. (In Background papers, Human development report. p 151-212).

PILLAY, A. M. & NAUDÉ, W. A. 2006a. Financing low-income housing in South Africa: borrower experiences and perceptions of banks. *Habitat international*, forthcoming

PILLAY, A. M. & NAUDÉ, W. A. 2006b. Savings and affordability in South Africa's low-income housing market. *Savings and development*, 30(1):79-94.

POSEL, D. 2003. The collection of national household survey data in South Africa (1993-2001): rendering labour migration invisible. *Development Southern Africa*, 20(3):361-368.

POSEL, D. 2004. Have migration patterns in post-apartheid South Africa changed? *Journal of interdisciplinary economics*, 15(3-4):277-292.

PRESCOTT-ALLEN, R. 2001. The wellbeing of nations. International development research centre: Island Press.

PRINSLOO, D.A. & CLOETE, C. E. 2002. Post-apartheid residential mobility patterns in two South African cities. *Property management*, 20(4):264-277.

QIZILBASH, M. 1996. Capabilities, well-being and human development: a survey. *Journal of development studies*, 33(2):143-162.

RAHMAN, T., MITTELHAMMER, R. C. & WANDSCHNEIDER, P. 2003. Measuring the quality of life across countries: a sensitivity analysis of well-being indices. Helsinki, Finland. Paper prepared for WIDER international conference on inequality, poverty and human well-being, May 30-31, 2003.

RAMUTSINDELA, M. 2002. Second time around: squatter removals in a democratic South Africa. *GeoJournal*, 57:49-56.

RAPPAPORT, J & SACHS, J. D. 2003. The United States as a coastal nation. *Journal of economic growth*, 8:5-46.

ROBINSON, P. S. 2003. Implications of rural settlement patterns for development: a historical case study of Qaukeni, Eastern Cape, South Africa. *Development Southern Africa*, 20(3):405-421.

ROGERSON, C. M. 2001a. Redressing urban poverty in post-apartheid South Africa. (*In*, CROP international studies in poverty research, poverty reduction: what role for the state in today's globalised economy? New York: Palgrave. p.41-362.)

ROJAS, M. 2003. The multidimensionality of poverty: a subjective well-being approach. Helsinki, Finland. Paper prepared for WIDER international conference on inequality, poverty and human well-being, May 30-31, 2003.

SAFF, G. R. 1995. Residential segregation in South Africa: what can be learned from the United States experience? *Urban affairs review*, 30:782-808.

SAFF, G. R. 2001. Exclusionary discourse towards squatters in suburban Cape Town. *Ecumene*, 8:87-107.

SEIK, F. T., YUAN, L. L. & MIE, W. K., eds. 2000. Research on quality of life in cities. (*In* Seik *et al.* Planning for a better quality of life in cities. School of building and real estate. National University of Singapore: Singapore).

SEN, A. K. 1984. Rights and capabilities. (*In* Sen, A. K. Resources, values and development. Oxford: Blackwell Press).

SEN, A. K. 1993. Capability and well-being. (*In* Nussbaum, M. C. and Sen, A. K. The quality of life. Oxford: Clarendon Press).

SEN, A. K. 1996. On the foundations of welfare economics: utility, capability and practical reason. (*In* Farina, F., Hahn, F. & Vannucci, S. *Ethics, rationality and economic behaviour*. Oxford: Clarendon Press).

SMITH, L. & HANSON, S. 2003. Access to water for the urban poor in Cape Town: where equity meets cost recovery. *Urban studies*, 40(8):1517-1548.

STOVER, M. E. & LEVEN, C. L. 1992. Methodological issues in the determination of the quality of life in urban areas. *Urban studies*, 29(5):737-754.

SUMNER, A. 2003. Economic and non-economic well-being: a review of progress on the meaning and measurement of poverty. Helsinki, Finland. Paper prepared for WIDER international conference on inequality, poverty and human well-being, May 30-31, 2003.

TUROK, I. 2001. Persistent polarization post-apartheid? Progress towards urban integration in Cape Town. *Urban studies*, 38:2349-2377.

UN MILLENNIUM PROJECT. 2005. Investing in development: a practical plan to achieve the millennium development goals, overview. UNDP: New York.

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP). Human development report, 1990. New York: Oxford University Press.

VAN DONK, M. 2002. HIV/AIDS and urban poverty in South Africa. [Web:] <http://www.sacities.net/members/cdshiv.stm> [Date of access: 10 May, 2006].

VEENHOVEN, R. 1996. Happy life-expectancy: a comprehensive measure of quality of life in nations. *Social indicators research*, 39:1-58.

VEENHOVEN, R. 2004. Subjective measures of well-being. Helsinki: United Nations University. (*WIDER discussion paper no. 2004/07*.)

VENABLES, A. J. 2005. Spatial disparities in developing countries: cities, regions, and international trade. *Journal of economic geography*, 5(1):3-21.

VISSER, V. 2001. Social justice, integrated development planning and post-apartheid South Africa. *Urban studies*, 38(10):1673-1699.

VISSER, G. 2002. Gentrification and South African cities: towards a research agenda. *Cities*, 19(6):419-423.

WEY, H. 2000. Quality of life assessment: is quality of place an appropriate proxy? (*In* Seik *et al.* Planning for a better quality of life in cities. School of building and real estate. National University of Singapore: Singapore).

WORLD BANK. 1999. A strategic view of urban and local government issues: implications for the bank. Washington, D.C.: World Bank.

WORLD BANK. 2001a. Well-being measurement and analysis technical notes. Washington, D. C.: World Bank.

ZAIM, O. 2005. A framework for incorporating environmental indicators to the measurement of human well-being. Helsinki: United Nations University. (*WIDER research paper no. 2005/05.*)

ZAIM, O., FÄRE, R. & GROSSKOPF, S. 2001. An economic approach to achievement and improvement indexes. *Social indicators research*, 56:91-118.