An ANALYSIS OF THE QUALITY OF LIFE OF MIGRANTS IN GAUTENG, A PROVINCE OF SOUTH AFRICA

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Abstract

Gauteng, the economic centre of South Africa, attracts many migrants from across the African continent and other regions in South Africa: almost 44% of the total population are migrants. In this study, a composite index is constructed and the quality of life of cross-border, internal migrants and the native population of Gauteng is compared. This study uses the method of Nicoletti et al. (2009) to construct the composite index, and adapts it to be suitable for the analysis of categorical data. Furthermore, this study compares the means of the quality of life scores of the different groups using ANOVA. The results of the study show that although there are statistically significant differences between the mean quality of life scores of the groups, the effect size approaches zero. This suggests that migrants and non-migrants experience almost equal levels of quality of life in Gauteng. This result contradicts findings in existing literature that measures well-being.

Keywords

Quality of life, Well-being, Migration, Composite indices, Gauteng Region, Measuring instruments

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1. INTRODUCTION

After the 1994 democratic elections in South Africa, migration regulations were eased and migration to the province of Gauteng, the economic centre of South Africa, increased considerably (Statistics South Africa [Stats SA], 2012). In 2011, 44% of the total population of Gauteng consisted of migrants, a much higher proportion than any other province in South Africa (Stats SA, 2012). The literature has shown that the main cause for migration is the improvement of quality of life (Ravenstein, 1885).

Academic literature and international discussions on the nexus between migration (with the aim of improving the quality of life) and development have become increasingly prominent (for example Geiger & Pecoud, 2013; Clemens, Caglar & Rapoport, 2014; the UN General Assembly High-Level Dialogue on International Migration and Development, 2014 and the World Migration Report 2013 of the International Organisation of Migration [IOM], 2014). It is argued that migration is a positive phenomenon that contributes to sustainable development and poverty reduction in both the sending and the receiving countries (IOM, 2014; World Bank, 2014).

The link between migration studies and development studies was previously researched; however, these studies primarily examine the effect of remittances on development (Ajilore & Ikhide, 2013; Rubinov, 2014; Fransen & Mazzucato, 2014; Salas, 2014), or use quality of life to predict migration patterns (Liu, 1975; Osborne, 2003; Rebhun & Raveh, 2006 and Lewer, Pacheco & Rossouw, 2009). These studies are at a macro-level and do not consider the well-being (quality of life) of migrants at a micro-level. Furthermore, these studies often analyse migration from the South to the West, for example from Africa to Europe and not South-South migration, such as migration from countries in Africa to South Africa. It is likely that the resettlement experiences of migrants migrating to different parts of the world might vary and should be considered in research.

Recently another strand of migration literature has developed, which is at a micro-level, namely the analyses of the 'subjective well-being' or 'happiness' of migrants (Safi, 2010; Meizer, 2011; Bartram, 2012 and Bartram, 2013). This line of study fits into the 'happiness literature'. The 'happiness literature' uses a question such as 'are you satisfied or happy with your life?' to measure the well-being of migrants. The aim of the majority of these studies is to determine if the subjective well-being of migrants improves after migration.

However, recent research has shown that a single indicator such as 'life satisfaction' is not a sufficient measure of quality of life (Stiglitz, Sen & Fitoussi, 2009), and that a multidimensional measure, which includes both objective and subjective measures of well-being, should be used to measure the concept. The literature does not agree on a standard definition of quality of life or on the dimensions that should be included in a composite index to measure the concept. Nonetheless the Stiglitz Report (2009) summarises the general findings in the literature and concludes that the following dimensions are most often included in measuring quality of life: health, education, everyday activities (including work), participation in the political process, social relationships, safety and the environment lived in.

In this study I address the gap in the migration literature by measuring the quality of life of migrants at a micro-level. To measure quality of life, I construct a comprehensive composite index using Nicoletti, Scarpetta, and Boylaud's (2000) method. The composite index includes various dimensions of quality of life, measured by both objective and subjective indicators. This method of Nicoletti et al. (2000) was originally developed to construct composite indices in the study field of 'market regulations' and the first time employed to quality of life research by

Greyling and Tregenna (2014). They adapted the method so that it is appropriate in the analysis of categorical data, opposed to the analysis of continuous data, mostly used in statistical analysis.

In this research I distinguish between internal migrants and cross-border migrants and compare the quality of life of these groups to the native population of the region. Internal migrants are migrants who moved from one region to another in the same country, and cross-border migrants are migrants who crossed international borders. To compare the average quality of life scores of the different groups, I use the statistical method Analysis of Variance (ANOVA) and furthermore calculate the effect size of the differences in the means. To investigate the differences, if any, in the quality of life scores, I deconstruct the composite quality of life scores of the different groups into their specific dimensions, and determine which dimensions of quality of life contribute to the disparities in the composite quality of life scores of the different groups. For the purposes of this study I use a data set collected in 2011 by the Gauteng city-region observatory (GCRO) on quality of life in the Gauteng region.

This study makes three distinct contributions to the literature. Firstly, it measures the quality of life of internal migrants, cross-border migrants and the native population in the Gauteng region. It is believed to be the first study internationally of its kind. Secondly, it compares the quality of life of these groups and analyses the dimensions of quality of life which contributes to the disparities in the experienced quality of life. Thirdly, the study contributes to understanding the quality of life experienced by South-South migrants. Knowledge on the quality of life of migrants, and the components that affect their well-being, is valuable in directing future policy to address issues related to migration.

The results of the study showed that the dimension of quality of life which explained the most variance in the data set was 'housing and basic services'. This suggests that this dimension contributed the most to the quality of life experienced by the people in Gauteng.

Comparing the mean quality of life scores of each of the groups, the results of the ANOVA showed that there were statistically significant differences between the mean quality of life scores of internal migrants and the native Gauteng population, and between cross-border migrants and the native Gauteng population; however, there were no statistically significant differences between the means of cross-border and internal migrants. The effect size of these differences between the groups was found to be very small. After deconstructing the composite index into the different dimensions of quality of life, I found that the intermediate composite indices' scores of the compared groups varied. This finding explained the statistically significant differences in the means of the composite quality of life scores.

However, when all the intermediate composite index scores within each of the compared groups were aggregated, the composite quality of life scores of the groups were very similar, explaining the previously found small effect size. Therefore, the different groups in Gauteng experience almost equal levels of quality of life. This finding contradicts previous research in the happiness literature on among other south-north migration studies, which shows that the well-being of migrants is lower than that of the native population (for example Safi, 2010; Bartram, 2012; Stillman, Gibson, Mc Kenzie & Rohorua, 2014).

The rest of the paper is set out as follows: section 2 discusses the literature on the measurement of the well-being of migrants. In section 3 the data is described. Section 4 discusses the methodologies used in this research. Section 5 reports the results on the construction of the composite index of quality of life. Section 6 reviews the findings on the compared quality of life scores of the different groups and section 7 concludes.

2. LITERATURE ON THE WELL-BEING OF MIGRANTS

As research on the measurement of quality of life of migrants is very limited and includes only a few studies (see Michalos, 1997; Lewer et al., 2009), this section reviews not only the literature that links quality of life and migration, but also related research. The related literature includes studies on the subjective well-being of migrants and results found on the different indicators of quality of life for South Africans in general.

As previously mentioned, there are few papers that link quality of life and migration. One of these is that by Michalos (1997), which highlights the complexity of measuring the quality of life of migrants. The paper divides migration literature into five different types of enquiries, namely: demographic studies which give the demographics of migrants, studies explaining the determinants of migration, studies on the costs and benefits of migration, studies on the kinship involving migrants and studies identifying the developmental stages of moving, migrating and relocation. After reviewing the literature within each of the different types of enquiries the author concludes by giving a list of issues which should be considered when the quality of life of migrants is measured. The list includes: the size of the region (international, national, regional), time frames, population composition, domains of life to include in the research, indicator selection, measurement scales, identifying the decision makers, the quality of life model (the functional form and aggregation function), distributions of the quality of life indicators, and the determination of the place of residence. This list emphasises the intricacy and the many evaluative decisions involved in measuring quality of life, which is also considered in this study.

The other studies that link quality of life and migration mostly analyse quality of life as a determinant of migration patterns (see for example Liu, 1975; Osborne, 2003; Rebhun & Raveh, 2006; Lewer et al., 2009). In these studies objective quality of life indicators or composite indices are analysed to determine their effect on migration patterns. However, these studies are at a macro-level and do not consider the effect of migration on the quality of life of an individual. Furthermore, these studies often analyse the quality of life of migrants who that settle in the North, e.g. Europe, and not countries in the South, such as South Africaln this research the aim is to measure the quality of life of migrants at a micro-level in a country and a region in the South, namely the province of Gauteng in South Africa.

Turning to the findings of the subjective well-being literature, the studies show that in general the subjective well-being of migrants is lower than that of the destination country's population (Safi, 2010; Bartram, 2012; Stillman et al., 2014; IOM, 2014). Furthermore, research on immigrants in Europe shows that, even after many years subsequent to migration, immigrants are less happy than the native population (Safi, 2010).

If the happiness of migrants is compared to a comparable group of stayers in the country of origin, the results suggest that migrants are in general happier than the stayers (see Meizer, 2011; Bartram, 2012). Having said this, it has been suggested that the countries from which the migrants originate also play a role in the general happiness of migrants: for example, Bartram (2013) found that migrants originating from Romania are not happier than the stayers.

In a study on internal migrants, Knight and Gunatilaka (2010) show that the happiness of ruralurban migrants in China is lower than the happiness of rural households. The authors suggest that this is due to higher aspirations being relative to achievements. However, a longitudinal study on internal migrants in the UK found that after an initial decrease in well-being just prior to migration, the level of well-being returns to a level similar to that experienced before migration (Nowok, Van Ham, Findlay & Gayle, 2011). From these studies, it seems that the internal migrants who migrate to urban areas in China are not as happy as those remaining in the rural areas, and that the happiness of internal migrants in the UK, except for a brief time period before migrating, returns to previous levels.

Studies on well-being in South Africa find the following: the dimension that represents the biggest effect on the well-being of South Africans is generally found to be 'housing and basic services' (see Bookwalter, Fullen & Dalenberg, 2006; Hinks and Gruen, 2007; Posel & Casale, 2011; GCRO, 2011; Posel, 2012; Møller, 2012). Other factors that contribute significantly to the well-being of the people in South Africa are social relationships, education, employment and safety (Kingdon and Knight, 2003; Powdthavee, 2003; Bookwalter et al., 2006; Higgs, 2007; GCRO, 2011; Møller, 2012; Human Sciences Research Council, 2013).

To conclude: there is essentially no previous research on the measurement of quality of life of migrants at a micro-level. The existing literature related to the well-being of migrants measures the subjective well-being of migrants and mostly uses a single indicator such as 'life satisfaction'.

3. DATA

To measure the quality of life of migrants in Gauteng, this study analyses a cross-sectional data set collected in 2011 by the GCRO. The purpose of this survey was to gather data on the quality of life of the people residing in Gauteng. Hence, this data set is ideal for the purposes of measuring quality of life, as it includes both objective and subjective indicators across many dimensions of quality of life. The only noteworthy omission is a lack of environmental variables, which prohibits the analysis of this dimension.

The total sample size is 16 729 respondents, of which 4 384 are internal migrants, and 835 are cross-border migrants. The internal migrants migrated to Gauteng from other provinces in South Africa, with Limpopo and KwaZulu-Natal being the primary provinces of origin. The majority of the cross-border migrants originate from the Southern African Development Community, which includes inter alia Zimbabwe, Mozambique, Angola and Mauritius. The main sending country is Zimbabwe, followed by Mozambique. The majority of the internal and cross-border migrants mention economic reasons as their main reason for migrating. TABLE 1 shows descriptive statistics of the sample.

In the sample there are more female migrants (56.5%, measured as a percentage of the total number of migrants) than male migrants (43.5%). In the case of cross-border migrants the number of female migrants (51.9%) just outnumbers the male migrants (48.1%).

More cross-border migrants are employed in both the formal sector (36.3%) and the informal sector (10.7%) than the other groups (see TABLE 1). The frequency of the income category variable shows that all the groups have the highest frequency of the variable in the category between R1601 and R3200. This indicates that the average income levels are relatively low in Gauteng. To complement the income of the groups a considerable proportion of the native Gauteng population (30%) and internal migrants receive government grants (30%). Cross-border migrants also benefit from grants, though to a much lesser extent than the other two groups (12.6% of cross-border migrants receive grants).

	Native Gauteng population	Internal Migrants	Cross-border migrants
Sample size (N)	10 517	4 384	835
% Male	43.0	43.0	48.0
% Female	57.0	57.0	52.0
Average age	40.8	40.7	34.0
% Employed (formal)	27.8	27.0	36.3
% Employed (informal)	4.6	7.6	10.7
% in Income category R1 601- R3 200	12.0	14.0	12.0
% Receiving grants	32.0	30.0	12.6
% Respondents with only primary education	12.3	17.2	22.5
% Respondents with tertiary education	18.0	13.0	17.0
How often does health prevent going to work (sometimes/always)	29.0	29.0	19.0
Life satisfaction (satisfied/very satisfied)	65.2	60.0	63.0

TABLE 1: Descriptive statistics of the different analysed groups

Source: GCRO data (2011)

Approximately the same percentage of the native Gauteng population (18%) and cross-border migrants (17%) have tertiary training, compared to only 13% of the internal migrants. The statistics show that both the native Gauteng population (29%) and the internal migrants (29%) more frequently report that their health 'always' or 'sometimes' keeps them from going to work, compared to 19% reported by cross-border migrants.

Judging from only the 'life satisfaction' variable it seems that the level of happiness across the groups is very similar. All of the groups reported that approximately 60% of the respondents in the group are either 'satisfied,' or 'very satisfied' with life, and just more than 20% of the respondents in each group reported that they were completely 'dissatisfied' with life.

4. METHODOLOGY

The methodology is divided into two sections. In the first section the steps that were followed to construct the composite index of quality of life of migrants are discussed, and in the second section the methods used to compare the means of the quality of life scores of the compared groups are described.

4.1 Methodology used to construct the composite index

In the following section I discuss the 'weighting and the aggregation of the composite index' and the 'data and the selection' of the indicators.

4.1.1 Weighting and aggregation of the composite index

The composite index was weighted and aggregated using the method of Nicoletti, et al. (2000). Nicoletti et al.'s method (2000) employs PCA to weight the composite index. PCA addresses many of the shortcomings of other statistical techniques, as it has differential weighting that allocates weights according to the explained variance of each of the extracted principal components in contrast to equal weighting, which allocates the same weight to all dimensions.

Nicoletti et al.'s method (2000) was developed to construct composite indices using continuous data that is appropriate for analysis using standard PCA. In this study, the data is categorical. Therefore standard PCA does not give robust results. Nicoletti et al.'s method (2000) was adapted (see Greyling & Tregenna, 2014) to allow for the analysis of categorical data, and Categorical PCA (CATPCA) was used (Gifi, 1990; Meulman, Van der Kooij & Heise, 2004) to extract the principal components. CATPCA converts categorical variables into numeric variables through a process called 'optimal scaling'. Optimal scaling replaces the category labels with category quantifications, thus converting categorical data, as the results of the former often explain more variance in the data set than standard PCA. The output obtained from CATPCA is similar to that of standard PCA.

According to the method of Nicoletti et al. (2000), the measuring indicators with the highest factor loadings on a specific extracted component are grouped into intermediate composite indices. The weighting of each of the measuring indicators in the intermediate composite index is derived by squaring the factor loadings of the indicator and scaling them to unity sum. The squared factor loadings of the indicators represent the proportion of the total variance of the indicator, which is explained by the component. The constructed intermediate composite indices are aggregated by allocating a weight to each one of them proportional to the explained variance of the component in the data set. The weight of each consecutive intermediate composite index composite index decreases as the explained variance of the extracted components decreases.

In mathematical terms the aggregation of the intermediate composite indices to arrive at the composite index of quality of life (CIQ) is as follows (Greyling & Tregenna, 2014):

$$CIQ_i = (\sum_{i=1}^{n} (ICI_i w_i)) \times 100$$
 (1)

where CIQ is the composite index of quality of life, ICI_i = Intermediate Composite Index (i=1...n), and w_i is the weight of the I^{th} ICI determined by the explained variance of the intermediate composite index (extracted component) in the data.

To test the validity of the index the norm is to compare the index to similar indices and results found in similar studies. As there are no related indices to which the index can be compared, as was shown in the literature review (section 2.2), the validity of the index was tested by correlating the quality of life index to conventionally used single-dimensional measures of quality of life, namely, 'income' and 'life satisfaction'. The degree and statistical significance of the correlation between these variables give an indication of the validity of the composite index (see Groh & Wich 2009). The results found in this study were also compared to results found in other studies on migrants in South Africa (see section 5).

To test the robustness of the newly constructed composite index I included and excluded different indicators in the composite index to determine if the results are similar. Furthermore,

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the CATPCA was run using different methods of treating the missingness in the data, with data imputation as well as listwise deletion. In addition, the selection of the optimal scaling methods in applying CATPCA was varied between ordinal, nominal and spline ordinal and spline nominal scaling methods to determine if the choice of scaling affected the results.

4.1.2 Selection and preparation of the indicators

Based on the recommendations of the Stiglitz Report (2009), which were derived from relevant literature and the availability of data, I selected a range of objectively and subjectively measured indicators to measure the dimensions of quality of life that would be included in the composite index. The dimensions on which data were available were housing, basic services, social relationships, 'work and economic' variables, education, health, governance, civic engagement, safety and satisfaction with life.

I recoded all the ordinal variables so that they had the same direction of coding such that one indicated the most 'negative' (that is, any scales that were negatively worded were reversed). Furthermore, nominal variables such as 'type of housing', which are qualitative of nature, were recoded into binary variables with a value of either one or two (see TABLE 2), so that these variables could be included in statistical analysis. The variables were coded according to the guidelines set out in the Reconstruction and Development Programme of South Africa (1998) and the marginalisation index of the GCRO (2011). In this research one indicates the weaker option of the two, whereas two indicates the better option. For example, looking at the 'electricity for lighting' variable, one indicates no electricity for lighting and two indicates that there is electricity for lighting.

The selection of the indicators was refined through successive rounds of CATPCA. Different combinations of the indicators were used to eliminate those variables with the lowest commonalities. This was done to derive a parsimonious set of variables, which explained the most variance in the data set and gave a good representation of the data. The final selection of indicators and their descriptive statistics are shown in TABLE 2.

Variable	Code	Frequency	Percentage
Satisfaction with dwelling			
Very dissatisfied	1	1098	6.6
Dissatisfied	2	2631	15.9
Neutral	3	621	3.7
Satisfied	4	9373	56.5
Very satisfied	5	2854	17.1
Piped water on the premises			
No piped water	1	1640	9.8
Have piped water	2	14591	87.2
Electricity for lighting			
No electricity	1	1832	11.2
Have electricity	2	14571	88.8
Flush toilet			

TABLE 2: Indicators included in the analyses

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Variable	Code	Frequency	Percentage
No flush toilet	1	1600	10.0
Have flush toilet	2	14336	90.0
Type of dwelling			
Informal dwelling	1	2058	12.3
Formal dwelling	2	14671	87.7
Satisfaction with time spent with family			
Very dissatisfied	1	234	1.4
Dissatisfied	2	1019	6.2
Neutral	3	1523	9.2
Satisfied	4	10804	65.3
Very satisfied	5	2958	17.9
Satisfaction with time spent with friends			
Very dissatisfied	1	29.2	1.8
Dissatisfied	2	1076	6.5
Neutral	3	2386	14.4
Satisfied	4	10254	62.0
Very satisfied	5	2532	15.3
Satisfied with available leisure time			
Very dissatisfied	1	363	2.2
Dissatisfied	2	2070	12.4
Neutral	3	3051	18.2
Satisfied	4	9261	55.4
Very satisfied	5	1690	10.1
Satisfied with life			
Very dissatisfied	1	1030	6.3
Dissatisfied	2	2425	14.7
Neutral	3	2420	14.7
Satisfied	4	8249	50.1
Very satisfied	5	2334	14.2
Satisfied with money to spend			
Very dissatisfied	1	3498	21.2
Dissatisfied	2	6511	39.4
Neutral	3	2012	12.2
Satisfied	4	3644	22.1
Very satisfied	5	852	5.2
Household status			
Poor	1	5256	32.8
Working class	2	6512	33.7
Middle class	3	3879	23.7

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Variable	Cod	e Frequency	Percentage
Upper class	4	447	2.7
Other	5	474	2.9
Education level			
None	1	463	2.8
Primary only	2	2130	13.2
Secondary incomplete	3	5382	33.4
Matric	4	5014	31.1
More	5	3134	19.5
Standard of living			
Very dissatisfied	1	1078	6.5
Dissatisfied	2	3183	19.3
Neutral	3	2901	17.6
Satisfied	4	7689	46.5
Very satisfied	5	1667	10.1
Employment status			
Unemployed	1	10659	64.3
٤mployed	2	5323	35.7
Politics is a waste of time			
Strongly disagree	1	1553	9.6
Disagree	2	3984	24.6
Neither agree nor disagree	3	1748	10.8
Agree	4	7274	44.8
Strongly agree	5	1661	10.2
No one cares about people like you			
Strongly disagree	1	1496	9.2
Disagree	2	4610	28.2
Neither agree nor disagree	3	2475	15.2
Agree	4	6697	41.0
Strongly agree	5	1053	6.4
People like you cannot influence developments			
Strongly disagree	1	1361	8.4
Disagree	2	4555	28.3
Neither agree nor disagree	3	2588	16.1
Agree	4	6335	39.3
Strongly agree	5	1268	7.9
Health prevents taking part in social activities			
Always	1	964	5.9
Some of the time	2	3293	20.2
Hardly ever	3	4434	27.1

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Variable	Code	Frequency	Percentage
Never	4	7644	46.8
Health prevents going to work			
Always	1	1018	6.2
Some of the time	2	3394	20.8
Hardly ever	3	4392	26.9
Never	4	7509	46.0
Safe after dark			
Very unsafe	1	5635	33.8
Bit unsafe	2	4203	25.2
Neither unsafe nor safe	3	1761	10.6
Fairly safe	4	3723	22.3
Very safe	5	1335	8.0
Safe at home			
Very unsafe	1	962	5.8
Bit unsafe	2	1629	9.8
Neither unsafe nor safe	3	1920	11.6
Fairly safe	4	6849	41.3
Very safe	5	5227	31.5
Satisfaction with safety provided by government			
Very dissatisfied	1	2260	13.6
Dissatisfied	2	3540	21.4
Neutral	3	2542	15.3
Satisfied	4	6584	39.7
Very satisfied	5	1649	9.9

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Source: Author's calculations using GCRO data (GCRO, 2011)

*Categories of indicators that do not add up to a hundred is due to missing variables

4.2 Comparison of the quality of life scores

After the construction of the quality of life scores of each respondent, the mean quality of life score of each of the analysed groups was calculated. To determine whether there were significant differences between the means of the three independent groups, I used a one-way Analysis of Variance (ANOVA). As the one-way ANOVA is an *omnibus* test statistic that reveals only if there is a statistically significant difference between the means of the groups, and does not reveal which groups are significantly different from one another, I performed a post-hoc test using the Tukey HSD test (Pallant, 2007). Lastly, I calculated the effect size to establish the magnitude of the differences in the means between the groups, and interpreted it using Cohen's rules of thumb. According to Cohen's rules of thumb, an effect size of 0.02 is small, 0.06 is medium, and 0.14 is large (Cohen, 1988: 284-287).

5. RESULTS ON THE COMPOSITE INDEX OF QUALITY OF LIFE

To construct the composite index of quality of life, I followed the steps explained in section 3.1. I ran a CATPCA on the selected indicators. I used the quantifications of the indicators, derived from the optimal scaling in the CATPCA, to rotate the data in standard PCA, as rotation is not yet an option in CATPCA. I rotated the data using the varimax method, as the components were orthogonal. Once the extracted factor matrix was rotated, it revealed a simpler component structure that increased the interpretability of the extracted components. To decide on the number of components to extract, I employed the Kaiser rule, the scree plot, and the interpretability of the rotated component matrix. These three guidelines suggested that six components should be extracted. The six extracted components explained more than 60% of the variation in the data set, which is an acceptable value of explained variance to be used in further analyses (for comparative studies see Vyas & Kumaranayake, 2006; Rossouw & Naudé, 2008; Lewer et al., 2009; Rossouw & Pacheco, 2012).

To test if similar rotated component matrices existed across all the analysed groups including internal migrants, cross-border migrants and the native Gauteng population, I ran separate CATPCAs for each group. I found negligible differences in the factor loadings of the indicators on the extracted components, and the same order of the highest loading indicators on the extracted components for all groups. The findings of the same order of the highest factor loadings of the indicators on the extracted components implied that these groups allocated similar weights to the dimensions. Therefore, in the steps that follow, the rotated component matrix for the data set (including all groups) was used to derive comparable quality of life indices. TABLE 3 shows the rotated component matrix of the six extracted components.

In the first extracted component, the indicators with the highest factor loadings (indicated in bold in TABLE 3) were 'satisfied with dwelling (.543)', 'piped water on the premises (.800)', 'flush toilet (.816)', 'electricity for lighting (.735)', and 'type of dwelling (.697)'. I named the first extracted component 'housing and basic services', based on the indicators with the highest factor loadings on the component. This name was also used to label the intermediate composite index, which was constructed based on the first extracted component.

Using the method explained in section 4.1.1 to construct an intermediate composite index, I derived the weights of the indicators included in the 'housing and basic services' intermediate composite index. The weights were 'satisfied with dwelling (11%)', 'piped water on the premises (24%)', 'flush toilet (25%)', 'electricity for lighting (20%)' and 'type of dwelling (20%)'.

	Extracted components (factor loadings)						Weights (Squared factor loadings scaled to unity sum)				d	
	1	2	3	4	5	6	1	2	3	4	5	6
Satisfied with dwelling	.543	.070	.270	.083	016	.199	0.11					
Piped water on the premises	.800	.034	.006	006	.012	006	0.24					
Flush toilet	.816	.044	.103	.006	007	.041	0.25					
Electricity for	.735	.039	.020	022	007	.042	0.21					

TABLE 3: Extracted components, factor loadings and derived weights of the indicators included in the composite quality of life index

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	Extracted components (factor loadings)						Weights (Squared factor loadings scaled to unity sum)				1	
	1	2	3	4	5	6	1	2	3	4	5	6
lighting												
Type of dwelling	.711	.051	.103	.000	008	.036	0.19					
Satisfaction with time spent with family	.030	.825	055	117	.019	017		0.29				
Satisfaction with time spent with friends	.013	.818	082	120	.038	011		0.29				
Satisfaction with available leisure time	.036	.743	.016	118	.012	.004		0.24				
Satisfied with life	.095	.642	.211	.001	.018	.178		0.18				
Satisfaction with money to spend	.092	.399	.483	.064	068	.221			0.11			
Household status	.275	.121	.659	.030	015	.125			0.20			
Education level	.125	.036	.712	040	.068	044			0.23			
Standard of living	.065	.745	.668	.006	.031	.144			0.26			
Employment status	019	041	.666	014	.084	004			0.20			
Politics is a waste of time	020	076	060	.750	018	.012				0.32		
No one cares about people like you	.039	050	.037	.827	.017	.074				0.39		
People like you cannot influence developments	.012	130	.023	.706	.012	.008				0.29		
How often does ill health prevent going to work	007	.048	.063	002	.966	.040					0.50	
How often does ill health prevent taking part in social activities	015	.040	.069	.014	.965	.035					0.50	
Safe in area after dark	.031	.052	.123	018	015	.749						0.34

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	Extracted components (factor loadings)						J	Weights (S	quared fo to unit	actor loadi ty sum)	ings scal	ed
	1	2	3	4	5	6	1	2	3	4	5	6
Safe at home	.113	.048	.002	.015	.030	.735						0.33
Satisfaction with safety provided by government	.050	.119	002	.093	.056	.743						0.33
Explained variance (Eigenvalue)	17.49	12.00	9.02	7.82	6.61	6.43						
Total % of explained variance	.294	.202	.152	.132	.111	.108						

Source: Author's calculations using GCRO data (GCRO, 2011)

Note: Factor loadings in bold indicate the highest factor loadings on a specific component.

The indicators 'piped water on the premises' and 'flush toilet' had the highest weights; therefore it was assumed that these variables contributed significantly to the dimension 'housing and basic services', and to the quality of life of the people in Gauteng. 'Satisfaction with dwelling', a subjectively measured indicator, had a slightly lower weighting in the intermediate composite index than the other variables, possibly indicating that the relationship between this variable and the latent variable was not as strong as between the objectively measured indicators. This finding held for all the subjectively measured indicators included in this analysis. However, subjective measured quality of life indicators play an important role in the concept 'quality of life' and are required to derive a holistic measure of quality of life. To aggregate the intermediate composite index 'housing and basic services', I linearly added each indicator, multiplied by its derived weight. As 'housing and basic services' was the first extracted component of the factor matrix, it explained the most variance in the data set, namely 29%. This was also the weight of the intermediate composite index in the composite index of quality of life, and showed the importance of this dimension in measured quality of life.

'Housing and basic services' represents one of people's basic needs. According to Maslow's (1943) hierarchy of needs, it is one of the first needs that people need to fulfil. The findings concerning the importance of this dimension are consistent with previous research done in South Africa (see for instance Møller, 2012; GCRO, 2011; Hinks & Gruen. 2007; Bookwalter et al., 2006; and Richards, O'Leary & Mutsonziwa, 2007).

In the second component, 'satisfaction with time spent with family (.825)', 'satisfaction with time spent with friends (.818)', 'satisfaction with time available for leisure (.743)', and 'satisfied with life (.642)', had the highest factor loadings. Considering the variables that loaded the highest on the component, I named this component 'social relationships'. I constructed the intermediate composite index 'social relationships' in the same manner as described to construct the 'housing and basic services' intermediate composite index. The weights of each of the indicators after squaring the factor loadings and scaling them to unity sum were as follows: 29% for 'satisfaction with time spent with family', 29% for 'satisfaction with leisure time' and 18% for 'satisfaction with life'. Social relationships is also a need described by Maslow (1943), who argued that people need to be loved and cherished, and to be part of their community to improve their quality of life. This dimension explained the second most variance in the data set, and carried a weight of

20% in the composite index of quality of life. This result agrees with previous findings on quality of life in Gauteng (Greyling, 2013).

In the third component the variables with the highest factor loadings were 'satisfaction with money to spend (.483)', 'household status (.654)', 'education level (.712)', 'standard of living (.668)' and 'employment status (.666)'. These variables are related to economic issues in which education plays an important role, as the level of education is a determinant of employment and standard of living earned. These indicators were weighted and aggregated to form the intermediate composite index labelled 'socio-economic status'.

The weights of each of these indicators in the intermediate composite index were: 11% for 'satisfaction with money to spend', 20% for 'household status', 23% for 'education level', 26% for 'standard for living' and 20% for 'employment status'. The socio-economic status of individuals is often seen as the most decisive dimension in explaining quality of life, although the literature (see among other sources Diener & Seligman, 2004 and the Stiglitz Report, 2009) emphasises that income and measures related to income are not adequate measures of wellbeing, as the concept is much wider than monetary measures only. The results of this study support this opinion.

In the fourth component, the indicators with the highest factor loadings were 'politics is a waste of time (.750)', 'nobody cares about people like you (.827)', and 'people like you cannot influence developments (.766)'. I labelled this component 'socio-political participation'. The weights of each of the indicators in the intermediate composite index, 'socio-political participation', were as follows: 32% for 'politics is a waste of time', 39% for 'no one cares about people like you', and 39% for 'people like you cannot influence developments'. This component explained the fourth most variance in the data set, namely 13,2%. The literature suggests (Weitz-Shapiro & Winters, 2008) that political participation improves people's well-being because of the resulting feeling of autonomy, competence and successful participation in the socio-political process. If individuals are of the opinion that they have no political power to influence the developments in and of a country, they may begin to feel despair and/or that 'no one cares', which negatively influences their quality of life.

In the fifth component 'ill health prevents taking part in social activities (0.965)' and 'ill health prevents going to work (.966)' were the two variables with the highest factor loadings. I weighted and aggregated the two health indicators in the same manner as previously explained with weights of 50% each. I labelled this intermediate composite index 'health'. This dimension is related to the functioning of humans, as good health is essential to maintain human life. This dimension explained 11.1% of the variance in the data and had a corresponding weight in the composite index of quality of life.

In the sixth component, the variables with the highest factor loadings were 'safe in your area after dark (.749)', 'safe at home (.715)', and 'safety provided by the government where you live (.743)'. The weights allocated to each of the indicators included in the intermediate composite index were 34%, 33%, and 33% respectively. I labelled this intermediate composite index 'safety'. This dimension explained 10.8% of the variance in the data, and carried the same weight in the composite index of quality of life.

Finally, I constructed the composite index of quality of life by aggregating the weighted intermediate composite indices. Note that the weighting of each consecutive intermediate composite index contributed less to explaining the variance in the data set, decreasing from

29.4% for the first intermediate composite index 'housing and basic services' to 10.8% for the sixth intermediate composite index 'safety'.

To test the validity of the composite index of quality of life I used other correlation analysis (see section 4.1.1). I correlated the values of the composite index to the traditionally used singledimensional measures of quality of life, namely 'income' and 'life satisfaction'.

For this purpose, I used the 'income' variable and the 'life satisfaction' variable included in the GCRO data set (2011). The composite quality of life index was positive and statistically significantly (at the 5% level) correlated to both income (r = 0.588) and 'life satisfaction' (r = 0.468). The correlation between the composite quality of life index and the variables 'income' and 'life satisfaction' is not the perfect test for the validity of the composite index, as these measures are single-dimensional and not as comprehensive as the composite index of quality of life. The 'life satisfaction' variable, furthermore, is among the variables included in the composite index. Nonetheless, the positive and statistically significant correlation coefficients are indicative of the robustness of the composite index. In addition, the validity of the index was tested by comparing the result found in this study to previous findings in the literature (see section 6).

6. QUALITY OF LIFE SCORES OF THE DIFFERENT GROUPS

Using the methodology explained in section 4.2, I calculated the quality of life scores of each respondent in the data set. If a respondent selected the highest score in each of the indicators, he/she achieved the maximum quality of life score, which is a score of one; lower scores show lower levels of quality of life.

To compare the quality of life scores between the groups, I calculated the mean quality of life score of each group (see FIGURE 1). The means of the different groups were 0.638 (standard deviation = 0.075) for the native Gauteng population, 0.623 (0.075) for cross-border migrants, and 0.623 (0.076) for internal migrants (see FIGURE 1).



FIGURE 1: Quality of life scores of the different groups

Source: Author's calculations using GCRO data (GCRO, 2011)

To test if there are statistically significant differences between the means of the groups, I used a one-way ANOVA. An ANOVA assumes homogeneity of the variances and tests whether the

variance in the quality of life scores is the same for each of the three groups. To test this assumption I used the Leven test (F - statistic = 0.528, p-value = .467) and found the assumption tenable.

The result of the ANOVA showed that it was significant (*F-statistic* = 48.553, *p*-value = .000), indicating that there was a statistically significant difference between the means of the groups (see TABLE 4). To determine between which groups these differences occurred, I did post-hoc evaluations using the Tukey HSD test (Pallant, 2007) (see TABLE 5). The test revealed significant pairwise differences between the mean scores of the cross-border migrants (0.0146, ρ = .000) and the native Gauteng population, and the internal migrants (-0.0150, ρ =.000) and the native Gauteng population; however, the differences in the mean scores between the internal migrants and the cross-border migrants were not statistically significant (0.0004, ρ = .003).

	Sum of Squares	df*	Mean Square	F	Sig.
Between groups	0.550	2	0.275	48.553	0.000
Within groups	64.957	11473	0.006		
Total	65.506	11475			

TABLE 4: One-way ANOVA comparing the means of the groups

Source: GCRO data (GCRO, 2011)

*df = degrees of freedom

TABLE 5: Post-hoc comparisons of the means using the Tukey HSD test

Groups (I)	Groups (J)	Mean Difference (I-J)	Std. Error	Sig.
Native Gauteng	Internal Migrants	.0150**	.00161	.000
	Cross-border Migrants	.0146*#	.00332	.000
Internal migrants	Native Gauteng	0150**	.00161	.000
	Cross-border Migrants	0004	.00349	.993
Cross-border migrants	Native Gauteng	0146*#	.00332	.000
	Internal Migrants	.0004	.00349	.993

Source: GCRO data (GCRO, 2011)

** The mean difference is significant at the 0.05 level.

Calculating the effect size $(\dot{\eta}^2)$ given by the formula (Pallant, 2007):

$$\dot{\eta}^{2} = \frac{Sum of squares between groups}{Total sum of squares}$$
(2)

I found the actual magnitude of the differences between the mean quality of life scores of the different groups, based on Cohen's (1988) conventions of interpreting effect size, to be very small ($\dot{\eta}^2$ = 0.0084) and approaching zero. This suggests that the quality of life experienced by migrants and the native Gauteng population is almost equal. This finding differs from the results

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found in the subjective well-being literature describing South-North migration, which shows that migrants' subjective well-being is lower than that of the native population.

There are two possible explanations for this finding - one technical, the other of a geographical nature. Firstly, the inclusion of objective indicators and multiple dimensions in the measurement of quality of life probably gives a better indication of quality of life than a single-dimensional indicator such as 'life satisfaction'. Secondly, it is very likely that the experiences of migrants in South-South migration are very different from those migrating from the South to the North. In South-South migration, migrants most probably migrate to an economic viable region, such as Gauteng, from a much poorer region. The economically stronger region most likely offers better opportunities and living conditions to migrants than their home regions.

6.1 Analysis of the differences in the means of the quality of life scores of the groups

In this section, I investigated the possible reasons for the statistically significant differences in the means of internal and cross-border migrants, on the one hand, and the native Gauteng population, on the other, by deconstructing the quality of life scores into the different dimensions of quality of life.

The first dimension to be examined is 'housing and basic services'. I found that within this dimension the indicators for the native Gauteng population were higher than for both the crossborder and the internal migrants. 91% of all the native Gauteng population lived in formal housing, compared to 78% of the internal and 76% of the cross-border migrants (GCRO, 2011). The other indicators relating to basic services ('piped water on the premises', 'flush toilet' and 'electricity used for lighting'), showed that approximately 90% of the native Gauteng population had access to these amenities compared to 80% of internal and cross-border migrants. A possible reason for the lower levels of housing and basic services of migrants is that migrants are more likely (than the native Gauteng population) to stay in informal settlements, as this is often the type of housing most accessible to them.

Comparing the difference of means in the second dimension called 'social relationships', the results showed negligible differences in the indicators 'satisfaction with time spent with family and friends and for leisure' and 'satisfied with life'. Hence considering the 'social relationship' dimension of quality of life, the well-beings of all groups were similar.

In the third dimension, 'socio-economic status', the differences between the indicators of the different groups were more pronounced. Through investigating the different indicators I found that the incomes of the native Gauteng population and cross-border migrants were slightly higher than that of internal migrants. The internal and cross-border migrants were more likely to have no education or only primary education compared to the native Gauteng population (GCR0, 2011). However, if only migrants who migrated after 1994 were considered, 72% had tertiary training (Stats SA, 2012). This suggests that the level of education of cross-border migrants who arrived in Gauteng after 1994 had increased compared to earlier migrants (Stats SA, 2012).

Cross-border migrants were more likely than both the internal migrants (30% in the formal sector and 8% in the informal sector) and the native Gauteng population (29% in the formal sector and 5% in the informal sector), to be employed in either the formal sector (37%) or the informal sector (13%) (GCR0, 2011). The higher levels of employment can be explained, as the majority of cross-border migrants move to Gauteng to improve their economic status and

therefore either have work in the formal sector before migrating to Gauteng, or, alternatively, find work in the informal sector and await an opening in the formal sector. If the cross-border migrants do not work, they have few other options of receiving an income, although some of them (19%) do receive government grants. On the other hand, almost 32% of the native Gauteng population and 30% of internal migrants receive government grants, which carry them through difficult times and ease the urgency to find employment.

Comparing the different sectors of employment in the formal sector, I found that the biggest proportion of the Gauteng population, including cross-border migrants, internal migrants and the native population, worked in the private household sector (approximately 15% of each individual group) (GCRO, 2011). Furthermore, the cross-border migrants worked mostly in either the mining sector (12%) or the construction sector (10%). A much smaller percentage of the native Gauteng population (3% in mining and 2% in construction) or internal migrants (6% in mining and 8% in construction) worked in these sectors (GCRO, 2011). A much bigger proportion of both internal migrants and the native Gauteng population, approximately 40%, compared to cross-border migrants (19%), worked in higher skilled sectors such as wholesale and retail, financial services and the public sectors.

Looking at the subjective measures of the socio-economic dimension, namely 'satisfied with available money' and 'household status', the results indicated that cross-border migrants and the native Gauteng population were somewhat more satisfied than the internal migrants with the money they had available to spend. Generally, when asked to judge their household's status all groups reported this to be poor.

In summary, cross-border migrants had on average a lower level of education and work in lower skilled sectors than the South Africans (the native Gauteng population and internal migrants). However, a higher percentage of cross-border migrants were employed, and they earned approximately the same income as the native Gauteng population.

In the fourth dimension 'socio-political participation', the indicators 'politics is a waste of time', 'no one cares about people like you' and 'people like you cannot influence development in your community' were answered very similarly by all groups.

The fifth dimension is 'health', with the two indicators 'how often does ill health prevent you going to work' and 'how often does ill health prevent you from taking part in social activities'. The answer to these questions were highly correlated and show in both cases that internal migrants and the native Gauteng population were more likely than the cross-border migrants to have their health keep them from going to work or participating in social activities. The last dimension was the 'safety dimension', in which similar replies were received from all groups.

The main differences between internal and cross-border migrants and the native Gauteng population were within the dimensions 'housing and basic services', and 'socio-economic status'. In the other dimensions, the indicators had comparable values. I found the effect size of the differences in the means of the groups to be very small and approaching zero, indicating that the quality of life of all people in Gauteng is almost equal for the sample, despite the quality of life within the dimensions differing slightly. Once all these dimensions were aggregated, the differences between the quality of life scores of the different groups equalled out.

7. CONCLUSION

In this research paper I measured the quality of life of cross-border and internal migrants in Gauteng, and compared this to the quality of life of the native population. This is one of the first studies internationally to link migration research and the measurement of quality of life of migrants at a micro-level.

To measure quality of life, I constructed a composite index using the method of Nicoletti et al. (2000), adapted by Greyling and Tregenna (2014), to the analysis of categorical data used in quality of life research. The method objectively weights the index using the explained variance in the data set.

To compare the means of the quality of life scores to determine if there was a statistically significant difference between the groups, I used the statistical method ANOVA and I calculated the effect size of the differences in the means. Lastly, I deconstructed the composite index of quality of life to identify the dimensions and indicators, which contributed to differences found.

The results showed that the quality of life scores of internal migrants, cross-border migrants and the native Gauteng population were almost equal, with a very small effect size approaching zero. This finding contradicts previous results found in the subjective well-being literature, which showed that the well-being of migrants was lower than that of the native population.

However, the ANOVA and post-hoc testing showed statistically significant differences between the means of internal and cross-border migrants, on the one hand, and the native Gauteng population, on the other. These differences were mainly in the 'housing and basic services' dimension and the 'socio-economic' dimension. Migrants had less access to formal housing and basic services than the native Gauteng population, and cross-border migrants had lower education levels than internal migrants and the native Gauteng population. Despite these differences, cross-border migrants had a higher employment rate, and earned approximately the same income, as the other groups. Future research is needed to investigate the likely reasons for the higher employment rates of cross-border migrants compared to South African citizens. Nevertheless, when the individual dimension scores of each of the groups were aggregated the differences between the composite scores of the different groups almost equalled out.

Possible explanations for the relatively equal experienced quality of life of the groups are: (1) the geographical region of the study representing South-South migration, compared to previous studies, which represented South-North migration, and (2) the type of measuring instrument used to measure well-being. Migrants who migrate South-South often migrate from very poor countries to wealthier countries in which the living conditions are better, and therefore their experienced quality of life improves compared to living conditions in their home countries. Their experiences of quality of life are thus comparable to that experienced by the native population. Moreover, a multi-dimensional measure that includes objective and subjective measures of well-being, as was developed in this research paper, might give a more holistic and reliable measure of quality of life than a single indicator such as subjective well-being.

As the experienced quality of life of migrants and the native Gauteng population is very alike in the region, it is probable that the inflow of migrants to the region will continue. These inflows can pose challenges, specifically in the areas of housing, the provision of basic services and health care. Therefore stricter legislation is needed to regulate the inflow of migrants. Furthermore, the selection process should be managed to ensure that the maximum value is achieved from the inflow of human capital to the region.

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