THE SILENT SUCCESS:
DELIVERY OF PUBLIC ASSETS SINCE DEMOCRACY

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CONTENTS

1. INTRODUCTION

Most developing economies often yield positive economic growth, which however is simultaneously associated with little or no change in non-income welfare. This paper will estimate the extent to which non-income welfare has improved since democracy. The focus is on the public assets, measuring their delivery to the poor between 1993 and 2011.

Through utilizing an approach for generating an asset index, namely factor analysis, both the reduction in the incidence of asset poverty as well as measures of the changes in asset inequality since 1993 will be estimated. For comparability and scientific verification purposes, the nationally representative household survey data are relied on for the analysis in this chapter.

2. DATA AND METHODOLOGY

Four sources of data were utilized for the analysis, namely the 1993 South African Integrated Household Survey from the Project for Statistics on Living Standards and Development (PSLSD), the 1999 October Household Survey (OHS), as well as the 2005 and 2011 General Household Surveys (GHS). For more information on the data sources, see Appendix A.

All four datasets were cleaned and aligned to enable accurate comparisons between the four years. Variables were renamed to ensure uniformity. In addition, all variables not used in the analysis were removed from the datasets and the four clean datasets used in the analysis only contain household-level information.

Factor analysis was used to derive the public asset index at household level. It is a statistical method for deriving the scoring coefficients or weights for each dimension of the asset variable, before using these coefficients to derive the public asset index. Households having low index scores are asset poor, while those with high index scores are relatively well off in asset ownership. For more detailed discussion of the factor analysis methodology, refer to Appendix B.

3. EMPIRICAL FINDINGS

3.1 Factor Analysis Results

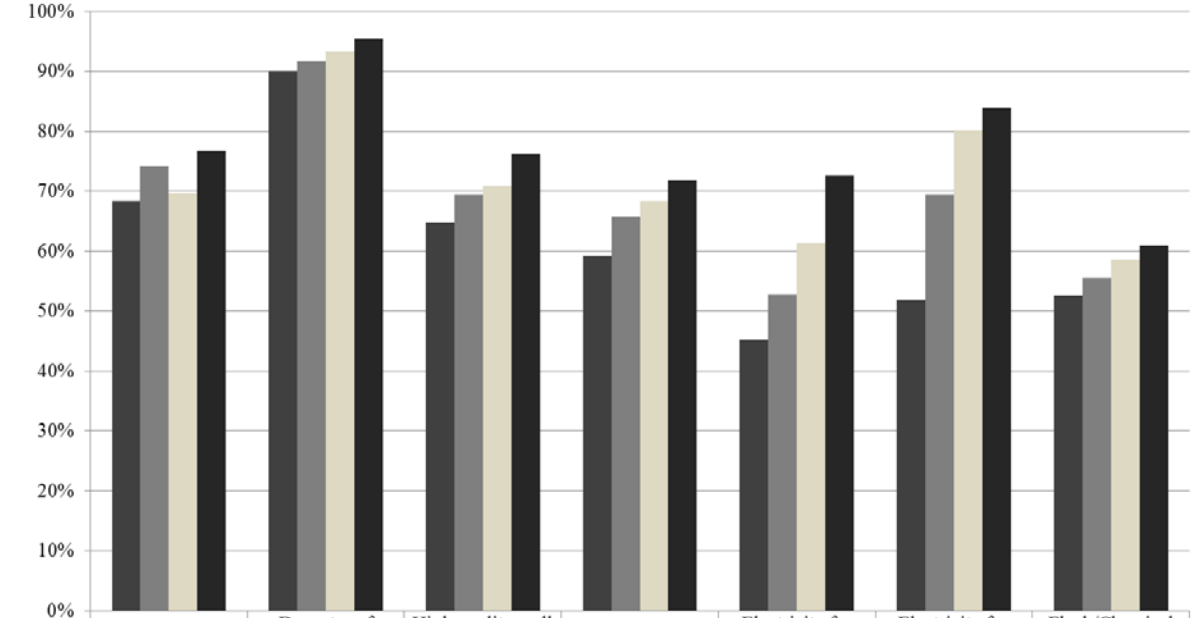
Seven public asset variables were used in the construction of the public asset index, namely dwelling type, roof material of the dwelling, wall material of the dwelling, main source of drinking water, main energy source for cooking, main energy source for lighting, and type of sanitation facility[1].

Figure 1 presents the household access rates for the assets in the four surveys, and it can be seen that, with the exception of formal dwelling, the percentage of households with decent roof material[2], high-quality wall material[3], piped water, electricity for cooking, electricity for lighting as well as flush or chemical toilet increased steadily over the 18-year period. Despite the fact that the percentage of households residing in formal dwelling decreased from 74.2 percent to 69.8 percent between 1999 and 2005, in absolute terms, the number of households living in a formal dwelling increased from 7.98 million to 8.87 million

[1] The categories included in each asset as well as the number and proportions of households with access to each category for each of the four years are available from the authors on request.
[2] Decent roof material includes: bricks, tile, asbestos, and corrugated iron/zinc.
[3] High-quality material includes: bricks, cement block and concrete.

over the six-year period. The decline in the proportion of households with access to formal dwelling could be attributed to the increase of the number (and therefore relative proportion) of households staying in informal dwelling or shack not in backward in 2005. This trend, in turn, could be explained by the fact that some households migrated into urban or semi-urban areas looking for employment and these households then settled into an informal dwelling.

Figure 1: Household access to public assets, 1993-2011



	Formal dwelling	Decent roof material	High-quality wall material	Piped water	Electricity for cooking	Electricity for lighting	Flush/Chemical toilet
1993	68.3%	89.9%	64.8%	59.3%	45.2%	51.9%	52.6%
1999	74.2%	91.7%	69.5%	65.7%	52.7%	69.5%	55.5%
2005	69.8%	93.3%	71.0%	68.4%	61.3%	80.2%	58.6%
2011	76.7%	95.5%	76.2%	71.9%	72.6%	83.9%	60.9%

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Note: Decent roof material includes: bricks, tile, asbestos, and corrugated iron/zinc.
High-quality material includes: bricks, cement block and concrete.

The four datasets (1993, 1999, 2005 and 2011) were pooled and factor analysis was performed on the pooled sample. Table 1 presents the scoring coefficients (asset weights) for the public asset index produced by the factor analysis, based on equation (2) in Appendix B. The signs of the weights are all as expected, with positive signs indicating the ownership of or access to the assets associated with relatively higher levels of welfare. From the table, it can be seen that relatively large positive weights were derived for residence in formal dwelling, high-quality wall material, access to piped water, electricity for cooking, electricity for lighting, and access to flush or chemical toilet facility.

Table 1: Scoring coefficients or asset weights for the public asset index

Dwelling: Formal	0.6286
Dwelling: Informal	-0.3369
Roof material: Bricks	0.0980
Roof material: Tile	0.4074
Roof material: Asbestos	0.2439
Roof material: Thatch	-0.3422
Roof material: Inferior quality	-0.0727
Wall material: High quality	0.6577
Wall material: Low quality	-0.3183
Water source: Piped water	0.7362
Water source: Borehole	-0.2039
Water source: Surface water	-0.4434
Energy source for cooking: Electricity	0.8205
Energy source for cooking: Paraffin/Coal	-0.4430
Energy source for cooking: Wood/Dung	-0.5650
Energy source for lighting: Electricity	0.7893
Energy source for lighting: Candles	-0.6600
Energy source for lighting: Other inferior sources	-0.0637
Sanitation: Flush/Chemical toilet	0.7339
Sanitation: Pit latrine without ventilation	-0.4571
Sanitation: Bucket latrine	-0.1305
Sanitation: None	-0.4083

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Note: Reference category:
Dwelling: Traditional
Roof material: Corrugated iron/zinc
Wall material: Medium quality
Water source: Public tap
Energy source for cooking: Gas/Solar energy
Energy source for lighting: Paraffin
Sanitation: Pit latrine with ventilation

The weights were then applied to the pooled dataset and the asset index values for all households across the four surveys were estimated. Note that it is possible that the derived asset index for a household can have a negative value, if the household mostly has access to those assets with negative coefficients. Table 2 provides the summary statistics for the asset index for the four years. Although the actual value of the asset index is not meaningful as it does not reflect any monetary value, it should be kept in mind that the higher the value of the index of a household, the less asset poor that household is, as a relatively higher asset index value reflects a “basket” of public assets, indicating a relatively asset wealthy household. The table shows that the mean value of the asset index increased continuously across the four years, implying that the average household became less asset poor over the period.

In addition, the change in the asset index between 1993 and 1999, 1999 and 2005, as well as 2005 and 2011 is statistically significant. Hence, the results from the table provide preliminary evidence that the mean South African household’s public asset entitlement deprivation declined over the 18-year period under study. Furthermore, the changes in the mean values of the asset index suggest non-linearity in service delivery, as indicated by the fact that there is a larger improvement between 1993 and 1999 (the mean asset index increased more rapidly between these two years), compared with the 1999-2005 and 2005-2011 periods.

Table 2: Mean public asset index in each year

Year	Mean	Standard deviation	t-statistic
1993	-0.2993	1.0813	
1999	-0.0905	0.9868	-20.9072*
(Change 1993-1999)	(0.2088)		
2005	0.0368	0.9267	-6.7632**
(Change 1999-2005)	(0.1273)		
2011	0.2068	0.9551	-34.9796***
(Change 2005-2011)	(0.1700)		

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Notes: * Statistically significant at 5% level.
The change in mean public asset index between the two periods is shown in brackets.

3.2 Non-Income Poverty Levels and Trends

In this section, two poverty lines were derived, namely the values at the 20th percentile and 40th percentile of the asset index distribution in 1993[4]. In and of themselves, these asset poverty lines are not useful, but they do serve as a reference point when comparing the 1999, 2005 and 2011 distributions.[5]

The standard FGT class of poverty measures (Foster, Greer and Thorbecke, 1984), widely known as the FGT measures, are used to conduct the poverty analysis. The focus is on the poverty headcount ratio (HC) and poverty gap ratio (PG) by race of the household, gender of the household, and province of residence.

Given that the asset index values at the 20th and 40th percentiles respectively in 1993 were used to calculate the 'reference' poverty lines, the poverty headcount ratios were 0.2 and 0.4 respectively in 1993, as expected. Using the poverty line at the 40th percentile, Table 3 and Figure 2 shows that asset poverty decreased continuously across the four surveys. In particular, it almost halved between 1993 and 2005. The decrease was most rapid between 1993 and 1999 (38.4 percent), while the 2011 poverty headcount ratio (0.1391) was only slightly above one-thirds of the 1993 ratio. The result corroborates the findings in Table 2, as there is an apparent non-linearity in public asset service delivery over the 1993-2011 period, with relatively faster delivery taking place in the first six years (1993-1999).

All the changes in the ratios across the surveys were statistically significant. Very similar findings could be observed using the poverty line at the 20th percentile. Table 3 also presents the poverty gap ratios at the two poverty lines in the surveys under study, once again, a similar continuous downward trend is observed, as in what happened to the poverty headcount ratios as discussed above.

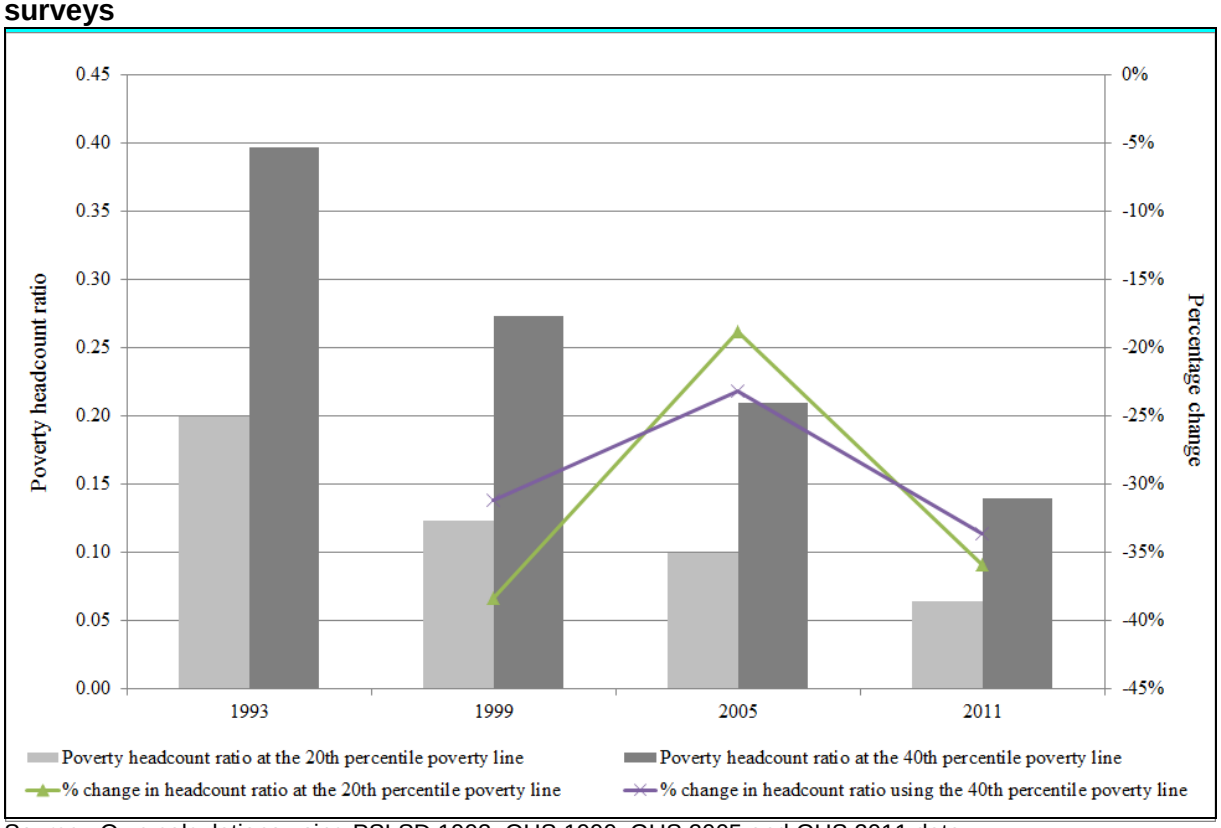
[4] These two values are -1.4879 and -0.8977 respectively.
[5] In order to calculate measures of asset poverty and inequality, all the values of the asset index cannot be negative. Since it is found that the minimum asset index value in the pooled dataset is -2.1194, a constant value of 2.1194 is added to each asset index to ensure that all the asset index values in all four years were non-negative, before the poverty and inequality analyses could be conducted.

Table 3: Measures of poverty in each year

Year	Poverty line at 20th percentile		Poverty line at 40th percentile	
	HC	PG	HC	PG
1993	0.1995	0.0761	0.3966	0.1917
1999	0.1229*	0.0521	0.2730*	0.1237
2005	0.0998*	0.0453	0.2096*	0.0980
2011	0.0640*	0.0241	0.1391*	0.0617

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Notes: An asterisk denotes that the change in the poverty headcount ratio between two consecutive periods is statistically significant at the 5% level.

Figure 2: Poverty headcount ratios and percentage change of the ratio between surveys



Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Looking at asset poverty levels and trends in greater detail, Table 4 shows what happened by gender of the household head, and it is interesting that at both poverty lines and for both poverty ratios, the difference between the female ratio and the male ratio has narrowed throughout the years. For instance, in 1993, the difference between the female and male poverty headcount ratios was 0.0678 (0.2493 – 0.1815), but it was only 0.0074 (0.0686 – 0.0612) in 2011.

The narrowing of the differences in public asset poverty rate by gender as found above is different from the findings from recent studies (Rogan, 2010; Posel & Rogan, 2012) which looked at income poverty by gender. These studies found that the extent and depth of poverty was significantly higher for females and female-headed households. In addition, a greater decline in poverty among males and male-headed households resulted in the widening of the differences in income poverty rates by gender.

Furthermore, Table C.1 in Appendix C shows that at both poverty lines, female-headed households accounted about one-thirds of asset poor in 1993, before increasing to just below 50 percent in 1999. Afterwards, a downward trend took place, as this share dropped to 45 percent in 2005 and further to approximately 40 percent in 2011.

Table 4: Measures of poverty by gender of household in each year

Year	Poverty line at 20th percentile		Poverty line at 40th percentile	
	HC	PG	HC	PG
		1993		
Male	0.1815	0.0701	0.3635	0.1748
Female	0.2493	0.0924	0.4872	0.2379
		1999		
Male	0.1007*	0.0410	0.2321*	0.1030
Female	0.1599*	0.0705	0.3412*	0.1583
		2005		
Male	0.0879	0.0391	0.1835*	0.0861
Female	0.1200	0.0559	0.2541*	0.1182
		2011		
Male	0.0612*	0.0227	0.1344*	0.0597
Female	0.0686*	0.0264	0.1469*	0.0651

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Notes: An asterisk denotes that the change in the poverty headcount ratio between two consecutive periods is statistically significant at the 5% level.

In Table 5, the changes in poverty levels in the four population groups are presented. African-headed households had the highest poverty headcount ratios across all four years using both poverty lines. In fact, the racial breakdown of the racial poverty shares shows that more than 97 percent of the asset poor households were headed by blacks, as shown in Table C.2 in Appendix C.

The African-headed households, however, benefited considerably from the aggregate decrease in asset poverty throughout the period. This can be indicated by the fact that the 2011 poverty headcount ratio for these households was less than one-thirds of the ratio in 1993, and this took place in both poverty lines. Similar trends could be observed for the black-headed households when looking at the poverty gap ratios.

Looking at the coloured-headed households, it is interesting that asset poverty increased between 1993 and 1999, before a decline took place between 1999 and 2005, but poverty only decreased negligently between 2005 and 2011. Finally, the table shows that poverty levels for Indian-headed and white-headed households have always been extremely low throughout the years.

Table 5: Measures of poverty by race of household in each year

Year	Poverty line at 20th percentile		Poverty line at 40th percentile	
	HC	PG	HC	PG
		1993		
African	0.2798	0.1067	0.5520	0.2678
Coloured	0.0030	0.0004	0.0367	0.0097
Indian	0.0000	0.0000	0.0000	0.0000
White	0.0000	0.0000	0.0010	0.0001
		1999		
African	0.1627*	0.0691	0.3571*	0.1630
Coloured	0.0242*	0.0093	0.0824*	0.0299
Indian	0.0022	0.0004	0.0104	0.0023
White	0.0000	0.0000	0.0055*	0.0009
		2005		
African	0.1282	0.0583	0.2676*	0.1255
Coloured	0.0097*	0.0037	0.0334	0.0132
Indian	0.0061	0.0015	0.0075	0.0043
White	0.0002	0.0001	0.0041	0.0007
		2011		
African	0.0808*	0.0304	0.1746*	0.0078
Coloured	0.0098	0.0038	0.0311*	0.0121
Indian	0.0009	0.0000	0.0028	0.0011
White	0.0000	0.0000	0.0000*	0.0000

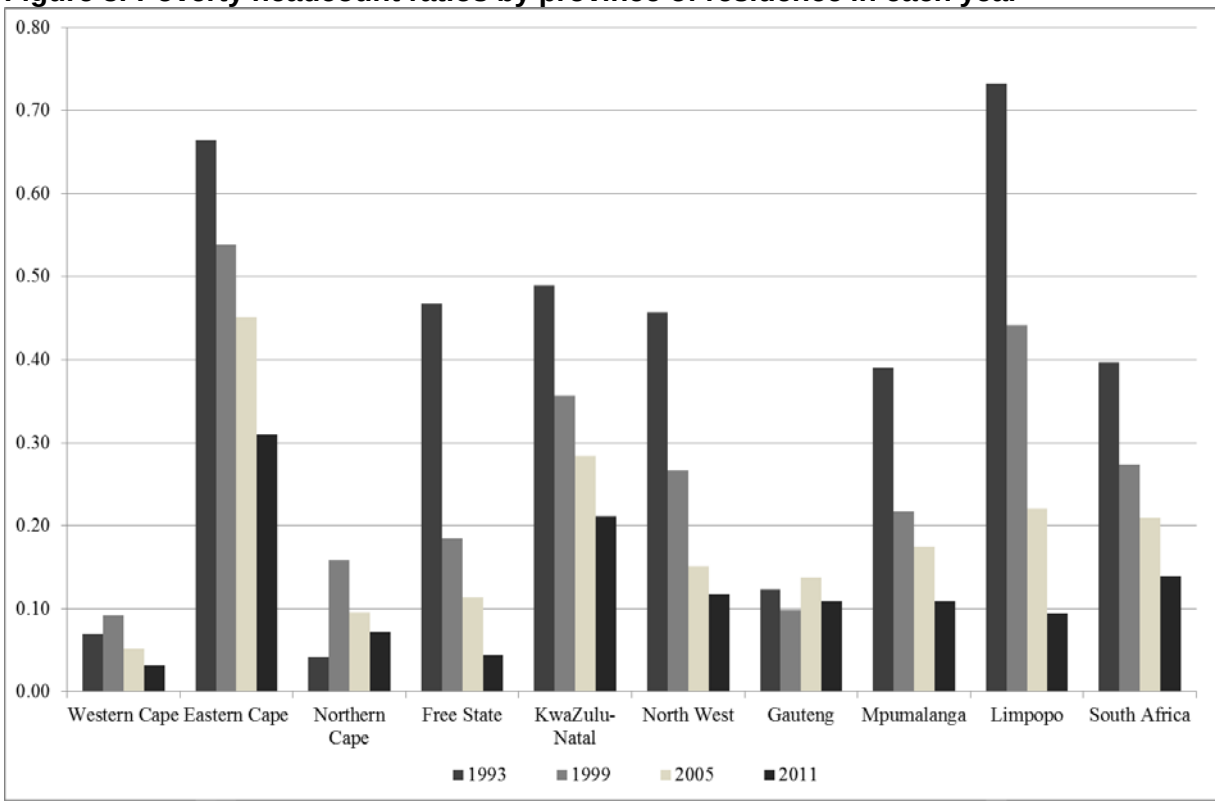
Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Notes: An asterisk denotes that the change in the poverty headcount ratio between two consecutive periods is statistically significant at the 5% level.

With regard to poverty by province of residence, Table C.3 in Appendix C shows that Eastern Cape and KwaZulu-Natal accounted for the highest shares of the asset poor, while the shares were the lowest in Western Cape and Northern Cape. The latter results are probably due to the fact that Western Cape is the most developed province in South Africa, while Northern Cape is the smallest province with the lowest population size. Notably, the share of poor accounted for by the Gauteng province shows a continuous upward trend, increasing from 4.8 percent to 24.3 percent between 1993 and 2011 at the 20th percentile poverty line, and increasing from 6.8 percent to 20.3 percent between the two years at the 40th percentile poverty line. However, the opposite happened when looking at the Limpopo share (decreasing from 16.4 percent to 3.8 percent and from 19.7 percent to 6.6 percent between the two years, as the 20th and 40th percentile poverty lines respectively).

Figure 3 shows the levels of asset poverty by province in the four surveys under study[6], and it can be seen that poverty has always been relatively lower in the Western Cape, Gauteng and Eastern Cape, despite experiencing an increase between some surveys. For the other six provinces, although poverty levels were higher, a continuous downward trend took place across the surveys. For instance, the figure shows that, at the 40th percentile poverty line, an abrupt decrease of poverty headcount ratio took place in Free State and Limpopo between 1993 and 1999. In fact, as a result of the relatively more rapid decline of poverty in these two provinces, by 2011, these provinces yielded the second and third lowest poverty headcount ratios, after Western Cape. This finding might be indicative that government has been more successful in targeting the delivery of public assets to households in these two provinces.

[6] Table D.1 in Appendix D shows both the poverty headcount ratios and poverty gap ratios by province.

Figure 3: Poverty headcount ratios by province of residence in each year



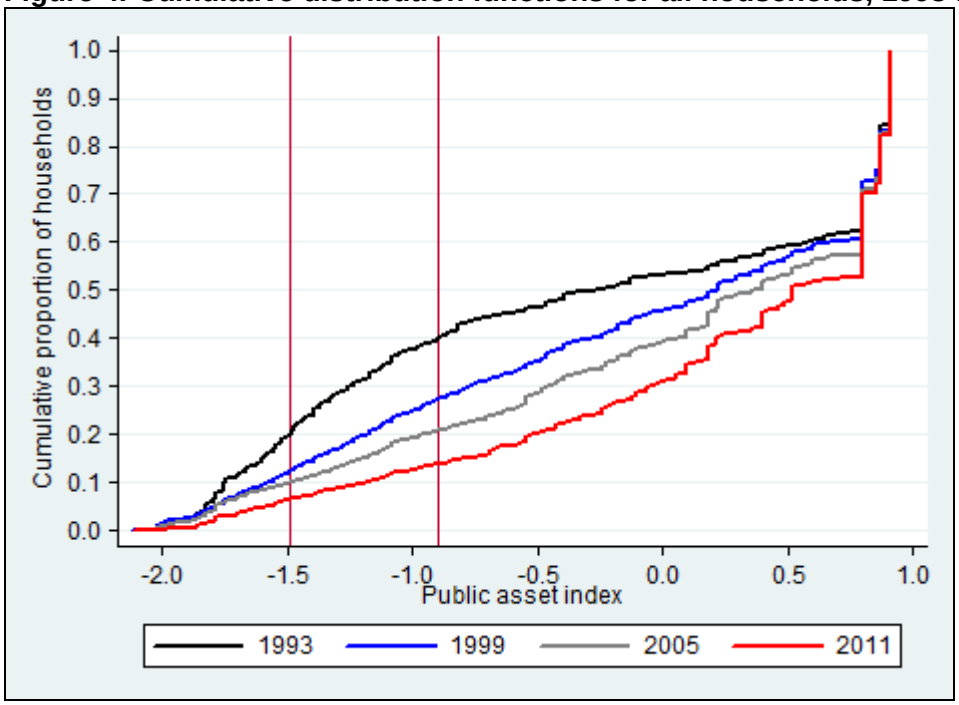
Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Another way of examining the changing pattern of asset poverty is by plotting cumulative distribution functions (CDFs). In the case of the public asset index at household level, the vertical axis of the CDF shows the percentage of households with an asset index value that is lower than or equal to the asset index value on the horizontal axis. As the asset index increases, the corresponding cumulative proportion of households would also increase. The strength of this approach is that it makes it possible to compare the changes in poverty from one period to the next (or poverty amongst various demographic groups, such as race, gender, province), independent of any single asset poverty line.

If the CDF for a given period lies above the CDF for the previous period on the horizontal axis, this means that poverty has increased, regardless of which poverty line is chosen. In contrast, if the CDF for a period lies below the CDF for the previous period, this means poverty has decreased at all feasible poverty lines. However, if the two CDFs cross each other, this implies that the comparison of poverty estimates between the two periods is sensitive to the poverty line chosen.

Figure 4 shows the CDF graphs for all households in the four surveys, with the two vertical lines presenting the asset index values at the 20th and 40th percentiles in 1993, as explained earlier. It can be seen that at all asset values below 0.8, the 1993 graph lies above the 1999 graph, the 1999 graph lies above the 2005 graph, and the 2005 graph lies above the 2011 graph. This finding suggests that the poverty headcount ratio is not sensitive to the poverty line being chosen, as long as the poverty line index value is below 0.8. In addition, the gap between the 1993 and 1999 is the greatest, implying that the extent of decline of poverty was relatively greater between these two years. Similar findings as discussed above are also observed when looking at the CDF graphs for African-headed households.

Figure 4: Cumulative distribution functions for all households, 1993-2011

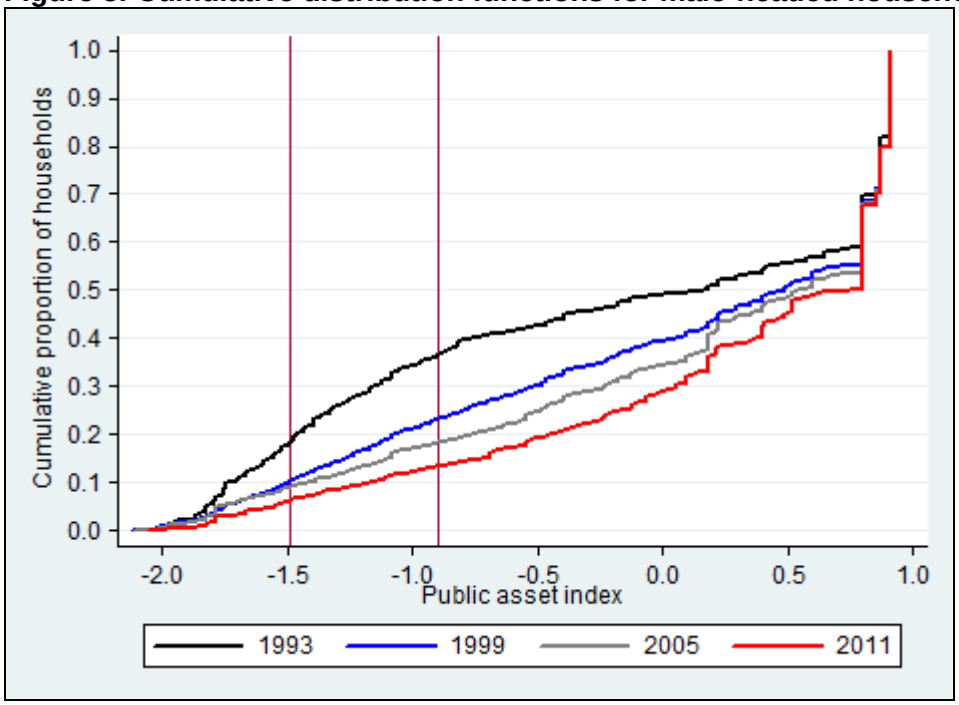


Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Figures 5 and 6 show the CDF graphs for male-headed and female-headed households respectively. Once again, it can be seen that, in general, the poverty headcount ratios are not sensitive to the poverty line being chosen. In addition, for male-headed households, it is obvious that poverty decreased more rapidly between 1993 and 1999, but the decrease became slower since 1999, as indicated by the fact that the 1999, 2005 and 2011 CDFs are quite close together. This once again confirms the findings in Tables 2 and 3 that a relatively faster delivery of public assets took place between 1993 and 1999.

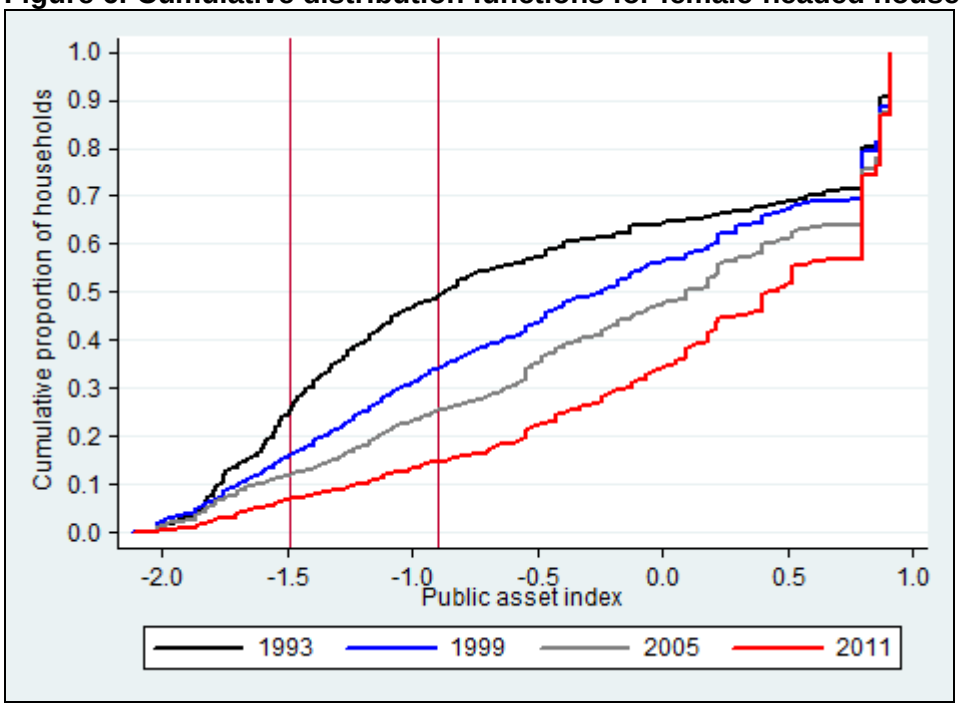
Conversely, for female-headed households, Figure 6 clearly indicates that the gap between the CDFs are relatively larger for female-headed households, implying that the extent of poverty decline throughout the years was more rapid for the female-headed households, thereby accounting for the small difference between the female and male poverty headcount ratios by 2011, as explained earlier in Table 4.

Figure 5: Cumulative distribution functions for male-headed households, 1993-2011



Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Figure 6: Cumulative distribution functions for female-headed households, 1993-2011



Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

3.3 Non-Income Inequality Levels and Trends

The changes in public asset inequality are evaluated in this section. Table 6 presents the Gini coefficients using factor analysis derived asset index values. Looking at all households, two important points can be observed. Firstly, asset inequality was much lower than income inequality Secondly, asset inequality decreased continuously across the four surveys, contradicting the upward trend in income inequality as found by recent studies (Bhorat, Van der Westhuizen & Jacobs, 2009; Leibbrandt, Woolard, Finn & Argent, 2010).

Table 6: Gini coefficients

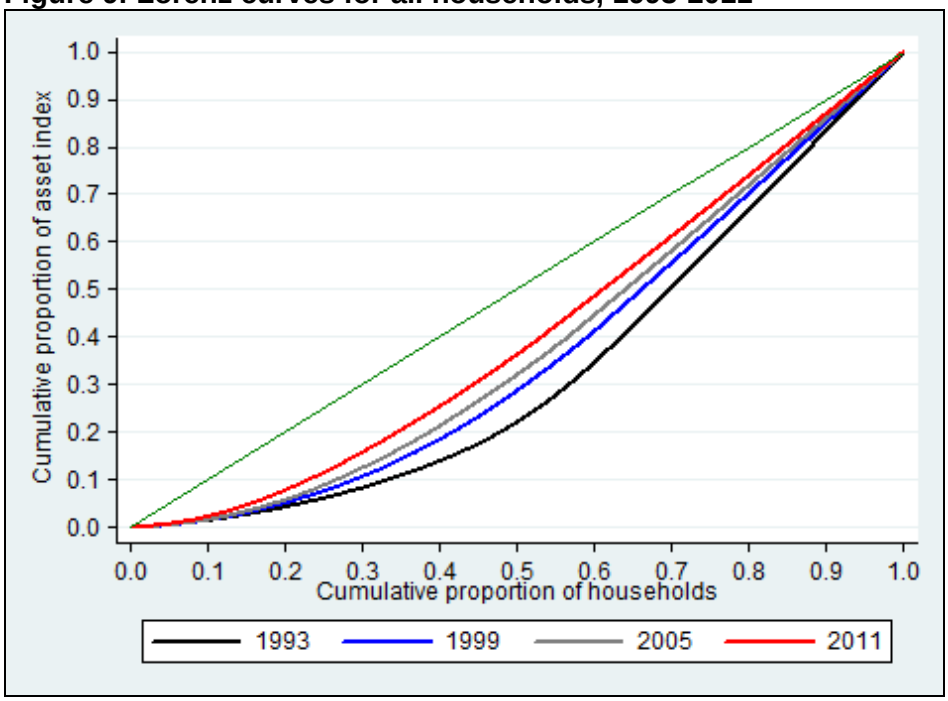
Year	1993	1999	2005	2011
		All		
All	0.3314 (0.3262 0.3365)	0.2686* (0.2650 0.2722)	0.2339* (0.2299 0.2379)	0.1848* (0.1813 0.1882)
		Gender		
Male	0.3122 (0.3054 0.3190)	0.2399* (0.2357 0.2440)	0.2136* (0.2079 0.2192)	0.1782* (0.1732 0.1831)
Female	0.3747 (0.3661 0.3832)	0.3100* (0.3038 0.3162)	0.2651* (0.2591 0.2710)	0.1948* (0.1911 0.1986)
		Race		
African	0.3904 (0.3868 0.3939)	0.3141* (0.3097 0.3185)	0.2725* (0.2681 0.2769)	0.2138* (0.2095 0.2181)
Coloured	0.0984 (0.0845 0.1123)	0.1165* (0.1077 0.1252)	0.0732* (0.0655 0.8092)	0.0675 (0.0607 0.0743)
Indian	0.0106 (0.0070 0.0141)	0.0301* (0.0198 0.0404)	0.0344 (0.0193 0.0494)	0.0231 (0.0142 0.0319)
White	0.0150 (0.0128 0.0172)	0.0193* (0.0171 0.0215)	0.0190 (0.0165 0.0215)	0.0225* (0.0200 0.0250)
		Province		
Western Cape	0.1169 (0.1026 0.1312)	0.1193 (0.1103 0.1283)	0.0961 (0.0842 0.1079)	0.0775* (0.0704 0.0846)
Eastern Cape	0.4451 (0.4337 0.4565)	0.4058* (0.3978 0.4138)	0.3617* (0.3513 0.3722)	0.2825* (0.2740 0.2911)
Northern Cape	0.1327 (0.0986 0.1669)	0.1864* (0.1729 0.1999)	0.1424* (0.1291 0.1557)	0.1266 (0.1141 0.1391)
Free State	0.3618 (0.3472 0.3765)	0.2176* (0.2100 0.2253)	0.1713* (0.1619 0.1807)	0.0938* (0.0877 0.0999)
KwaZulu-Natal	0.4052 (0.3909 0.4195)	0.3283* (0.3202 0.3364)	0.2813* (0.2701 0.2924)	0.2260* (0.2172 0.2347)
North West	0.3188 (0.3071 0.3304)	0.2532* (0.2447 0.2617)	0.2156* (0.2036 0.2276)	0.1820* (0.1691 0.1950)
Gauteng	0.1454 (0.1349 0.1559)	0.1361 (0.1288 0.1433)	0.1516* (0.1416 0.1615)	0.1452 (0.1355 0.1549)
Mpumalanga	0.3212 (0.3061 0.3364)	0.2439* (0.2350 0.2528)	0.2241* (0.2141 0.2340)	0.1762* (0.1663 0.1862)
Limpopo	0.3633 (0.3525 0.3740)	0.2875* (0.2817 0.2933)	0.2306* (0.2228 0.2384)	0.1750* (0.1684 0.1815)

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.
Notes: 95% confidence intervals are in parentheses.
An asterisk denotes that the change in the poverty headcount ratio between two consecutive periods is statistically significant at the 5% level.

Table 6 also shows the Gini coefficients by gender of household head, and it can be seen that the continuous downward trend as mentioned above took place for both male-headed and female-headed households. Furthermore, the difference in asset Gini coefficients between the two genders narrowed in more recent surveys. With regard to asset inequality by race of household head, the table shows that it decreased continuously only for African-headed households. Finally, the table presents Gini coefficients by province of residence, and it is interesting that, with the exception of Gauteng, inequality decreased in all provinces. The decrease was greater in Eastern Cape, Free State, KwaZulu-Natal and Limpopo.

Figure 9 shows the Lorenz curves across the four years by including all households. Decreasing asset inequality between 1993 and 1999, 1999 and 2005, as well as 2005 and 2011 are illustrated by the fact that the 1999 Lorenz curve lies above the 1993 curve, the 2005 curve lies above the 1999 curve, and the 2011 curve lies above the 2005 curve. Similar findings are observed in the male-headed, female-headed and African-headed households, but not in the case of coloured-headed households.

Figure 9: Lorenz curves for all households, 1993-2011



Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

The trends in income inequality based on post-2000 data for South Africa have consistently pointed to a sharp rise in the Gini coefficient, using various measures of income and expenditure across a series of nationally representative surveys. Specifically, Bhorat and Van der Westhuizen (2011) found that the Gini coefficient, calculated using per capita expenditure estimates, increased from 0.64 in 1995 to 0.69 in 2005. Using alternative datasets and per capita income, Leibbrandt, et.al. (2009) estimated that the Gini coefficient increased from 0.66 in 1993 to 0.70 in 2008. Evidence for post-a*partheid* South Africa hence overwhelmingly suggests that one of the most unequal countries in the world had, in fact, become the most unequal.

The non-income inequality results present here, however, show steady and relatively large improvements in the distribution of access to public services between 2003 and 2011. Put differently, the estimates are reflective of a redistributive state which, through improved public service delivery has managed to be ensure declining levels of non-income inequality. In addition, the slightly faster drop in non-income inequality levels for female-headed households is suggestive of a gender bias in the Government's delivery of public services. Finally, all provinces except Gauteng experienced a decline in non-income inequality over the period. This result might be reflective of the fact that the Gauteng province has been unable to keep up with the demand for services generated by the steady inflow of asset poor individuals into the province. Indeed, this trend may be a predictor of future asset and service delivery challenges for the country's economically dominant province.

4. CONCLUSION

Using a factor analysis methodology, a public asset index was constructed as a non-income based measure of welfare. The index in turn also reflects trends in public service delivery in the post-*apartheid* South Africa. Asset poverty, as measured by the headcount rate and poverty gap ratio, declined continuously between 1993 and 2011. The pace of change however was more rapid between 1993 and 1999, indicative of a non-linear decline in asset deprivation levels. In addition, households residing in relatively poor provinces like the Free State and Limpopo, as well as those headed by females and African enjoyed relatively more rapid declines in poverty. While analysis of the trends in income inequality has consistently

shown sharp increases in the levels of inequality in South Africa, the estimates based on the public asset index show steady decreases in the levels of non-income inequality over the period.

A key result, and one which stands in stark contrast to the trends in income poverty for this specific cohort, is the improvement in the non-income welfare levels of female-headed households, both in terms of their poverty rates and inequality estimates. While income poverty estimates continue to show higher poverty levels for these households, the results based on our public asset index suggest an acceleration in service delivery to these households between 2005 and 2011. Due to this positive gender bias in the delivery of state assets, asset poverty levels of female-headed households were almost similar to those of male headed households in 2011. The changes in the inequality estimates for female-headed households support the notion of a gender bias in service delivery.

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APPENDICES

Appendix A: Information on the four data sources

The first source of data is the 1993 South African Integrated Household Survey from the Project for Statistics on Living Standards and Development (PSLSD), conducted by the Southern African Labour and Development Research Unit (SALDRU). The survey collected a wide range of indicators of standard of living, with the main aim being the collection of statistical information about the conditions under which South Africans lived. The information was intended to provide policy makers with the data required for planning strategies to implement the goals outlined in the government's Reconstruction and Development Programme (RDP). The survey only took place once and the data was released in 1994. 8,809 households took part in the survey.

The second data source is the 1999 October Household Survey (OHS). Statistics South Africa (Stats SA) has been collecting labour market data since 1993 with the OHS, which was conducted annually between 1993 and 1999. In the OHSs, in addition to the labour market data, the information on a wide range development and poverty indicators of the households was also captured. 26,134 households took part in the 1999 OHS.

The OHS was replaced by Labour Force Survey (LFS) since 2000, and LFS took place twice a year. Since the second LFS in 2005, the abovementioned household-level questions were generally excluded, but were asked instead in the General Household Survey (GHS), introduced since 2002. This leads to the last two sources of data, namely the 2005 and 2011 GHSs, with 28,129 and 25,086 households taking part in each survey respectively.

Appendix B: Factor analysis

The underlying model takes the following form, following Sahn and Stifel (2000):

$$a_{ik} = \beta_k c_i + \mu_{ik} \quad (1)$$

where the i-th household ownership (represented by the variable a_{ij}) of asset or service, k, is linearly linked to a common factor, c_i, which is termed as household welfare. The strength of the relationship is thus represented by the estimated value of β. The difficulty with the above is that the dependent variable (a_{ik}) and its coefficient (β) are unobservable. However, the use of factor analysis allows direct estimation of the relationship, and hence the construction of the appropriate weights for the household asset and service index.

Specifically, factor analysis proceeds from the assumption that the relationships between the variables under consideration (public assets in this chapter) are reducible to a square correlation matric. In vector form, therefore, and drawing on the notation of equation (1) above, the correlation matrix takes the form a_{ik} which effectively represents the unique correlations between the k public assets across the i households. Factor analysis involves trying to distil these correlations into one unique, common factor, f_{1i}. The values contained in this matrix are commonly referred to as factor loadings for the first common factor.

Technically, deriving these factor loadings on the unique factor are achieved through extracting the maximum possible variance that exists across the asset variables. This involves estimating both the unit roots of the correlation matrix (known as eigenvalues) and their eigenvectors (Cattell, 1965; Child, 1969). More importantly, though, these factor loadings serve as the starting point for constructing or effectively, imputing, the asset index. Put differently, given that it is not possible to impose a weighting structure on the different assets, in their contribution to the overall household welfare, these weights are estimated. Through the process of factor analysis, it is possible to impute an appropriate and acceptable weighting structure for each specific asset available to households. Hence, the information from the unique factor loadings is used to derive:

$$c_i = f_1 a_{11} + f_2 a_{22} + ... + f_k a_{ik} \quad (2)$$

where the values f_1,..., f_k represent the weights being projected onto the observed assets owned by households (Sahn and Stifel, 2000). These values are often referred to as scoring coefficients. These scoring coefficients are then normalized for each household, so as to derive an asset index for each household. The normalization takes place around the mean and standard deviation of each asset. Hence, the asset index is constructed as follows:

$$A_i = f_1\left(\frac{a_{i1} - \mu_1}{s_1}\right) + f_2\left(\frac{a_{i2} - \mu_2}{s_2}\right) + ... + f_k\left(\frac{a_{ik} - \mu_k}{s_k}\right) \quad (3)$$

where μ and s represent the mean and standard deviation for each asset respectively. Households having low index scores are asset poor and those with high asset index are relatively well off in asset ownership.

Appendix C: Gender, racial and provincial shares of the poor

Table C.1: Poverty shares by gender of household head

	Poverty line at 20th percentile				Poverty line at 40th percentile			
	1993	**1999**	**2005**	**2011**	**1993**	**1999**	**2005**	**2011**
Male	66.5%	51.1%	55.5%	59.8%	67.0%	53.0%	55.2%	60.4%
Female	33.5%	48.9%	44.5%	40.2%	33.0%	47.0%	44.8%	39.6%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Table C.2: Poverty shares by race of household head

	Poverty line at 20th percentile				Poverty line at 40th percentile			
	1993	**1999**	**2005**	**2011**	**1993**	**1999**	**2005**	**2011**
African	99.9	98.3	99.1	98.7	99.2	97.1	98.4	98.2
Coloured	0.1	1.6	0.8	1.2	0.7	2.5	1.2	1.8
Indian	0.0	0.0	0.2	0.0	0.0	0.1	0.1	0.1
White	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.0
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Table C.3: Poverty shares by province

	Poverty line at 20th percentile				Poverty line at 40th percentile			
	1993	**1999**	**2005**	**2011**	**1993**	**1999**	**2005**	**2011**
Western Cape	1.1%	3.3%	2.4%	1.2%	1.8%	3.5%	2.5%	2.4%
Eastern Cape	29.4%	34.3%	31.1%	27.0%	23.3%	26.9%	29.3%	27.5%
Northern Cape	0.1%	0.7%	0.7%	0.9%	0.2%	1.3%	0.9%	1.1%
Free State	9.5%	4.1%	3.3%	1.4%	9.3%	4.7%	3.6%	1.9%
KwaZulu-Natal	26.8%	32.3%	32.0%	28.5%	19.6%	25.5%	26.2%	28.8%
North West	4.8%	3.4%	5.8%	7.5%	11.0%	8.1%	5.8%	5.8%
Gauteng	4.8%	7.4%	14.5%	24.3%	6.8%	7.8%	15.4%	20.3%
Mpumalanga	7.2%	5.0%	4.7%	5.5%	8.4%	5.4%	5.2%	5.6%
Limpopo	16.4%	9.5%	5.4%	3.8%	19.7%	16.9%	11.1%	6.6%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Appendix D: Poverty levels by province

Table D.1: Measures of poverty by province of residence of household in each year

Year	Poverty line at 20th percentile		Poverty line at 40th percentile	
	HC	PG	HC	PH
		1993		
Western Cape	0.0204	0.0036	0.0700	0.0300
Eastern Cape	0.4227	0.1789	0.6642	0.3691
Northern Cape	0.0171	0.0052	0.0416	0.0169
Free State	0.2386	0.0739	0.4674	0.2226
KwaZulu-Natal	0.3373	0.1508	0.4899	0.2863
North West	0.0995	0.0354	0.4572	0.1591
Gauteng	0.0438	0.0178	0.1231	0.0497
Mpumalanga	0.1683	0.0583	0.3903	0.1685
Limpopo	0.3069	0.0824	0.7323	0.3154
		1999		
Western Cape	0.0390*	0.0089	0.0914*	0.0397
Eastern Cape	0.3089*	0.1381	0.5379*	0.2792
Northern Cape	0.0399	0.0141	0.1586*	0.0530
Free State	0.0719*	0.0227	0.1846*	0.0732
KwaZulu-Natal	0.2039*	0.1014	0.3568*	0.1926
North West	0.0509*	0.0164	0.2669*	0.0873
Gauteng	0.0417	0.0162	0.0979*	0.0431
Mpumalanga	0.0900*	0.0333	0.2172*	0.0918
Limpopo	0.1112*	0.0336	0.4414*	0.1421
		2005		
Western Cape	0.0241*	0.0083	0.0516*	0.0215
Eastern Cape	0.2281*	0.1058	0.4515*	0.2195
Northern Cape	0.0353*	0.0137	0.0953*	0.0380
Free State	0.0495*	0.0181	0.1133*	0.0508
KwaZulu-Natal	0.1655	0.0779	0.2839*	0.1491
North West	0.0718	0.0322	0.1508*	0.0684
Gauteng	0.0618*	0.0280	0.1377*	0.0651
Mpumalanga	0.0750	0.0311	0.1749*	0.0752
Limpopo	0.0505*	0.0228	0.2203*	0.0713
		2011		
Western Cape	0.0069*	0.0021	0.0317*	0.0110
Eastern Cape	0.1400*	0.0464	0.3100*	0.1301
Northern Cape	0.0258	0.0111	0.0714*	0.0317
Free State	0.0142*	0.0052	0.0439*	0.0162
KwaZulu-Natal	0.0962*	0.0381	0.2107*	0.0926
North West	0.0707*	0.0297	0.1174*	0.0611
Gauteng	0.0598*	0.0226	0.1087*	0.0555
Mpumalanga	0.0497*	0.0209	0.1088*	0.0504
Limpopo	0.0249*	0.0101	0.0948*	0.0315

Source: Own calculations using PSLSD 1993, OHS 1999, GHS 2005 and GHS 2011 data.

Notes: An asterisk denotes that the change in the poverty headcount ratio between two consecutive periods is statistically significant at the 5% level.

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