

Poverty, Inequality and Growth Linkages: National and Sectoral Evidence from Post-Independence Namibia

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This paper provides an overview of poverty, inequality and growth in post-Independence Namibia.

The main findings of the paper are:

- Inequality remained at more or less the same level between 1993/94 and 2003/04, with a very high Gini coefficient of around 0.60 for both periods.
- The finding that the level of inequality hardly changed contradicts previous reports that Namibia's Gini coefficient decreased from 0.70 to 0.60 between 1993/94 and 2003/04.
- Income growth (as measured indirectly by consumption growth) over this ten-year period was higher among the poorest and richest households than among the middle classes.
- In terms of economic sectors, the most significant reduction in poverty was among subsistence farmers.

From 1993/94 to 2003/04, Namibia experienced solid growth in income levels and poverty reduction, but overall inequality remained largely unchanged at one of the highest levels in the world. This was because the income levels of both the poorest and richest sections of Namibian society rose rapidly during the ten-year period, while the middle classes did not gain to the same extent.

In terms of the impact on poverty reduction, growth in income levels appears to have been much more important than changes in welfare distribution.

The second part of the study focuses on developments by economic sector. The population share of urban sectors increased relative to rural ones, pointing towards a trend of rural-urban migration. All sectors experienced positive real expenditure growth; the three most important sectors, namely subsistence farming, urban and rural wage earners, saw average growth in expenditure of 3.5 to 3.9 percent annually. Of these sectors, urban wage earners had the lowest incidence of poverty.

Intra-sectoral developments were far more important for overall poverty reduction than population shifts between sectors. Most important was the reduction in poverty among subsistence farmers, which constituted around half of the total decrease.



1 Introduction

Ever since Namibia came into being as an independent country in 1990, socio-economic assessments of the country have pointed out the country's high levels of poverty and inequality (see Central Statistics Office 1996; Central Bureau of Statistics 2006; UNDP, 2007). At the same time, average economic growth has been strong by regional standards. This paper provides an overview of the trends in poverty, inequality and growth in post-Independence Namibia and attempts to trace the relationship between them. The importance of the linkages between poverty, inequality and growth has received increasing attention in the development literature, in particular the impact of growth and inequality on poverty reduction. While there is much speculation regarding these linkages in Namibia, little rigorous analysis has been done in this regard.

Based on household consumption expenditure, this study is aimed at filling this gap and contributing to our understanding of the developments in household welfare in the country. The analysis relies on a new poverty line developed by the Central Bureau of Statistics (2008a) and comparable consumption aggregates as derived by Schmidt (2009). It further investigates whether there is evidence for some of the linkages put forward in the theoretical and international literature. More specifically, the paper explores the role economic growth and inequality changes have played in poverty reduction in Namibia. The analysis is extended by a sectoral breakdown that allows profiling poverty, inequality and growth by different segments of the economy. It further enables an identification of the sectors that contributed most to poverty reduction and whether there is evidence for correlations between sectoral growth, poverty reduction and inequality.

The data source for this paper is the Namibia Household Income and Expenditure Survey (NHIES) datasets for 1993/94 and 2003/04. The two NHIES are currently the only representative budget surveys available for post-Independence Namibia, limiting the period for analysis to the ten years between them. Both surveys are weighted, nationally-representative household budget surveys which follow a stratified, two-stage probability sample design.

The chosen welfare measure is household consumption expenditure, which has been found to be a better predictor of long-term welfare than household income, especially among poor households (Fields, 2001). The consumption data include cash purchases and imputed values for items stemming from in-kind trade and own production. All expenditure values in the analysis are expressed as monthly per-capita consumption expenditure, scaled by a commonly used adult-equivalence scale¹. Household sample weights are adjusted for household size (i.e. the data is weighted by individuals) due to the tendency of poorer households to be larger than richer ones. The use of individual rather than household weights thus avoids underestimating the extent of poverty among the population, which would otherwise occur.

The paper is structured as follows: The second section introduces the theory and international evidence of links between poverty reduction, growth and inequality. The third section provides an overview of national trends in growth, poverty incidence and inequality in post-Independence Namibia. An analysis of whether growth has been pro-poor over the period under review follows in the fourth section. Section five compares the relative contributions of growth and redistribution to overall poverty reduction. The sixth section provides a decomposition of poverty, growth and inequality by economic sector. It also probes if there is evidence for some of the correlations found in the international literature. A summary and conclusions follow in section seven.

¹ Adult-equivalence scales are used to approximate the notion that a child has lower consumption needs than an adult. Scaling weights: from age 0 to 5 = 0.5; age 6 to 15 = 0.75; age 16 and above = 1.

2 Theory and international empirical evidence

A relatively broad consensus has emerged among development economists in recent years that sustained growth plays a positive role in reducing poverty (Dollar and Kraay, 2002; Ravallion, 2001; Klasen, 2004; Bourguignon, 2004). What is still being debated, however, is the magnitude of this impact and which other conditions influence it. One factor of importance that has been identified is the level of inequality prevalent in society. Based on an absolute poverty line and mean expenditure as the chosen welfare measure, changes in poverty can be fully attributed to the impact of expenditure growth and changes in inequality (Bourguignon, 2004). More specifically, poverty reduction can thus be due to overall growth in which poor households share proportionally, therefore lifting some of them out of poverty, or due to a decrease in inequality at a given expenditure mean. Methodologies have been developed to make a distinction between the so-called growth effect and redistribution effect on poverty tractable (Huppi and Ravallion, 1992; Kakwani, 1997). One should note that shifts in the distribution are not necessarily due to redistribution in the sense of taking from high-expenditure households and giving to poorer ones, but that they can follow from a variation in growth rates between expenditure quantiles.

While the determination of poverty changes from growth and redistribution is tractable in a descriptive sense, the causal relationships between poverty, growth and inequality are complex and interdependent (Fields, 2001). If growth is heterogeneous across households, it will lead to changes in inequality. Changes in inequality, on the other hand, may have an impact on future growth. For example, worsening inequality could lead to poorer households becoming more risk-averse (or worsen their access to credit), thus rendering them unwilling (or unable) to exploit growth-promoting opportunities. Increases in poverty may have similar effects, for example due to the inability to accumulate physical and human capital, leading to lower growth among poor households, which also changes the relative welfare distribution by increasing inequality. There may, however, also be adverse effects on growth from redistribution; if agents do not reap the full gain of growth-inducing activities, for example because part of it is taxed away, they will have less incentive to engage in such activities. One must therefore be cautious with counterfactual claims such as “had government only reduced inequality by x percent, then growth would have led to y percent less poverty”. For this to hold, the assumption is required that growth would have been no lower with more redistributive policies (Ravallion, 2002). Aside from these behavioural links, higher initial inequality reduces the poverty impact of growth, all else being equal, simply because the absolute increments in the welfare of the poor are smaller than under a more equal distribution. Klasen (2004) provides an illustrative numerical example of this observation.

The empirical literature generally confirms that the poor benefit from growth. In their much-quoted cross-country study, Dollar and Kraay (2002) find that the poor tend to benefit as much from growth as the average household and that poverty reduction is fastest where mean income growth is highest. It had also been found that poverty reduction is slower in countries with higher income inequality (Deininger and Squire, 1998; Alesina and Rodrik, 1994). Klasen (2004) reconciles these results by pointing out that Dollar and Kraay (2002) only find a close correlation between average income growth and the proportionate income growth rate of the poor; poverty reduction is nonetheless easier in countries with lower inequality, because at a given growth rate, the proportionate income gains of the poor are larger in absolute terms. While a review of the cross-sectional literature points towards the absence of a systematic relationship between inequality and growth (Fields, 2001), there are indications that high initial levels of inequality have an adverse effect on subsequent growth (Alesina and Rodrik, 1994; Ravallion, 2001).

As has been pointed out, cross-country regressions suffer from the imprecision of averaging a diverse set of variables. To begin with, the nature of economic growth is not homogenous across countries, but it is the result of a plethora of processes and circumstances that vary with each case. Moreover, the measurement of poverty and inequality, which could in theory be standardised, is subject to different methodologies over time and, even more so, across countries. The finding that inequality has fallen in post-Independence Namibia (CBS, 2006) is a point in case of erroneously comparing different methods to calculate the Gini-coefficient, as will be shown in the next section.

3 An overview of growth, poverty and inequality in Namibia

Based on the NHIES data, it is possible to profile household consumption expenditure, poverty and inequality in Namibia for the periods 1993/94 and 2003/04. Table 1 presents the estimated values of mean per capita consumption, poverty incidence and inequality for the two survey years, as well as the respective rates of change.

Monthly consumption per capita, adjusted by an adult-equivalence scale and expressed in 2003/04 Namibia dollars², is estimated at N\$474 in 1993/94 and N\$742 in 2003/04. This implies consumption growth by 56.5 percent over the period under review, or an annualised growth rate of 4.6 percent, which is somewhat higher than the average real GDP growth of 4.3 percent annually derived from National Accounts data for that period (Central Bureau of Statistics, 2008b). Average real growth of final private consumption expenditure from the National Accounts is estimated at 3.5 percent per annum. There are a number of potential sources for this discrepancy: Methodological changes between the two NHIES surveys, in particular a more detailed breakdown of consumption items in the NHIES 2003/04, may have led to an overestimation of consumption growth.³ On the other hand, the differences may stem from comparability problems between the NHIES and National Accounts data, for example due to imperfect matching of survey periods. Measurement errors in the National Accounts are not uncommon due to the diversity of data sources or incorrect measurement of the informal sector. In addition, the National Accounts' definition of private consumption aggregate includes spending by non-profit institutions, which do not feature in the NHIES data. For the purposes of this study, the NHIES consumption growth rates are deemed more appropriate as they are based on the same data from which the poverty and inequality estimates are derived.

Table 1: Expenditure growth, poverty and inequality between 1993/94 and 2003/04

	Mean p.c. Expenditure (N\$) ¹	Poverty measures ²			Inequality measures			
		Poverty head-count index (P0)	Poverty Gap Index (P1)	Poverty Severity Index (P2)	Gini	GE(0)	GE(1)	GE(2)
1993/94	473.95	0.580	0.279	0.167	0.612	0.681	0.826	2.448
2003/04	741.82	0.377	0.128	0.061	0.600	0.635	0.777	1.852
Average annual change (%)	4.58%	-4.22%	-7.45%	-9.63%	-0.19%	-0.69%	-0.62%	-2.75%

Notes: 1) monthly, adjusted for adult-equivalence, in 2003/04 N\$

2) Based on Cost of basic needs poverty line of N\$262.45 per month (2003/04 N\$)

All measures calculated with individual weights for adult equivalent consumption expenditure.

Source: Own calculations based on NHIES data.

The incidence of poverty is estimated based on a Cost of Basic Needs (CBN) poverty line. The CBN methodology computes the cost of a basic bundle of consumption goods that are deemed essential. This bundle consists of a food component that yields the minimum daily calorific intake for an adult (in this case 2,100 kcal), based on items typically consumed by the poor, and a non-food component that is estimated from actual spending patterns of households that can just about cover their nutritional needs. The CBN poverty line used in this study was derived by the Central Bureau of Statistics (2008a) and amounts to N\$262.45 in 2003/04 prices per adult per month. Based on this poverty line, poverty measures of the so-called P_α class (Foster, Greer and Thorbecke, 1984) are calculated. The general formula for these measures is

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^\alpha \quad \alpha \geq 0$$

where n is the total population, q the number of poor individuals, y_i the income or consumption of individual i , z the poverty line, and α a parameter measuring poverty aversion. The three P_α measures applied here are the commonly-used headcount index of poverty P_0 , which measures the population share of individuals under the poverty line; the poverty gap index P_1 , which measures the aggregate

² 1993/94 consumption data was adjusted by Consumer Price Index (CPI) inflation to average prices of the 2003/04 survey (September 2003 to August 2004).

³ For a detailed discussion see Schmidt (2009).

consumption deficit of the poor as a proportion of the poverty line and normalised by the population size⁴; and a distribution-sensitive measure, the poverty severity index P_2 , which is similar to the poverty gap index, but here the poverty deficits of the poor are weighted by the deficits themselves rather than equally. The poverty severity index is thus most sensitive to changes at the very bottom of the income distribution.

As presented in Table 1, over the period under review the poverty headcount index decreased significantly from 58 percent to 38 percent of individuals, which amounts to an average decrease of 4.2 percent annually. Both poverty gap and distribution-sensitive poverty gap indices fell even more rapidly, indicating significant improvements of the situation of the average poor individual and the distribution of consumption among the poor.

Finally, inequality is estimated by means of the Gini coefficient and the class of Generalised Entropy measures. The Gini coefficient has been the most popular inequality measure in Namibia and is often used in applied work internationally (Fields, 2001). It can take on a value between 0, representing total equality, and 1, representing total inequality. The Generalised Entropy or $GE(\alpha)$ measures have the advantage that they contain a parameter α that can be adjusted in order to place weight on different parts of the welfare distribution. The lower α , the more sensitive the measure is to changes in the bottom of the distribution. The most common measures are the Theil-L index $GE(0)$, Theil-T index $GE(1)$ and $GE(2)$, which will also be applied in this study. A more detailed description of the Gini coefficient and the $GE(\alpha)$ measures can be found in Annexure 1.

Based on adult-equivalent consumption expenditure, and weighted for individuals, the Gini coefficient is estimated at 0.61 for 1993/94 and 0.60 in 2003/04. These levels rank Namibia among the most unequal societies in the world. The $GE(\alpha)$ measures also register small reductions, the largest of which being found with $GE(2)$, which emphasises changes in the upper end of the distribution. However, none of the inequality changes over time are statistically significant at the 95 percent (or even 90 percent) level. Annexure 2 provides the estimated standard errors and confidence intervals, as well as additional $GE(\alpha)$ measures. A graphical depiction of inequality is the Lorenz curve, which plots the cumulative share in consumption expenditure against population percentiles. Annexure 3 contains the Lorenz curves for both survey years, which confirm just how similar the two distributions are.

All of the applied inequality measures point towards the same finding: We cannot reject the hypothesis that inequality has remained unchanged over time. This is contrary to the conventional wisdom that inequality decreased significantly in Namibia over the period. How did this impression of declining inequality come about? The often-cited trend can be found in Central Bureau of Statistics (2006), which summarises the results of the NHIES 2003/04, pointing out that there was a reduction in the Gini coefficient from 0.70 in 1993/94 to 0.60 in 2003/04. What was apparently not checked, however, is the basis on which the high coefficient for 1993/94 was calculated, for which no written record appears to exist. The 2003/04 calculation, on the other hand, is easy to replicate and analogous to that in this paper, based on consumption expenditure (excluding household investments), adjusted by adult equivalent and weighted by individuals, as opposed to households.

We attempted to achieve the high Gini of 0.70 from the NHIES 1993/94 data with a number of configurations, but to no avail. The highest value achieved was 0.69, by relying on a wider expenditure definition⁵, adjustments per capita without adult-equivalence scale and weighting by households, not individuals.⁶ Each of these changes has a positive impact on measured inequality. It thus appears that the authors of the NHIES 2003/04 Main Report were comparing apples with pears. Based on comparable consumption aggregates, the same adult-equivalence scales and the same type of sample weight, the reduction in measured inequality is too small to distinguish it statistically from no change at all.

⁴ Note that this is different from the average percentage difference of the poor from the poverty line as it also depends on the size of the non-poor population.

⁵ For example including funeral fees, fees for life/pension insurance, building materials, which were excluded for 2003/04; also included rent cost and maintenance of house, which are replaced by imputed rent cost in 2003/04 calculation.

⁶ Anecdotal evidence has it that after the first NHIES, the Gini coefficient had to be estimated based on expenditure deciles rather than individual observations due to a lack of computing power; this may be behind the difference from 0.70 to 0.69.

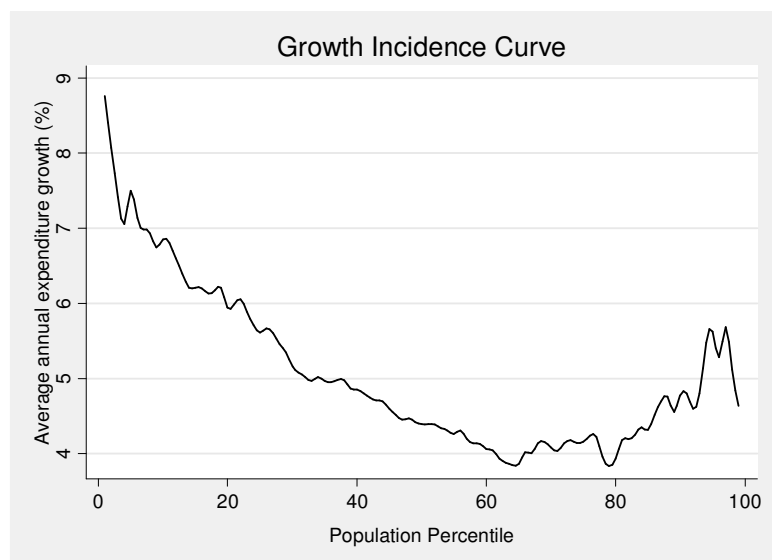
To sum up, the ten years between the two surveys have seen robust expenditure growth, a significant drop in poverty and stagnant inequality. At first sight, one might speculate that growth must have had a larger impact on poverty reduction than changes in inequality. It remains to be tested, however, how large the impact of each was, as significant reductions at the bottom of the distribution, i.e. those relevant for poverty reduction, may have been cancelled out by increasing inequality at the non-poor end of the distribution, thus leading only to a marginal overall decrease in inequality. Before this question is addressed, the following chapter looks at the nature of growth and whether it has been pro-poor.

4 Has there been pro-poor growth in Namibia?

Pro-poor growth has been interpreted in various ways in the literature, which makes it important to clarify what one means by it. Firstly, there is an absolute definition of pro-poor growth, which requires that poor people must benefit from growth in absolute terms, i.e. that the chosen poverty measure declines over time (Ravallion, 2004). This definition lacks some intuitive appeal, as even growth that is strongly skewed towards rich households would be deemed pro-poor as long as there is a marginal absolute gain to the poor. Secondly, there is a relative definition, under which growth is pro-poor if it favours the poor in relative terms, such that they exhibit higher mean growth than the non-poor. This implies that poverty falls more under pro-poor growth than it would have done had growth been proportional along the entire income distribution. This relative definition of pro-poor growth has proved more popular in the literature (McCulloch and Baulch, 1999; Kakwani and Pernia, 2000; Klasen, 2004) and shall also be employed in this study. The questions this section seeks to answer are twofold: firstly, whether there has been pro-poor growth in Namibia between the two NHIES surveys; and secondly, if there was pro-poor growth, how large was it? Two methodologies are relied on: firstly, the Growth Incidence Curve following Ravallion and Chen (2003); and secondly, the index of pro-poorness as developed by Kakwani and Pernia (2000).

The Growth Incidence Curve (GIC) plots the growth rate for a given expenditure percentile, where the percentiles are ranked in ascending order. Figure 1 below illustrates the GIC for Namibia, based on percentile growth in adult-equivalent consumption expenditure from the NHIES surveys. The growth rates are expressed in real terms per annum.

Figure 1: Growth Incidence Curve for Namibia, 1993/94 – 2003/04



Source: NHIES data; own calculations

Two observations stand out from the graph: firstly, all expenditure percentiles experienced positive growth.⁷ This implies that all percentiles experienced an improvement in their real consumption from 1993/94 to 2003/04, which in turn means that irrespective of where one draws the poverty line, the poverty headcount index has fallen over time. Secondly, the shape of the GIC is convex, such that the highest growth rates are registered by the poorest percentiles. Growth rates decline until around the 65th percentile; from the 80th percentile onwards, growth rates increase with expenditure. Poorer households and the richest quintile thus gained more from growth than those in-between. The highest growth rates are registered right at the bottom of the distribution. This catching-up of the poor should have led to lower inequality, but since the richest households also gained disproportionately, we observe that overall inequality was not significantly reduced.

Ravallion and Chen (2003) propose a measure of pro-poor growth that integrates the growth rates of the poorest quantiles until the poverty line in the initial period. The pro-poor growth rate is thus the mean growth rate of the poor (Ravallion, 2004). Based on the CBN poverty line of N\$262.45, a pro-poor growth rate of 5.6 percent p.a. is derived, compared to 4.6 percent p.a. mean growth and 4.4 percent p.a. median growth. According to this measure, it can thus be concluded that growth was pro-poor at a rate of 1 percentage point.

McCulloch and Baulch (1999) propose a different measure of pro-poor growth which they term the “poverty bias of growth”. It is derived by subtracting changes in the poverty headcount index that occurred between two periods under actual circumstances, from the change in poverty that would have occurred if all households had gained equally at the mean growth rate. Applied to the NHIES data and all three poverty measures in this study, growth appears to have indeed been biased towards the poor over the 10-year period under review: Had growth been equally distributed, then in 2003/04 the poverty headcount index would have been 1.5 percentage points higher, the poverty gap index would have been 2.8 percentage points higher and the poverty severity index would have been 2.3 percentage points higher.

5 The impact of growth and redistribution on poverty reduction

While growth appears to have favoured the poor, it remains to be seen how changes in the welfare distribution impacted on them, and how large the relative impact of these two factors was. Kakwani (1997) proposes a methodology of decomposing poverty reduction into growth and inequality effects. Whereas the best-known decomposition of this kind is that by Datt and Ravallion (1992), Kakwani’s method has the advantage that it does not leave a residual term that is difficult to interpret. This is achieved by averaging results across the initial and final distributions and means.⁸ According to his methodology, the change in poverty between two periods can be fully explained by a growth effect and a poverty effect such that

$$\theta_{ij} = G_{ij} + I_{ij}$$

where θ_{ij} is the change in poverty between the years i and j , G_{ij} is the growth effect and I_{ij} is the inequality effect. Based on this approach, Kakwani and Pernia (2000) define the poverty elasticity⁹ η as

$$\eta = \theta_{ij}/g_{ij}$$

where g_{ij} is the mean growth between periods i and j . η is the proportional change in total poverty when there is a positive growth rate of 1 percent. Similarly, one can define $\eta_G = G_{ij}/g_{ij}$ and $\eta_I = I_{ij}/g_{ij}$ where η_G is the proportional change in poverty if there is a positive growth rate of 1 percent and the relative distribution of incomes does not change, and η_I is the proportional change in poverty when

⁷ Note that this does not mean all households experienced positive growth. Since the NHIES are independent budget surveys, individual households cannot be traced over time. Therefore, one can only compare average growth rates by percentile.

⁸ See Annexure 3 for a more formal description.

⁹ Elasticity measures the percentage change in one variable (poverty) in response to a one-percent change in another variable (growth).

inequality changes but real mean income does not change. Kakwani and Pernia (2000) derive their index of pro-poor growth as

$$\phi = \frac{\eta}{\eta_g}$$

where η is the observed elasticity of the poverty measure with respect to changes in mean expenditure, and η_g is the elasticity of the poverty measure assuming an unchanged distribution of expenditure. ϕ is thus an index that measures how much poverty actually changed between two periods relative to how much it would have changed if expenditure had grown proportionally at the mean growth rate for all households. If ϕ is greater than 1, then growth is said to be strictly pro-poor. If $0 < \phi < 1$, it means that inequality had a poverty-increasing effect, but that poverty still declines overall due to growth. Kakwani and Pernia (2000) refer to this as a case of 'trickle-down' growth.

Table 2 presents the growth and inequality effects on poverty reduction in Namibia. The proportion of poor individuals, as measured by the headcount ratio, declined by 35 percent from 1993/94 to 2003/04, meaning that on average each percentage point of growth (57 percent over the 10-year period) led to a reduction in the poverty rate by 0.62 percent. Following Kakwani's (1997) methodology, this poverty elasticity is explained by two factors: a pure growth effect of -0.624 percent and a pure inequality effect of 0.004 percent. The miniscule (positive) inequality effect implies that changes in the distribution of expenditure played a negligible (and poverty-increasing) role in changing the poverty headcount ratio.

Table 2: Poverty elasticity of growth and pro-poor growth index for Namibia, 1993/94 – 2003/04

Indicator	Poverty Indices			Poverty Elasticity ¹	Explained by		Pro-poor growth index ²
	93/94	03/04	% change		Growth	Inequality	
Headcount poverty P0	0.58	0.38	-35.0	-0.62	-0.624	0.004	0.99
Poverty Gap P1	0.28	0.13	-53.9	-0.95	-0.813	-0.140	1.17
Poverty Severity P2	0.17	0.06	-63.7	-1.13	-0.884	-0.243	1.27

1) Percentage change in poverty incidence with respect to percent change in real adult equivalent expenditure.

2) Extent of poverty reduction (poverty elasticity) explained by pure expenditure growth effect.

Source: NHIES, own calculations.

In the case of the poverty gap ratio and the poverty severity index, the growth effect also dominates, but the inequality effect is significantly larger than for the headcount ratio, and it is also negative. This implies that the degree of poverty among the poor, and especially that of the poorest percentiles, improved and benefited from inequality changes.

The pro-poor growth index for headcount poverty is 0.99, which suggests that growth has been roughly poverty-neutral. Regarding the index scores for the poverty gap ratio (1.17) and the severity poverty index (1.27), however, growth has been strictly poor-poor. How do these findings compare to other countries in the region? Christiaensen et al (2002) analysed household survey data from nine countries in sub-Saharan Africa during the 1990s. Despite wide variations in growth performance and poverty reduction between the countries, the study generally finds growth to have been pro-poor in the aggregate, also based on Kakwani and Pernia's (2000) methodology. All of the countries with positive growth episodes in the sample (Ghana, Mauritania and Uganda) registered pro-poor growth indices greater than 1, based on the headcount ratio, leaving Namibia at the bottom of this group. The authors unfortunately do not provide indices based on the poverty gap ratio and the severity of poverty index, where Namibia fared considerably better.

An important lesson from these findings is that the definition and methodology of assessing pro-poor growth has a potentially significant impact on the measure. In the previous section, both the GIC and McCulloch and Baulch's (1999) approach indicated pro-poor growth, whereas the definition by Kakwani and Pernia (2000) above yields ambiguous results depending on the chosen poverty measure. The shape of the GIC implies that although the poorest percentiles gained the most, many of them may have been too far from the poverty line to surmount it in the ten-year period between the two NHIES. In

that case their improvement will impact on the measured poverty gap ratio and poverty severity index, but it has no bearing on the headcount index.¹⁰

McCulloch and Baulch's (1999) method shows that poverty reduced faster than it would have with proportional growth, while Kakwani and Pernia's (2000) pro-poor growth index score for the headcount ratio of just less than 1 indicates the opposite. This apparent contradiction is due to the chosen reference period: McCulloch and Baulch (1999) chose the initial period as their reference, whereas Kakwani (1997) estimates their growth effect as an average of the initial and terminal periods. So while poverty reduction was faster than it would have been with mean growth at the constant initial distribution, it was smaller than it would have been under mean growth at the constant final distribution. Kakwani and Pernia (2000) measure in their index the average poverty decrease, whose calculation is outlined in Annexure 4, and which is ever so slightly faster than the observed decrease. It is not clear which of the two methods is preferable, although choosing the initial period as a reference may seem more intuitive. In any case, it can be concluded that the poor benefited from growth and that the growth effect was far more dominant than the inequality effect.

6 Sectoral decomposition of poverty, growth and inequality

In order to better understand the relationships between poverty reduction, growth and inequality, it is helpful to disaggregate the NHIES data by economic sector. This allows one to observe in which sector the largest poverty reduction, growth and intra-sectoral changes occurred in the welfare distribution, and whether these trends appear to be correlated. For the purposes of the analysis, we classify each household by its main source of income. It should be noted that this is an imperfect approximation, but the only one tractable given the available data. It is imperfect in two ways: firstly, members of a household may be employed in multiple sectors, but secondary or tertiary sources of income are not recorded in the NHIES. Secondly, some of the income sources do not constitute economic sectors, but social transfers such as remittances and pensions. Since some of these transfers, such as old-age pensions, are not means-dependent, they signal mainly that a household lacks any other significant source of income. Despite these qualifying notes, some interesting observations can be made based on the assumption that the main source of income is equivalent to the economic sector on which a household depends.

The following main sources of income can be identified from the data: "Salaries/wages", "Subsistence farming", "Commercial farming", "Non-farming business activities", "Remittances" and "Pensions". In order to do justice to the separate developments in urban and rural areas, "Salaries/wages" and "Non-farming business activities" are subdivided by rural and urban location of the household. More than three-quarters of the population was dependent on either wage labour or subsistence farming, with the rest mainly depending on entrepreneurial income or transfers.

There were some changes in the list of possible income sources between the two surveys which required modifications to the categories. While the 1993/94 survey only had "Remittances" and "Pensions" as social transfer sources, the 2003/04 survey included a broader range of options such as "Cash Remittances", "Pensions", "Maintenance Grants", "Drought relief assistance" and "In-kind receipts". In order to allow for comparisons, "Remittances" was aggregated in the 2003/04 data from "Cash Remittances" and "In-kind receipts", while "Pensions" was aggregated from "Pensions" and "Maintenance grants". The latter were not separately listed in the 1993/94 questionnaire, but are often interchangeably used with pensions or welfare grants. The residual category "Other" in the 2003/04 data includes investment/savings income, rental income, drought relief aid and other/not stated. In the 1993/94 data, no such distinction can be made, but nonetheless the unspecified category "Other" comprised only 0.1 percent of the population.

¹⁰ This is one of the most frequent criticisms of the headcount ratio as a measure of poverty trends.

Population shares and mean expenditure by sector

Table 3 below shows the population shares and mean monthly adult-equivalent consumption expenditure for the two survey years and the average annual growth rates for the 10-year period in-between. Subsistence farming is the most important source of income with 42 percent of individuals depending on it in 1993/94. This share was reduced to 36 percent of the population in 2003/04. Urban wage labour, the second most important sector, saw its share increase from 23 percent to 27 percent. Rural wage labour saw its share decrease somewhat from 15 percent to 13 percent. The developments in these three major categories point towards a trend of urbanisation, which is confirmed by the 6 percentage point increase in the share of the urban population, from 29 percent in 1993/94 to 35 percent ten years later. Commercial farming, which unsurprisingly only a small fraction of the population cites as their main source of income, saw its share drop from 1 percent to 0.5 percent. Non-farming business activities experienced the highest relative growth rates¹¹, albeit from a low base. The share of people relying mainly on social transfers decreased slightly over time.

Table 3: Population shares and mean expenditure by sector, 1993/94 – 2003/04

	Population share			Mean expenditure ² (N\$ ³)		
	1993/94	2003/04	Change ¹	1993/94	2003/04	Change ¹
Wages and salaries (Urban)	0.23	0.27	1.7%	940.70	1324.13	3.5%
Wages and salaries (Rural)	0.15	0.13	-1.2%	461.72	673.90	3.9%
Subsistence farming	0.42	0.36	-1.5%	237.69	337.30	3.6%
Commercial farming	0.01	0.00	-8.6%	1372.68	5326.81	14.5%
Non-farming business (Urban)	0.02	0.04	4.7%	1124.60	1503.88	2.9%
Non-farming business (Rural)	0.02	0.03	4.6%	231.07	729.07	12.2%
Remittances	0.04	0.03	-0.9%	385.22	387.92	0.1%
Pensions	0.11	0.10	-1.0%	281.41	420.49	4.1%
Other	0.00	0.03	44.3%	252.98	603.99	9.1%
All urban	0.29	0.35	1.8%	899.96	1299.87	3.7%
All rural	0.71	0.65	-0.8%	300.85	445.77	4.0%

Notes: 1) Changes expressed in average annual terms.

2) Monthly adult-equivalent consumption expenditure.

3) N\$ in 2003/04 prices;

All shares and means adjusted for household size.

Source: NHIES, own calculations.

Mean consumption expenditure increased in all sectors over the period under review, with households in rural areas gaining slightly more than their urban counterparts. The biggest growth rates were registered in commercial farming and rural non-farming activities. Notably, households mainly relying on pensions saw real expenditure grow by an average of 4.1 percent annually, which is higher than what wage earners and subsistence farmers experienced.

Poverty incidence by sector

The incidence of poverty is unsurprisingly highest for those households mainly relying on pensions and remittances, with headcount poverty rates standing at 65 percent and 52 percent respectively in 2003/04. The absence of economic activity that could yield a significant return thus appears to be closely correlated with high poverty rates. The two social transfer categories also registered a slower reduction in poverty than the economic categories.

Commercial farming saw the largest drop in the poverty headcount index from 53 percent in 1993/94 to only 4 percent in 2003/04. This is not surprising given the high growth rates in the sector, but both these observations should be interpreted with caution. Firstly, the sector itself and the respective sample are very small. Secondly, there may be definitional issues: in 2003/04, the questionnaire's list of main income sources included "Subsistence Farming" and "Commercial farming" for agricultural

¹¹ The strong growth in „Other“ is excluded from the analysis as it is unclear which households are included in this category and how much of the growth is due to methodological changes.

activities, whereas that for 1993/94 had included “Subsistence Farming (crop & animal)”, “Cash cropping” and “Animal rearing”. The latter two categories were summed to constitute “Commercial Farming” for the purposes of this analysis. It may well be, however, that households that have small-scale farming operations that include the selling of some produce or animals in the market would have put themselves in the “Cash cropping” or “Animal rearing” category in 1993/94, but equivalent households may not have identified with the “Commercial farming” label in 2003/04, as it may evoke associations with large-scale farming. There could thus be a bias in the sample of commercial farming households that leads to an overestimation of expenditure growth and poverty reduction. This is supported by the fact that the population share of the sector shrunk by more than half. The small size of the sector limits its relevance for overall poverty and growth, so we shall now focus on the most important sectors in this respect, wage earners and subsistence farmers.

Table 4: Poverty incidence by sector and urban/rural location, 1993/94 – 2003/04

Sector	Poverty measures								
	P ₀			P ₁			P ₂		
	1993/94	2003/04	Change	1993/94	2003/04	Change	1993/94	2003/04	Change
Wages and salaries (Urban)	0.25	0.14	-6.0%	0.10	0.04	-7.9%	0.05	0.02	-9.1%
Wages and salaries (Rural)	0.51	0.31	-4.7%	0.23	0.11	-6.9%	0.13	0.05	-8.4%
Subsistence farming	0.72	0.48	-3.9%	0.35	0.15	-8.4%	0.21	0.06	-11.5%
Commercial farming	0.53	0.04	-23.0%	0.29	0.01	-29.3%	0.19	0.00	-36.3%
Non-farm. business (Urban)	0.41	0.18	-7.8%	0.18	0.06	-10.3%	0.10	0.03	-12.3%
Non-farm. business (Rural)	0.75	0.50	-3.9%	0.35	0.19	-6.0%	0.20	0.09	-7.5%
Remittances	0.70	0.52	-2.8%	0.34	0.23	-3.7%	0.20	0.13	-4.0%
Pensions	0.78	0.65	-1.8%	0.41	0.25	-4.9%	0.26	0.12	-7.3%
Other	0.62	0.56	-1.0%	0.40	0.25	-4.6%	0.29	0.14	-7.2%
Urban	0.31	0.17	-5.7%	0.12	0.06	-7.1%	0.07	0.03	-8.1%
Rural	0.69	0.49	-3.5%	0.34	0.16	-7.0%	0.21	0.08	-9.4%

Source: NHIES, own calculations.

Urban wage earners had the lowest incidence of poverty¹² in both survey years, followed by urban non-farming business owners. These two groups also registered the highest rate of poverty reduction in relative terms. Subsistence farmers saw their poverty headcount drop at a slower rate, but they realised the largest absolute decrease from 72 percent in 1993/94 to 48 percent in 2003/04. Regarding the poverty gap index (P₁) and poverty severity index (P₂), subsistence farmers registered faster relative reductions than both urban and rural wage earners. These two indices place more weight on the bottom of the distribution than the headcount index, implying that the poorest subsistence farmers gained more than those around the poverty line, in relation to their wage-earning peers.

Overall, urban areas registered a higher relative rate of reduction for headcount poverty than rural areas, whereas that for the poverty gap index is almost identical and finally, for the poverty severity index, rural areas experienced a more rapid decrease. This implies that relatively (but not in absolute terms) more households were lifted above the poverty line in urban areas, while rural households right at the bottom of the distribution gained relatively more than those in urban areas, even if they remained below the poverty line.

Intra-sectoral effects most important for overall poverty reduction

While we observe poverty reduction in all sectors, there is still a need to explore how important these intra-sectoral developments were compared to population shifts between sectors. Ravallion and Huppi (1991) present a sectoral decomposition formula for poverty changes based on the P_α class of poverty measures. Let P_{it} denote the poverty measure for sector i with population share n_i at date t , where

¹² Excluding commercial farming for the above-stated reasons.

there are m such sectors (9 in our case) and $t = 1993/94, 2003/04$ ¹³. The authors show that the following decomposition formula holds:

$$P_{04} - P_{94} = \sum (P_{i04} - P_{i94})n_{i94} + \sum (n_{i04} - n_{i94})P_{i94} + \sum (P_{i04} - P_{i94})(n_{i04} - n_{i94})$$

(Intra-sectoral effects) (Population shift effects) (Interaction effects)

where all summations are over $i = 1, \dots, m$. The intra-sectoral effects describe the contribution of poverty changes within sectors, controlling for the base period (1993/94) population shares; the population shift effects signify how much poverty was reduced between the two periods due to the various changes over time in population shares of sectors. The interaction effects stem from possible correlations between sectoral gains and population shifts. We conduct two different decompositions, one by economic sector and one by urban and rural location. Table 5 shows that the total intra-sectoral effects were responsible for between 94 percent and 100 percent of the overall poverty reduction, depending on the poverty measure. Population shift effects also contributed to poverty reduction (between 4 and 11 percent), whereas interaction effects were all poverty increasing of a magnitude of around 5 percent.

Table 5: Decomposition of poverty reduction by sector, 1993/94 – 2003/04

Sector	Pop. share 1993/94 (%)	P ₀		P ₁		P ₂	
		Absolute change	% of change	Absolute change	% of change	Absolute change	% of change
Wages and salaries (Urban)	22.6	-2.66	13.1	-1.26	8.4	-0.74	6.9
Wages and salaries (Rural)	14.75	-2.88	14.2	-1.70	11.3	-1.12	10.6
Subsistence farming	42.25	-9.99	49.2	-8.74	58.3	-6.33	59.6
Commercial farming	1.22	-0.60	2.9	-0.35	2.3	-0.23	2.2
Non-farming business (Urban)	2.28	-0.53	2.6	-0.27	1.8	-0.17	1.6
Non-farming business (Rural)	1.76	-0.43	2.1	-0.28	1.9	-0.19	1.8
Remittances	3.61	-0.62	3.1	-0.38	2.6	-0.23	2.2
Pensions	11.45	-1.45	7.1	-1.86	12.4	-1.60	15.1
Other	0.08	0.00	0.0	-0.01	0.1	-0.01	0.1
Total intra-sectoral effects		-19.16	94.3	-14.86	99.0	-10.64	100.1
Population-shift effects		-2.18	10.7	-0.94	6.2	-0.46	4.4
Interaction effects		1.01	-5.0	0.79	-5.3	0.48	-4.5
Total change in poverty		-20.32	100.0	-15.00	100.0	-10.62	100.0

Source: NHIES, own calculations.

In order to understand poverty reduction in post-Independence Namibia, one should thus focus on intra-sectoral effects given the chosen breakdown. Subsistence farming registered the largest absolute poverty reduction, which contributed about half to the overall reduction. The sector of rural wage earners contributed 14 percent to the reduction in headcount poverty, with urban wage earners adding 13 percent. An interesting pattern is that when moving from the headcount poverty index P_0 to the poverty gap index P_1 and poverty severity index P_2 , which place increasing weight on the poorest of the poor, then pensions, and to a lesser degree subsistence farming, gain rapidly in importance for poverty reduction. For example, the sector of households mainly depending on pensions contributed only 7 percent to the reduction in the headcount index, but 15 percent to that in the poverty severity index. Pensions therefore appear to have been of particular importance to those households right at the bottom of the welfare distribution.

¹³ For simplicity in the equation, let 94 denote the period 1993/94 and 04 the period 2003/04.

Table 6: Decomposition of poverty reduction by urban/rural location, 1993/94 – 2003/04

Sector	Pop. share 1993/94 (%)	P ₀		P ₁		P ₂	
		Absolute change	% change	Absolute change	% change	Absolute change	% change
Urban	28.89	-3.91	19.2	-1.88	12.5	-1.12	10.5
Rural	71.11	-14.58	71.8	-21.75	83.4	-9.23	86.9
Total intra-sectoral effects		-18.49	91.0	-14.40	96.0	-10.35	97.4
Population-shift effects		-2.23	11.0	-1.25	8.3	-0.80	7.5
Interaction effects		0.40	-2.0	0.64	-4.3	0.53	-5.0
Total change in poverty		-20.32	100.0	-15.00	100.0	-10.62	100.0

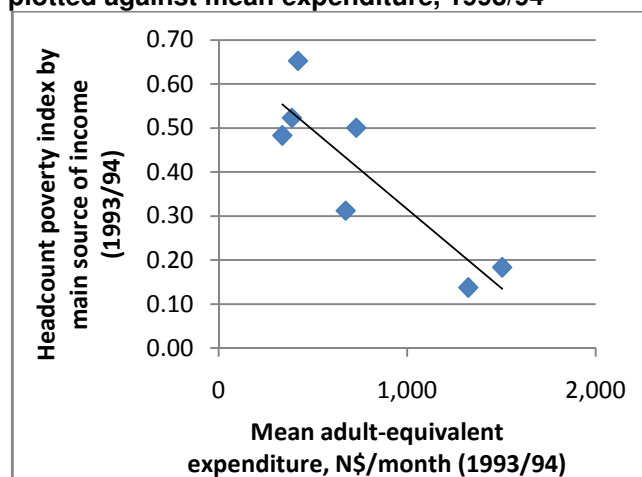
Source: NHIES, own calculations.

When disaggregating by urban and rural location, we find that intra-sectoral effects were responsible for 91 to 97 percent of the overall poverty reduction. Population-shift effects also contributed to the reduction between 8 and 11 percent. Interaction effects were positive (i.e. poverty increasing), but small. Among the intra-sectoral effects, poverty reduction in rural areas was more important, contributing 72 percent to overall reduction in the headcount index and even more in the other two measures.

Correlation between growth and poverty reduction

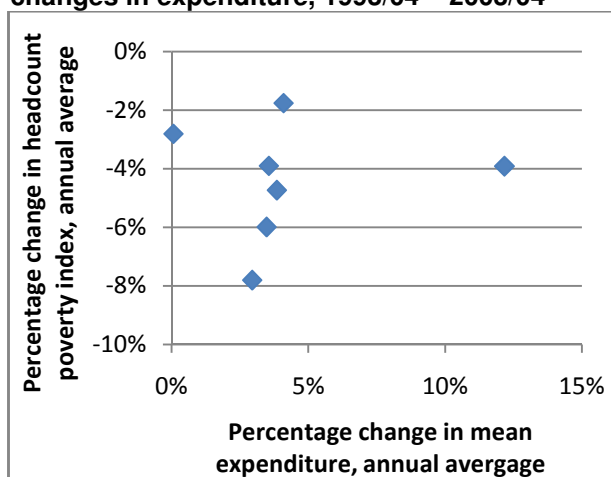
As was shown in the previous section, growth played a dominant role in overall poverty reduction. This is, however, a descriptive result that does not provide any information regarding the type of growth responsible. One approach to shed more light on the nature of the relationship is to look at the correlation between growth and poverty reduction within the different sectors of the economy. Given the breakdown allowed by the available data and the small size of some sectors one should be cautious when interpreting the findings, but two interesting observations stand out. Figure 2 below plots mean household consumption expenditure against sectoral headcount poverty index scores for the initial period 1993/94. Albeit based on only seven sectors¹⁴, there appears to be a significant negative correlation between the two variables.¹⁵

Figure 2: Poverty by main source of income plotted against mean expenditure, 1993/94



Source: NHIES, own calculations.

Figure 3: Changes in poverty plotted against changes in expenditure, 1993/04 – 2003/04



Source: NHIES, own calculations.

A different picture emerges from Figure 3, which plots sectoral expenditure growth against the rate of poverty reduction between 1993/94 and 2003/04. It appears that those sectors that experienced the

¹⁴ “Commercial farming” was omitted due to the comparability issue outlined above; “Other” was omitted due to lack of clarity which types of households constitute this category.

¹⁵ The same graph for 2003/04 yields an almost identical trendline.

more rapid rates of poverty reduction were, as a rule, not those which had the highest rates of expenditure growth; indeed, one may conclude that the rate of poverty reduction is uncorrelated with the rate of growth in each sector. This is, however, based on the crude sectoral breakdown applied in this study, whereas a more detailed disaggregation by industries, which the data do not allow, may have produced a different picture.

Inequality by sector

The sector with the highest Gini coefficient of 0.73 in 1993/94 was commercial farming. The sector's Gini decreased to 0.53 by 2003/04, apparently transforming it to one of the more equal sectors. What could have caused such a significant change? The most likely explanation is not any real development, but rather the data issue outlined above: semi-commercial farming households that were included in "Commercial farming" in 1993/94 would have led to strong inequality between these presumably poorer households and large commercial farms. If many of these households declared themselves subsistence farmers in the 2003/04 questionnaire, as we propose, this also would have led to decreasing inequality within the sector.

Rural non-farming business emerged as the most unequal sector in 2003/04 for all three inequality measures. That is surprising as it was estimated to be the most equal sector in 1993/94. While the underlying reasons are not known, the strong increase may be related to the rapid growth in consumption expenditure in the sector.

Subsistence farming exhibits the lowest levels of inequality among the larger sectors. It is also the only one of them that registered a significant reduction in inequality, with the Gini falling from 0.44 to 0.35. Wages and salaries showed ambiguous trends: while the Gini coefficient remained constant (urban) or decreased somewhat (rural), both Theil indices point towards increasing inequality. The reason behind this ambiguity is that the different measures are sensitive to different parts of the expenditure distribution. For example, the Theil-L measure, which is more sensitive towards changes at the lower end of the distribution, records only a marginal increase in inequality among wage earners, while the Theil-T measure, which is more sensitive towards changes in the upper end of the distribution, records a strong increase for both urban and rural areas.

Table 7: Inequality by sector and urban/rural location, 1993/94 – 2003/04

Sector	Inequality measures								
	Gini			Theil-L			Theil-T		
	1993/94	2003/04	Change	1993/94	2003/04	Change	1993/94	2003/04	Change
Wages and salaries (Urban)	0.55	0.55	0.1%	0.56	0.57	0.1%	0.56	0.95	5.4%
Wages and salaries (Rural)	0.56	0.53	-0.6%	0.57	0.60	0.4%	0.75	1.36	6.1%
Subsistence farming	0.44	0.35	-2.3%	0.33	0.25	-3.0%	0.40	0.46	1.5%
Commercial farming	0.73	0.53	-3.1%	1.37	0.51	-9.4%	1.21	0.63	-6.3%
Non-farm. business (Urban)	0.66	0.62	-0.6%	0.90	0.70	-2.5%	0.84	1.06	2.4%
Non-farm. business (Rural)	0.42	0.67	4.9%	0.31	1.22	14.6%	0.39	4.35	27.3%
Remittances	0.62	0.49	-2.3%	1.26	0.47	-9.3%	8.80	0.82	-21.1%
Pensions	0.59	0.57	-0.3%	0.62	0.86	3.4%	0.89	2.74	11.9%
Other	0.47	0.66	3.4%	0.40	1.03	9.8%	0.42	3.07	21.9%
Urban	0.58	0.57	-0.1%	0.63	0.61	-0.3%	0.63	0.61	-0.3%
Rural	0.54	0.50	-0.6%	0.51	0.44	-1.5%	0.74	0.67	-0.9%

Source: NHIES, own calculations.

According to both Gini coefficient and Theil-L measure, inequality appears to be larger in urban than in rural areas. This pattern is reversed under the Theil-T measure, pointing towards higher inequalities at the upper end of the rural expenditure distribution. These different trends underscore the importance of

applying a range of inequality measures with different properties in order to arrive at robust conclusions.

Intra-sectoral more important than inter-sectoral inequality

It is also of interest to examine to what degree inequality is due to inequality within sectors and between sectors. While the Gini index is the most commonly used measure of inequality, it has the drawback that it cannot be decomposed by contributions of within-subgroup and between-subgroup inequality (Bourguignon, 1979). In order to assess these contributions, generalised entropy indices such as the Theil-L and Theil-T are preferred due to their additive decomposability. The decomposition is described in Annexure 1.

Table 8: Within-group and between-group components of inequality, 1993/94 – 2003/04

	Theil-L		Theil-T	
	1993/94	2003/04	1993/94	2003/04
By Sector:				
Within-group	0.49	0.44	0.63	0.57
<i>Percentage</i>	72%	69%	77%	73%
Between-Group	0.19	0.20	0.19	0.21
<i>Percentage</i>	28%	31%	23%	27%
By Urban/Rural:				
Within-group	0.54	0.50	0.68	0.64
<i>Percentage</i>	80%	78%	82%	82%
Between-Group	0.14	0.14	0.15	0.14
<i>Percentage</i>	20%	22%	18%	18%
Overall:	0.68	0.64	0.83	0.78

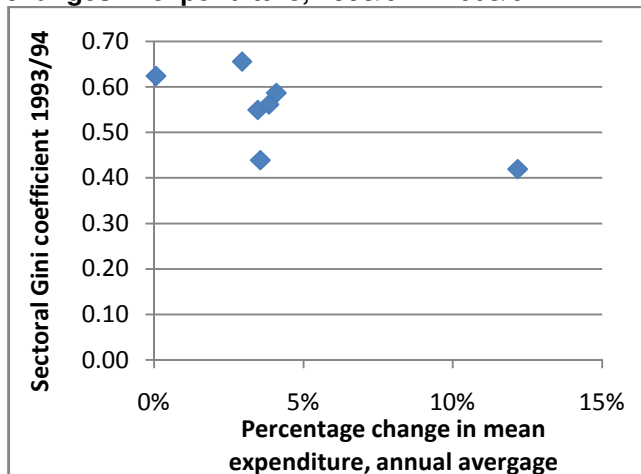
Source: NHIES, own calculations.

For both sectoral and urban/rural decomposition, within-group inequality contributes most to overall inequality. For example, based on the Theil-L measure in 2003/04, inequalities within the different economic sectors made up 69 percent of total inequality, while inequality between the sectors was responsible for the remaining 31 percent. Despite the smaller role played by between-group inequality, for the economic sectors we observe some increase in its significance over time. The dominance of within-group inequality was even more pronounced when considering urban and rural areas separately: for both measures and survey years, within-group inequality made up about four-fifth of the total.

Correlation of initial inequality with growth and poverty reduction

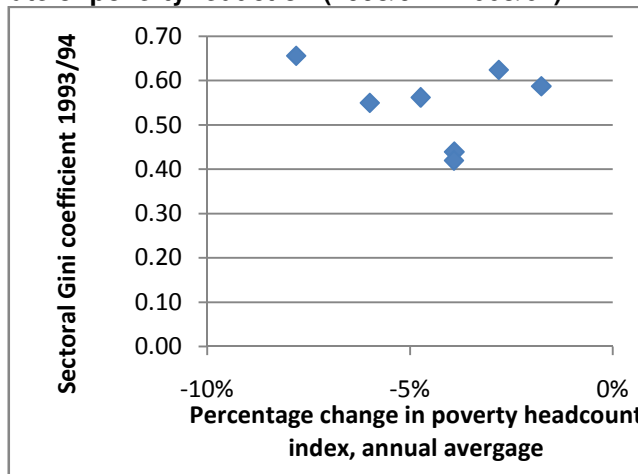
As pointed out in the first section of this paper, there is some international evidence pointing towards correlations between the initial level of inequality and subsequent growth and poverty reduction. Based on the sectoral breakdown in the NHIES data, there is no evidence to support either of these relationships in Namibia. While the selection of sectors is too small to draw any robust conclusions from it, we can reject the notion of any strong correlation between initial inequality and subsequent growth from Figure 4. Even the weak negative correlation one may see in the graph rests largely on the outlier on the right with high growth and low inequality, which is rural non-farming business activity, a sector on which less than 3 percent of the population depend.

Figure 4: Gini coefficient (1993/94) plotted against changes in expenditure, 1993/04 – 2003/04



Source: NHIES, own calculations.

Figure 5: Gini coefficient (1993/94) plotted against rate of poverty reduction (1993/94 – 2003/04)



Source: NHIES, own calculations.

Figure 5, which displays the initial sectoral Gini coefficient plotted against the reduction in the poverty headcount index, doesn't support any significant trend in their relationship either. As pointed out before, this absence of evidence for a strong correlation does not mean that a different sectoral breakdown would not provide different results.

7 Summary and Conclusions

Over the period 1993/94 to 2003/04, post-Independence Namibia experienced solid growth and rapid poverty reduction, but overall inequality remained very high and largely unchanged. Mean household consumption expenditure increased on average by 4.6 percent annually, while the poverty headcount index dropped from 58 percent to 38 percent. The Gini coefficient, on the other hand, remained at 0.60, one of the highest levels in the world. Taken together, this is an interesting finding, as theory would have predicted the high level of initial inequality to hamper poverty reduction. The result of persistent inequality also contradicts previous findings of a decreasing Gini coefficient, which are probably due to applying different calculation methodologies to the two NHIES data sets.

Growth in household consumption expenditure appears to have been pro-poor, with the poorest percentiles experiencing the highest growth rates. The richest percentiles also experienced higher growth than the middle of the distribution, which explains why overall inequality does not appear to have significantly decreased. With reference to poverty levels in 1993/94, it was shown that poverty would not have decreased as rapidly as it did if growth had been evenly distributed across all households. In terms of the relative impact on poverty reduction, growth appears to have been much more important than changes in the welfare distribution.

Interesting findings emerge from the breakdown by economic sector, which classifies households according to their main source of income. In terms of their population share, urban sectors gained over time relative to rural ones, pointing towards a trend of urbanisation. Nonetheless, even with a significant reduction in its population share, subsistence farming remains the largest individual sector. It also remains the sector with the lowest mean consumption expenditure per capita. All sectors experienced positive real expenditure growth, with commercial farming and rural non-farming business activities seeing the fastest growth rates, while households mainly relying on remittances registered the slowest expenditure growth. The three most important sectors, namely subsistence farming, urban and rural wage earners, which comprise more than three-quarters of the population, saw their expenditure grow on average between 3.5 to 3.9 percent annually.

Unsurprisingly, the incidence of poverty is highest for those households mainly relying on pensions and remittances. These two social transfer categories also registered a slower reduction in poverty than the economic sectors. Commercial farming saw the largest drop in poverty, but that may be partly due to

comparability problems in the data. Of the large sectors, urban wage earners had the lowest incidence of poverty in both survey years, as well as one of the highest rates of poverty reduction. Subsistence farmers saw their poverty headcount drop at a slower rate, but due to the high initial level of poverty they realised the largest absolute decrease.

While urban areas experienced a faster reduction in the headcount poverty index, rural sectors fared better in reducing their poverty gap and poverty severity index scores; this indicates that a higher proportion of households managed to cross the poverty line in urban areas, but among those households that remained in poverty, rural ones saw on average more improvement. Intra-sectoral effects were far more important for overall poverty reduction than population shifts between sectors. Most important was the reduction in poverty among households relying on subsistence farming, which constituted around half of the total poverty reduction. While the level of sectoral poverty appears to be related to the level of mean consumption expenditure, no such correlation could be found between expenditure growth and the rate of poverty reduction.

Concerning inequality, subsistence farming exhibits the lowest levels of inequality among the larger sectors. It is also the only one of them that registered a significant reduction in its Gini coefficient, from 0.44 to 0.35. Rural non-farming business emerged as the most unequal sector in 2003/04, which is unexpected as it was estimated to be the most equal sector in 1993/94. This radical change may be linked to the rapid sectoral growth in consumption expenditure. Among poorer households, inequality appears to be stronger in urban than in rural areas, while at the upper end of the distribution the pattern appears to be reversed, possibly due to the income variance among commercial farmers.

When decomposing overall inequality by economic sector or by urban/rural location, for all cases it is found that within-group inequality is much more significant than between-group inequality. This indicates that there are other important factors than sector or location that contribute to inequality between households. No evidence is found of correlations between the initial level of inequality and the subsequent rates of sectoral growth or poverty reduction.

Further research should focus on potential drivers of poverty reduction. We have established that the rapid rates of reduction were not due to large-scale redistribution, but rather to growth. One possible explanation that warrants investigation is the migration of underemployed rural labour to urban areas in search of higher-paying wage labour or entrepreneurial activities. This scenario finds support in the shifts in sectoral population shares combined with rapid decreases in poverty among subsistence farmers. A second explanation may be found in human capital accumulation among poor households, which would allow them to earn a higher return on their economic activities irrespective of the sector. This scenario is supported by the high level of public spending on the educational sector since Independence, but it is far from certain that the high inputs are matched by outcomes. More research should also concentrate on the shape of the Growth Incidence Curve, in particular why the poor and the rich have gained disproportionately in comparison to the middle classes.

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Annexure 1: Inequality and Poverty Measures

Following the notation by Fields (2001), the Gini coefficient can be expressed as

$$G = \frac{-(n+1)}{n} + \frac{2}{n^2\mu_x} \sum_{i=1}^n ix_i$$

where n is the total number of individuals, x_i is the expenditure by individual i and μ_x is mean expenditure. The Gini coefficient also has a more intuitive interpretation: it is based on the Lorenz curve, which is a graphical depiction of an income/expenditure distribution. The Lorenz curve plots the cumulative percentage of individuals (or households), ordered from poor to rich, on the horizontal axis and the cumulative percentage of expenditure (or income) on the vertical axis. The 45 degree line represents perfect equality where every individual has the same expenditure. The further below the 45 degree line the Lorenz curve lies, the more unequal the distribution. The Gini coefficient measures the area between the 45 degree line and the Lorenz curve (Area A), relative to the area between the 45 degree line and the horizontal and right vertical axis (Area A + B).

The Generalised Entropy measures can be expressed as follows

$$GE(\alpha) = \begin{cases} \frac{\alpha}{\alpha(1-\alpha)} \frac{1}{n} \sum_{i=1}^n \left[1 - \left(\frac{x_i}{\mu_x} \right)^\alpha \right] & \text{for } \alpha \neq 0,1 \\ \frac{1}{n} \sum_{i=1}^n \frac{x_i}{\mu_x} \ln \left(\frac{x_i}{\mu_x} \right) & \text{for } \alpha = 1 \\ \frac{1}{n} \sum_{i=1}^n \ln \left(\frac{\mu_x}{x_i} \right) & \text{for } \alpha = 0 \end{cases}$$

where n is the total number of individuals, x_i is the expenditure by individual i , μ_x is mean expenditure and parameter α represents the weight given to distances between expenditures at different parts of the distribution. For lower values of α , $GE(\alpha)$ is more sensitive to changes in the lower tail of the distribution, and vice versa. The values of the $GE(\alpha)$ measures can take any positive number and do not have an intuitive interpretation. The most common measures are $GE(0)$, $GE(1)$ and $GE(2)$. An advantage of $GE(\alpha)$ over the Gini coefficient is that this class of measures is additively decomposable by population sub-group. This decomposition can be written as

$$GE(\alpha) = GE_W(\alpha) + GE_B(\alpha)$$

where GE_W is within-group inequality and GE_B is between-group inequality. GE_W is the sum of $GE(\alpha)$ for each subgroup, weighted by that subgroup's share in total expenditure. GE_B is calculated as the inequality between the means of the different sub-groups.

Annexure 2: Inequality measures with standard errors

Table A1: Inequality measures with standard errors and confidence intervals, 1993/04 and 2003/04

1993/94				95% Confidence Interval	
Measure	Estimate	Std. Error	z	Upper	Lower
Gini ¹	0.612	0.017	37.0	0.581	0.649
GE(-1) ²	1.072	0.102	10.5	0.871	1.273
GE(0)	0.681	0.045	15.3	0.593	0.768
GE(1)	0.826	0.054	15.4	0.721	0.932
GE(2)	2.448	0.316	7.8	1.829	3.066
GE(3)	23.968	7.536	3.2	9.198	38.738

2003/04				95% Confidence Interval	
Measure	Estimate	Std. Error	z	Upper	Lower
Gini ¹	0.600	0.016	37.3	0.574	0.641
GE(-1) ²	0.891	0.055	16.2	0.783	0.998
GE(0)	0.635	0.028	22.3	0.579	0.691
GE(1)	0.777	0.034	22.6	0.709	0.844
GE(2)	1.852	0.109	17.0	1.639	2.066
GE(3)	9.698	0.956	10.1	7.824	11.572

Note: 1) Gini sampling variance generated by bootstrapping; confidence intervals corrected for sampling bias.
 2) GE(α) sampling variance estimated using Taylor series approximation, based on Biewen and Jenkins (2003).

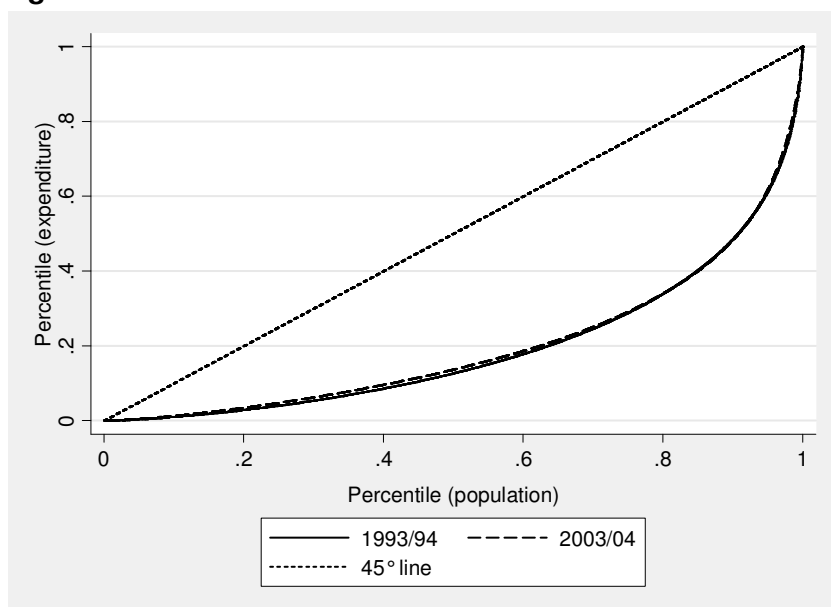
Source: Own calculations based on NHIES data.

Annexure 3: Lorenz curve comparisons

The Lorenz curve is a graphical depiction of income inequality, as presented for the two survey years in Figure A1 below. For each distribution the Lorenz curve plots the cumulative percentile of adult-equivalent consumption expenditure on the vertical axis and the cumulative percentile of the population on the horizontal axis. The population is ordered from the poorest to the richest percentile. The further away the Lorenz curve is from the 45-degree line, the more unequal the underlying distribution is said to be. The Lorenz curve also gives a graphical interpretation to the Gini coefficient, which is equivalent to the ratio of the area between the Lorenz curve and the 45-degree line to the area between the 45-degree line, the horizontal axis and the right vertical axis (at 1).

As Figure A1 shows, the Lorenz curves based on the NHIES 1993/94 and 2003/04 differ only marginally, with the 1993/94 distribution exhibiting slightly higher inequality, notably from the 20th to the 60th percentile. The proximity of the curves underlines, however, why none of the inequality measures differ in a statistically significant way.

Figure A1: Lorenz curves 1993/94 and 2003/94



Source: NHIES, own calculations.

Annexure 4: Decomposition of poverty reduction into growth and inequality effects

Kakwani (1997) stipulates three axioms for the decomposition of poverty changes into growth and inequality effects. Of particular note is Axiom 3, which holds that the growth and inequality effects should be symmetric with respect to the base and terminal years. In other words, the two effects must not change if the initial and final poverty rates are reversed. In compliance with the three axioms, he derives

$$\theta_{ij} = G_{ij} + I_{ij}$$

where θ_{ij} is the change in poverty between the years i and j , G_{ij} is the growth effect and I_{ij} is the inequality effect. There is thus no residual term and changes in poverty are fully explained by the two effects. Qualifying poverty measures are those that are fully defined by the poverty line, mean income and the distribution of income (Lorenz curve), such as the P_α class of measures used in this study. The growth and inequality effects are defined as

$$G_{ij} = \frac{1}{2} \left[\theta(z, \mu_j, L_i(p)) - \theta(z, \mu_i, L_i(p)) + \theta(z, \mu_j, L_j(p)) - \theta(z, \mu_i, L_j(p)) \right]$$

and

$$I_{ij} = \frac{1}{2} \left[\theta(z, \mu_i, L_j(p)) - \theta(z, \mu_i, L_i(p)) + \theta(z, \mu_j, L_j(p)) - \theta(z, \mu_j, L_i(p)) \right]$$

where z is the poverty line, which is fixed across the two years i and j ; μ is the mean of the distribution in each of the years, adjusted to the same price level; and $L(p)$ is the distribution of income/expenditure as measured by the Lorenz curve. $\theta(z, \mu_j, L_i(p))$ is thus the rate of poverty at the initial distribution but with the mean of the final year. It is thus the poverty rate that would have been achieved in the terminal period had all incomes grown at the same rate. The above definitions satisfy all of Kakwani's (1997) axioms and it can be easily shown that $\theta_{ij} = G_{ij} + I_{ij}$ also holds.

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The **Institute for Public Policy Research (IPPR)** is a not-for-profit organisation with a mission to deliver independent, analytical, critical yet constructive research on social, political and economic issues that affect development in Namibia. The IPPR has been established in the belief that development is ***best promoted through free and critical debate informed by quality research.***



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