Final report

Economic growth, inequality and poverty:

Estimating the growth elasticity of poverty in Zambia, 2006-2015*

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Economic Growth, Inequality and Poverty: Estimating the Growth Elasticity of Poverty in Zambia, 2006-2015*

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Abstract

The paper uses national household living conditions survey data to estimate trends in poverty at national, regional and sector levels. It also estimates growth elasticities of poverty at all these levels. Finally, the paper uses poverty decomposition methods to assess how much of the observed reduction in poverty between 2006 and 2015 is due to growth and distribution changes. It is found that poverty is high for households that depend on agriculture. We further find that between 2006 and 2015, the agriculture sector recorded an increase in poverty while other sectors such as construction, wholesale and retail and mining registered significant reductions in poverty. Increasing the welfare of each household by one percent while holding constant distribution gives a framework of assessing the growth elasticity of poverty in 2006, 2010 and 2015. Elasticity estimates show that at national level, head count growth elasticity of poverty has marginally increased over time from -0.56 in 2006 to -0.68 in 2010 and -0.67 in 2015. It is also found that the growth elasticity of poverty is low, ranging from -0.44 in some provinces to a maximum of -0.69. However, the elasticity increases with the increase in depth and severity of poverty. Poverty decompositions reveal that at national level growth is the main driver of reduction in poverty. However, adverse distribution of consumption that does not favour the poor limits the impact of growth on poverty. Therefore redistribution policies that favour the poor should be as important as the goal of achieving higher growth.

1   Introduction

Sub-Saharan African countries have experienced relatively sustainable economic growth in the last decade. For example, Zambia's economic growth has been positive since 2000 but poverty has remained static. In fact, the economy has been growing above 5 percent for eight consecutive years from 2005 to 2013(Worldbank, 2016) . Despite this remarkable growth, Poverty levels have remained stagnant during the same period. Between 2006 and 2010, poverty headcount reduced marginally from 62.8 to 60.5 per cent implying a drop of 2.3 percentage

point (CSO, 2012). The high poverty levels in the country have been accompanied by high unemployment especially among the youth.

The observed lack of responsiveness of poverty to growth in Zambia raises questions worth investigating. We use the Living conditions Monitoring Survey data set of 2006, 2010 and 2015 to address the following questions: How much should poverty fall given a particular growth rate? Is this change uniform across regions? Has the responsiveness of poverty to growth changed over time? Is the growth in all the sectors relevant and effective in reducing poverty? Can the observed reduction in poverty be attributed to growth or redistribution? Answers to these questions are important in informing design, implementation and evaluation of interventions aimed at reducing poverty.

Discussions around the poverty-growth and inequality nexus has attracted heated debates among scholars and policy makers. But there is no consensus on the magnitude of the responsiveness of poverty to growth. On one hand it is argued that growth-elasticity of poverty is around -0.5. while others say it is much higher ranging between -2.79 and -5. In Zambia, Grant (2005) found that elasticities ranged between-0.5 and -1.1 from 1991 to 1998. However, the paper does not explain the source of the observed responsiveness to growth of poverty. In this paper we define growth elasticity of poverty as the percentage change in poverty following one percentage point change in consumption.[1] The study is the first to conduct sectoral poverty analysis and further decompose poverty into growth and inequality components in Zambia. The rest of the paper proceeds as follows: section 2 gives a description of economic developments in Zambia since independence; Section 3 gives estimates in changes in poverty levels from 2006 to 2015; Section 4 outlines the methods of estimating growth elasticity of poverty and provides estimates for 2006 to 2010; Section 5, presents decompositions of the observed poverty changes into growth and inequality components; And, finally, section 6 gives concluding remarks.

2   Economic developments Since Independence

2.1   Policies Implemented

At independence and a few years after, Zambia was among the richest countries in sub-Sahara Africa with per capita GDP higher than that of most countries in the region. During this period, the country's major export commodity, copper, was enjoying a high market prices. As such the country had the necessary resources for development and poverty reduction. The booming copper industry, which still remains Zambia's economic mainstay to date, gave a propensity to state controlled policies. However, lack of consistent economic polices during the period saw the country lose grip of its economic fortunes(Thurlow and Wobst, 2004). For example, McPherson (1995) records that over the period 1976 to 1991, the first republic government adopted seven donor supported adjustment programmes. Each programme comprised policy measures designed to reduce the economy's internal and external imbalances and restore

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[1]For the operational definition of poverty elasticity of growth see the methods section

the conditions for sustainable growth. Each was abandoned, reinforcing Zambia's economic decline. As a consequence, the country started experiencing high levels of unemployment and underemployment.

Inconsistent policy reforms were at the same time accompanied by consistently falling copper prices in the late 1970's. Earnings from other sectors of the economy could not compensate for lost revenue from copper sales. Government interventions to facilitate structural change through import substitution giving priority to modern industries such as bicycle assembly failed to yield desirable results. The country had food shortages and was faced with high unemployment especially on the Copperbelt region. As a result, discontentment among the people led to demonstrations in the late 1980s which culminated in change of government in 1991.

Under the new government, the economy underwent massive economic reforms. As pointed out in the CSPR (2008) report, the new agenda was driven by liberal policies supported by the IMF and World Bank Structural Adjustment Programme, in anticipation of a more efficient private sector led economy. The role of government in economic affairs was reduced to creating a stable market, strengthening the institutions necessary for markets to function well (property rights, good governance, business environment etc.), and building human capital (education and health) to supply the increasingly skilled labour required by advances in technology. Additionally, the government privatised many state-owned industries, exchange rate controls were eliminated and positive real interest rates were maintained. In summary, the government endorsed free market principles.

However, the liberalisation of the Zambian economy did not come without cost. Different Structural Adjustment Programme(SAP) measures had negative effects on the people. First, the devaluation of the Kwacha saw an upward adjustment in commodity prices. Second, privatisation of state owned enterprises resulted in mass job losses due to liquidations of industries. And third, the removal of subsidies resulted in job losses and the demise of certain industries especially agricultural industries. In the end, the country saw rising poverty levels, after five years, the headcount poverty level had increased from in 75 percent 1991 to 81 percent 1996.

Between 2000 and 2007, Zambia benefited from debt cancellation under the Highly Indebted Poor Country (HIPC) initiative and the Multilateral Debt Relief Initiative (MDRI). Under MDRI, the World Bank provided Zambia with a total of US$2.7 billion in debt relief, resulting in a saving of US$233 million in debt service obligations (bank, 2008). Relief from debt serving allowed the government to embark on more ambitious growth poverty alleviating schemes. There was increased development expenditures in health, education, infrastructural development investments, and the wage freeze burden was lifted. This saw Zambia's economy begin to grow, prices of commodities dropping and general improvement in the livelihood of the people.

Since 2011, the country has been on a downward trend in terms of socio-economic development. Particularly, the high fuel and commodity prices, erratic water and power supply have resulted in further increases in poverty levels. Further, the high inflation, mainly due to increased money supply from higher public service salaries, coupled with unstable exchange

rate have had a negative spiral effect on the general price level. This is expected to impact negatively on people's livelihood and could compound the already high levels of poverty.

2.2 Macroeconomic evolution

For the period spanning 1970 to 2000, Zambia's economic growth was far from stable. Figure 1 shows that the country saw wide variations in the real rate of economic growth. The turbulent growth trend was such that in 1972 the economy expanded by 9.2 percent and declined in the next year to post a negative rate of growth. Table 1 indicates that average annual growth during this period was dismal. For example, between 1990 and 2000 growth averaged 0.7 percent. The unstable performance of the economy during this period was largely due to the failure to diversify the economy and an over-reliance on earnings from copper exports which made the country vulnerable to commodity price fluctuations. Other factors contributing to poor growth include macroeconomic instability particularly high interest rates which discourage private investment, the lack of timely structural reforms aimed at reducing the cost of inefficient state-owned firms and failure to realise anticipated benefits from privatisation (bank, 2004).

In the recent past, Zambia's economic performance has been positive with real Gross Domestic Product (GDP) growing above 5 % for eight consecutive years from 2005 to 2013. Notwithstanding the world financial crisis in 2009, the economy still posted positive growth. Key to this growth was the favourable copper prices and increased production in the mining and quarrying industry. Increased metal outputs were partly due to the rehabilitation of the old mines and the coming on stream of new mines in the North-Western region of the country. The high copper prices plus increased copper production helped increase Zambia's export earnings.

In 2015, growth fell to a decade low estimated at 3%. The dismal growth followed a reduction in the production levels in the mining industry after copper prices hit a six-year low. Falling copper prices on the international market have strained the fiscal position of Zambia and negatively affected the growth forecasts. he GDP growth forecast for Zambia in 2016 remains low. The World Bank predicts that Zambia's economy will grow by between 3 and 3.5 percent this year. Other contributing factors to low GDP growth include increasing power outages which has crippled the production processes of both large and small firms, high interest rates, rising inflation and low rainfall patterns. Tighter external financial conditions due to the increase in United States policy interest rates are further expected to negatively impact Zambia's growth prospects (IMF, 2016).

Figure 1: Trends in economic growth, 1970–2013
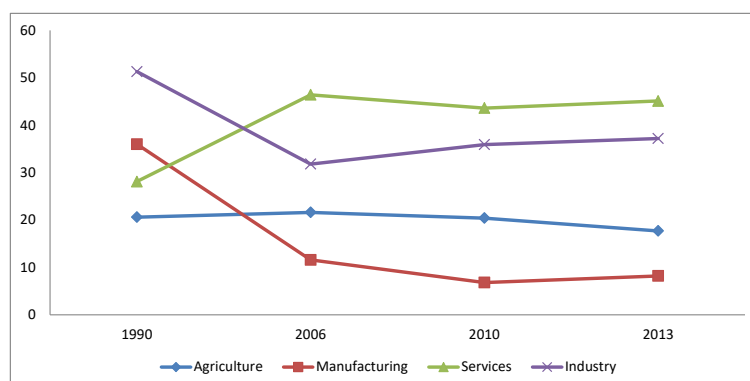
Source: World Bank (2015).

Between 1970 and 2000, the Zambian economy was experiencing unstable and sluggish growth. As a result per capita incomes continued to consistently deteriorate across the entire period hitting the lowest level in 1999. Falling per capita income resulted into high levels of poverty and inequality among the population. After 2000, per capita GDP started to rise and has remained positive ever since.

Table 1: Growth rates of different national accounts aggregates

Variable	1990-2000	2001–2005	2006-2010	2010-2014
Real GDP growth, %	0.7	5.0	6.0	7.0
GDP per capita growth, annual %	-1.8	2.3	3.4	3.5
Final consumption expenditure etc., annual % growth	4.7	0.1	13.7	23.9
General government final consumption expenditure, annual % growth	-3.1	18.4	3.4	13.9
Household final consumption expenditure, annual % growth	6.3	-1.6	16	25
Gross capital formation, annual % growth	18.4	13.6	12.9	14.5
Exports of goods and services, annual % growth	3.9	18.7	9.5	11.2
Imports of goods and services, annual % growth	12.6	8.7	15.1	22.4
Agriculture, real growth rate, %	4.8	1.1	4.2	2.6
Industry, real growth rate, %	-2.2	9.4	7.7	6.9
Manufacturing, real growth rate, %	1.9	5.1	2.8	7.2
Services etc., real growth rate %	2	5.1	6.5	7.8

Table 1 shows that for most of the period since 1990, combined consumption and investment expenditure grew more than the growth in real GDP. For example, in the 2010 to 2014 period, consumption expenditure grew three times more than the growth in real GDP. The implication being that economic agents were spending more on consumption and investments at a rate 3 times higher than the rate of growth of earnings.

Sectoral decomposition of growth shows that in the 1990s agriculture was one of the major driving forces of real economic growth. The sector grew at an average of 4.8 percent per annum. Going into the 2000s, the growth in agriculture sector declined to 1.1 percent between 2001 and 2005. Between 2006 and 2010 the sector grew by 4.2 before declining to 2.6 percent of

GDP in the last five years. This trend stands in clear contrast to growth in the services sector which has been experiencing a faster growth rate throughout the period. Growth in the services industry over the last three years has averaged 7.8 percent per annum. The service industry in Zambia is dominated by the public provision of education and health services. Growth of services has helped absorb much of the unemployed labour force in the country. However, growth in the service-based sectors alone does not guarantee sustainable growth for poverty reduction. Growth in non-service sectors including manufacturing, agricultural sectors is key to meeting the needs of its growing population, especially since the majority of the labour force are engaged in agriculture.

The manufacturing sector growth has been on a steady upward trend, rising from an average annual growth of 1.9 percent in the 1990s to more than double in the 2000s. Manufacturing is one of the prioritised sectors in Zambia's diversification programme FNDP (2006). The sector is identified as key for promoting pro-poor grow and creation of employment opportunities. To support this sector, Multi-Facility Economic Zones (MFEZs) and Industrial Parks (these are industrial areas for both export orientated and domestic orientated industries, with the necessary support infrastructure installed), have been established.

Table 2: Real GDP share, by expenditure category and sector, 1990, 2000, 2010, and 2013

Variable	1990	2006	2010	2013
Final consumption expenditure etc., % of GDP	83.4	69.5	65.5	70.8
General government final consumption expenditure, % of GDP	19	18.6	16.2	18.9
Household final consumption expenditure etc., % of GDP	64.4	50.9	49.35	51.9
Gross capital formation, % of GDP	17.3	20.7	22.6	27.1
External balance on goods and services, % of GDP	-0.7	8.3	11.9	2
Exports of goods and services, % of GDP	35.9	38.4	46.8	50.2
Imports of goods and services, % of GDP	36.6	30.1	34.9	48.1
Total	100	100	100	100
Agriculture, value added, % of GDP	20.6	21.6	20.4	17.7
Industry, value added, % of GDP	51.3	31.8	35.9	37.2
Manufacturing, value added, % of GDP	36	11.6	8.6	8.2
Services etc., value added, % of GDP	28.1	46.4	43.6	45.1
Total	100	100	100	100

We demonstrated in Table 1 that the manufacturing sector steadily posted positive growth in all the four periods. Notably between 2010 and 2014, the sector grew by an average of 7.2, a percentage higher than the growth in GDP in the same period. Notwithstanding this recent growth, the contribution to GDP between 1990 and 2014 declined. Table 2 shows that the manufacturing industry share of the economy has fallen from 36.0 percent in 1990 to 8.2 percent in 2014.

The sector contributions in table 2 indicate a shift in Zambia's industrial structure over the past two decades transitioning from agriculture to service industry with industry based sectors remaining largely weak over the same period. The total contribution of industrial based production (manufacturing included) to output has significantly declined from 51.3 percent in

1990 to 37.2 percent in 2013.

Figure 2: Trends in economic growth, 1970–2013
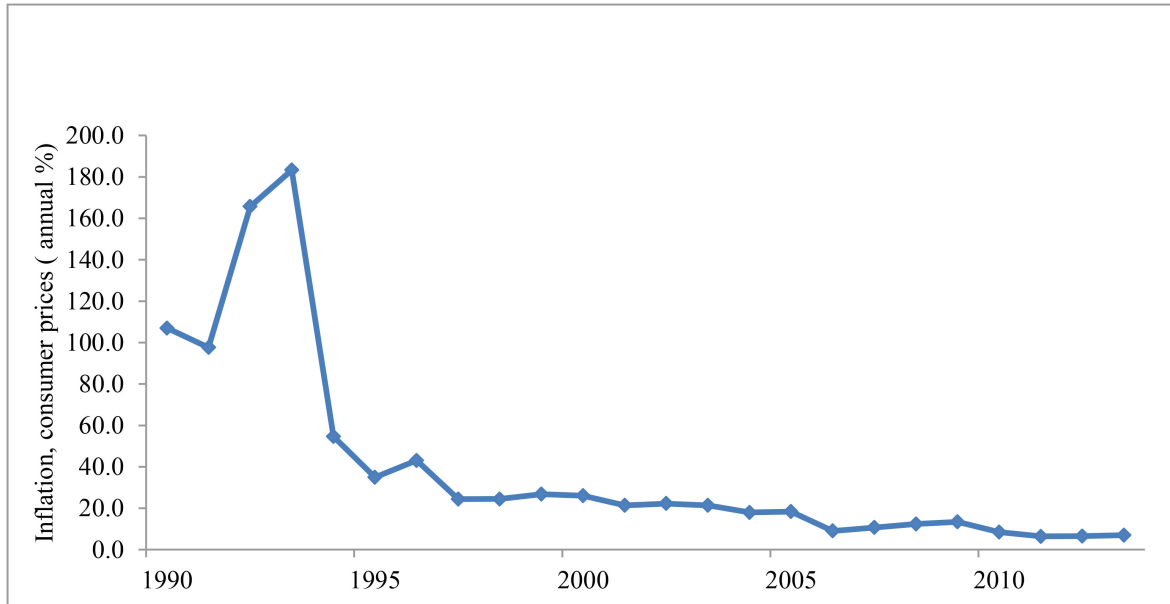
Inflation reduces the relative income of the poor hence sinking them even deeper into poverty. With high inflation levels, low-income groups find it difficult to pay for essential items including housing, food and utilities. Figure 2 shows that Zambian consumers experienced high levels of inflation throughout the 1990s reaching a record high of 188 per cent in 1993. From 1996 onwards, the annual inflation rate has been declining almost consistently to an annual average of 7.0 percent at the end of 2013. Despite maintaining single digit inflation for five years starting 2010, inflation rate jumped from 7.8 percent in 2014 to 21.5 percent in 2015. The increase has mainly been attributed to increases in the prices of some non-food items. Additionally, external factors such as falling international copper prices and depreciation of the local currency against major currencies hugely contributed to the rising price levels.

2.3   Distribution of Growth 2006-2015

To understand how growth in GDP or incomes has been distributed, a researcher has to rely on household survey data. The problem however is that national accounts data from which GDP is derived are not comparable to household data due to many factors. However, what is important here is that national household survey data do also indicate growth in average and median incomes over the period 2006 to 2015. Table 3 shows that the real average consumption per adult equivalent in 2015 prices increased from ZMW 315.15 in 2006 to ZMW 348.6 in 2015 representing a growth of 10.6 percent. The question then is how this growth was distributed across population subgroups using percentiles. But before looking at that we use kernel densities to visualize the entire distribution of household consumption in 2006, 2010 and 2015.

Table 3: Summary Statistics of Equivalent Consumption in 2015 Prices

| Year	Obs	Mean	Std. Dev.	Min	Max	Median
2006	18479	291.7	583.69	0.55	73898.53	158.11
2010	19398	333.2	628.36	12.02	31516.74	180.17
2015	12145	348.6	578.31	6.11	35698.69	188.94

Figure 3 shows the distribution of the logarithm of adult equivalent consumption distribution for the years 2006, 2010 and 2015. One main observation is that 2015 distribution does not peak as much as in 2006 and 2010 which suggests an increase in inequality in 2015 compared to other years. The shift from 2006 to 2015 in the left tail is less pronounced suggesting a lack of improvement of incomes for households in the lowest income bracket. The distribution in 2015 is to the right of the 2006 for most of the range, or higher than 3, because the overall income level has increased. A better understanding on where growth has occurred in average incomes is best seen using growth incidence curves.

Figure 3: Kernel Densities of Adult Equivalent Consumption 2006-2015

kernel = epanechnikov, bandwidth = 0.1400
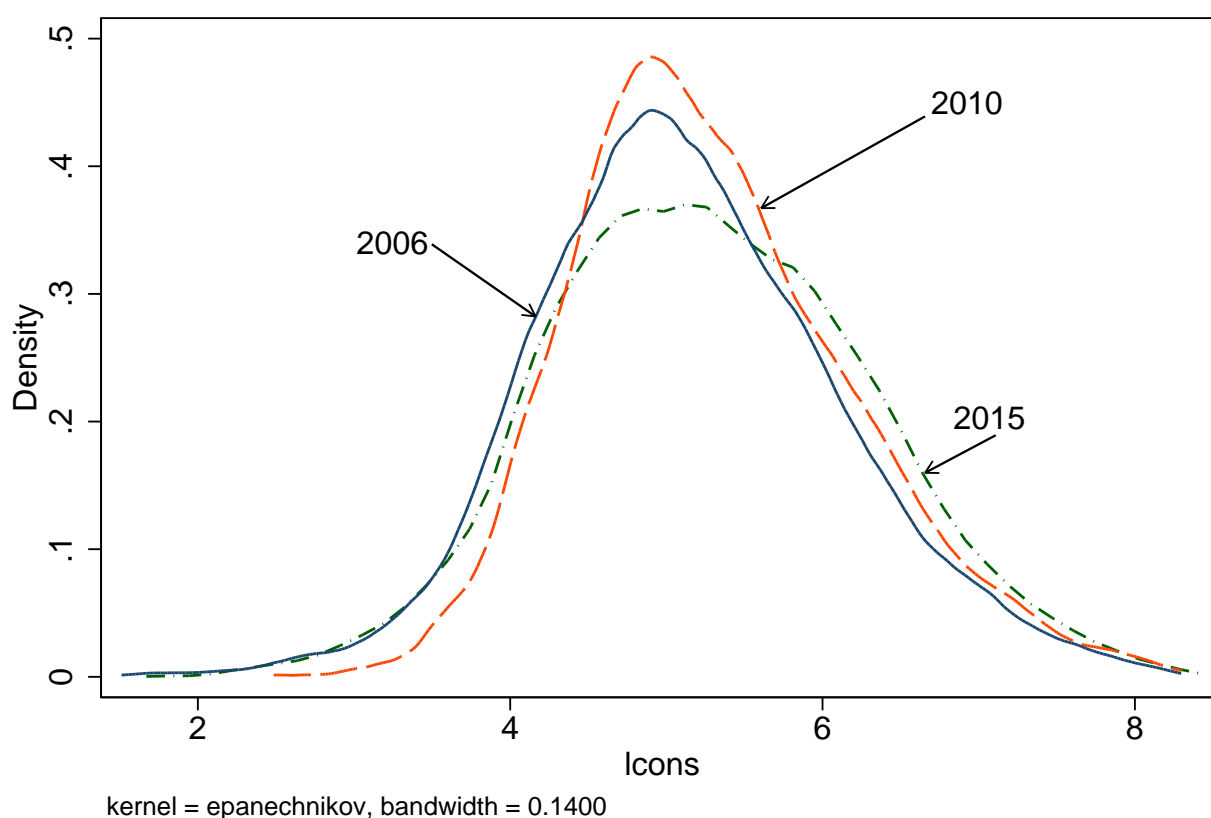
A Growth Incidence Curve (GIC) shows average annual real consumption growth for each percentile of the population ranked according to per capita consumption. Figure 4 shows the GIC for Zambia for the period 2006 to 2015 derived from the 2006 and 2015 CSO's Living Conditions Monitoring Survey's data.

Figure 4: Growth Incidence Curve 2006-2015
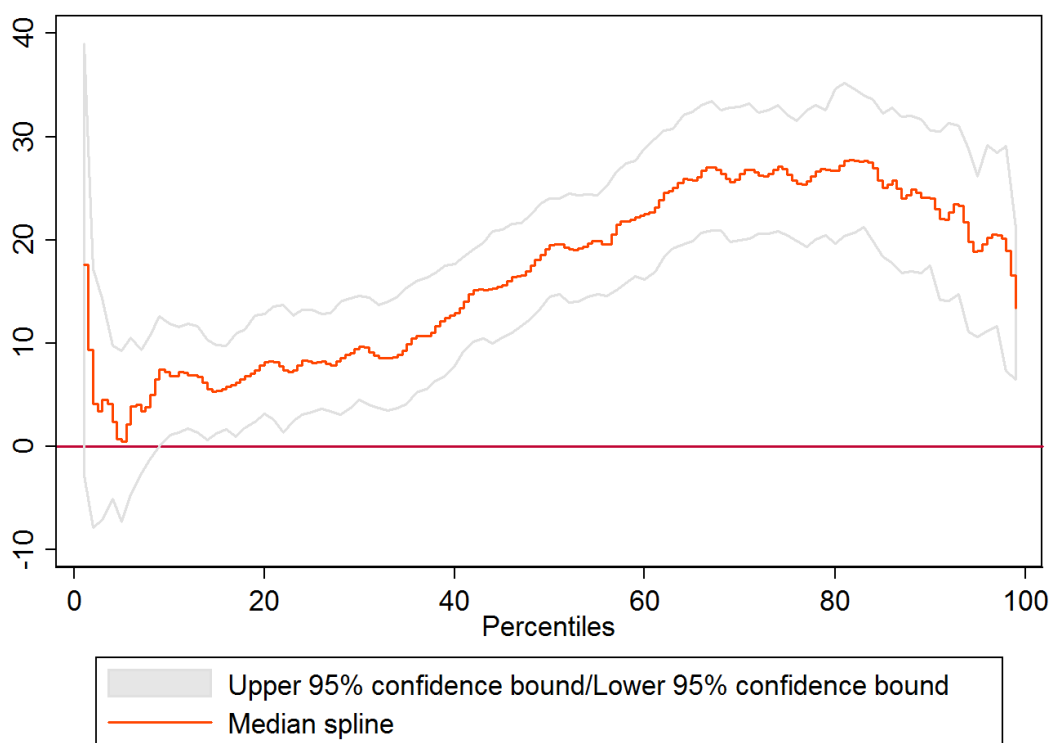
The figure shows that the poorest 20 percent of the population experienced low growth in incomes, below 10 percent in the period 2006-2015 while the highest 80 percent experienced increases in average incomes in excess of 20 percent. However, the highest 60 percent are the ones who experienced high growth in average consumption. This depicts a picture of increasing inequality over the period.

3   Methods and Data

3.1   Data and Measurements

This paper makes use of Living conditions monitoring surveys (LCMS). The LCMS are household surveys conducted by the Central Statistical Office covering the entire nation on a sample basis. Samples are drawn from both rural and urban areas. The surveys are designed to provide data for all districts and all the provinces in Zambia. In addition to consumption expenditure, the data collection instruments for these surveys are designed to collect information on various aspects of the living conditions of the households. In the initial phase we set out to estimate the growth elasticities of poverty from 1990 to 2010. However after reviewing the 2004 and 1991 LCMS data sets we came to a conclusion that the two data sets were highly incomparable to the three data sets from 2006 onwards covering the 2006, 2010 and 2015 surveys. However,

even for the three survey rounds selected, the datasets in their original form are not usable for this type of analysis due to some inconsistencies in the LCMS consumption expenditure modules across the three years. The analysis in this paper relies on household consumption expenditure as a measure of the living standards and subsequently in the estimation of poverty elasticity. Although the underlying LCMS datasets has the income variable, following now well-established practice in poverty literature, we capture a household's standard of living using household consumption expenditure. Each member of the household is assigned the same poverty status as the head of household. As such most of the data cleaning work involved attaining consistency in consumption expenditures to ensure comparability of this variable in the three survey rounds. There were key disparities both in terms of the consumption expenditure questions asked as well as the methods employed to collect data. We identified and corrected for three main sources of inconsistencies in the three data sets, these are outlined below:

3.1.1 Different levels of consumption expenditure aggregation

A comparison of the number of consumption expenditure lines between the three years show that in 2006, data was captured on 87 items while the 2010 and 2015 consumption expenditures included 213 items. These could easily be mistaken for omitted variables, however a close inspection reveals that most of the expenditure items captured in 2010 and 2015 were also captured in 2006 except they were in most cases lumped together under a single line item. Below we cite examples of such aggregations:

1. In 2006, oranges, apples, Mangoes, Bananas, Pawpaw, Watermelons, Lemons, Pineapples, Pears, Guavas, Avocados, and other fruits which all appear as distinct line items in 2010 are lumped into a single line item called fruits.

2. Pumpkin leaves, Cucumber, Kalembula, Bondwe, impwa are combined into other vegetables in 2006

3. Maize grain, Rice and sorghum , groundnuts, Irish potatoes, sweet potatoes are disaggregated into shelled (peeled)and unshelled(unpeeled) in 2015

4. Chicken, Kapenta, fish, beef, goat meat pig meat, sheep and game meat are each broken down into fresh, frozen, dried and/or smoked in 2010 and 2015 while there is no such level of disaggregation for 2006.

Much as we acknowledge that the lack of detailed disaggregation in 2006 compromises the accuracy of the data collected, it does not adversely impact on the reliability of our estimations considering that we are using total consumption expenditure.

3.1.2 Omitted consumption expenditure items

Both food and non-food expenditure items did not change between 2010 and 2015. The number of items remained the same. No new items were introduced and no items were removed in the

two surveys. Further the level of disaggregation also remained uniform in the two surveys. However, the same cannot be said about the 2006 data set. In here, a number of food and non-food items on which expenditure was collected in 2010 and 2015 are missing. These include expenditures on food items; Wheat flour, Sunflower, Soya beans, Pumpkins, Green maize, other meat types, cocoa and chocolate, spices and food from Kiosks, Cafes and Restaurants. Non-food items missing include expenditure on gas, coal insecticides, internet connection, typing services, filling in official forms, and water treatment costs.

Rather than deleting these line items from the 2010 and 2015 data sets to obtain a smaller but comparable consumption baskets, we employ Ordinary Least Squares (OLS) regression techniques to impute the expenditure values for these expenditure items for 2006. The set of independent variables comprises the household size and the location of the household (urban or rural area, province). We dropped the replaced negative values with zero minimum. We changed the estimated 2006 expenditure which is done using the 2010 base deflated into 2006 figures.

3.1.3 Varying reference periods

The survey instruments ask the respondents to recall the items consumed and the amounts spent. The recall period is however not the same for all expenditure items. For example in 2015, Consumption of maize grain (shelled and unshelled), breakfast mealie meal, roller meal, hammer mealie meal, pounded maize meal, the cost of milling, salt, spices and cooking oil is captured over the last four weeks, whereas the rest of food items are captured over the last two weeks. Similarly some non-food expenditure items such as expenditure on clothing, education and health have a reference period of one year whereas transportation and entertainment expenses are captured over a four week recall period.

We chose a common reference period of one month for all consumption expenditure items. Expenditure figures such as that of food collected for the last two weeks were multiplied by 2 and annual expenditure items are divided by 12 months. Items such as education expenditure for the last twelve months were gotten as reported.

3.1.4 Sector Decomposition

Part of the work in this paper involved the sectoral dimension of growth-elasticity of poverty. This type of analysis requires the decomposition of the economic structure into definite sectors. Zambia's economy is primarily driven by mining, agriculture, construction and services industries. Accordingly, we categorise households into six sectors, (i) Agriculture and fisheries (ii) Mining and quarrying (iii) Manufacturing (iv) Construction (v) Wholesale and retail trade, and (vi) Other services including public administration and government services. Since most households have more than one economically active member, we allocate the household to the sector of the head of household. Household head is the person whom all members of the household regard as the leader and normally makes day-to-day decisions concerning operations of the household.

Sector decomposition by this approach has a limitation in cases where there are more income earners in the household in addition to head of household. An alternative we considered was to allocate households to sectors by main source of income for the household. However, much as the survey asks each member of the household separately about income earned individually, the responses to this question do not allow for identification of distinct economic sectors.

3.2 Analytics of Growth Elasticity of Poverty

Procedurally, two basic approaches have been employed in an attempt to understand the impact of economic growth on poverty. The first one focuses on the relationship between poverty, income growth and income distribution. This branch of literature, underscores the important role of inequality in determining the responsiveness of poverty to economic growth. Methodological variations in the studies employing this approach come in the way that inequality is estimated. Some authors have used the Gini coefficient as a proxy to capture variations in income distribution (Ravallion and Chen, 1997). Alternatively a (log-normal) functional shape of the income distribution can be assumed, making it possible to characterize the entire distribution with only a scale and a distributional parameter (Bourguignon, 2003).

The second approach seeks to understand the responsiveness of poverty to growth while assuming a neutral income distribution over time. This category of literature maintains that growth has been the main driver of poverty reduction while attributing no significant role to income distribution (e.g Dollar and Kraay., 2002). Generally, recent findings of this stream of literature are that growth on average does benefit the poor as much as anyone else in society, and so standard growth-enhancing policies should be at the centre of any effective poverty reduction strategy. These findings are not necessary new but rather a build up on the conclusions of several other earlier authors including Deininger and Squire (1996) who emphasised that there is a strong and positive relationship between growth and poverty with no systematic link between growth and changes in aggregate inequality. Further, using household surveys for developing and transitional economies, Ravallion and Chen (1997); Ravallion (1997); Bruno et al. (1995) confirms that changes in inequality and polarization were uncorrelated with changes in average living standards.

Different methods exist to characterize how growth impacts on poverty. For instance Ravallion and Chen (1997) use regression approach to estimate the elasticity of poverty with respect to growth. However, in this paper we adopt the method of Kakwani (1993). Kakwani (1993) developed a framework of finding out how poverty responds to growth in average income holding constant the distribution of income. This method helps simulate the effect of growth on poverty holding constant the the income inequality. The framework of this approach assumes that $F(x)$ is the distribution function of individual income. If Z is the poverty line then, $H = F(Z)$ is the proportion of the poor. Generally H is referred to as the head count poverty. Although H is commonly used as a measure of the proportion of the poor, it fails to indicate by how far the poor are from the poverty line and how severe is the poverty. Therefore a more

general representation of poverty is represented as

$$\theta = \int_0^z P(z,x) f(x) dx \tag{1}$$

where $f(x)$ is the density function of x and $\dfrac{\partial P}{\partial x} < 0$, $\dfrac{\partial_2 P}{\partial_2 x} > 0$, $P(z,z) = 0$ and $P(z,x)$ is homogeneous of degree zero in z and x (Kakwani, 2001).In this case, x is income and z is the poverty line. The most common representation of equation 1 is the class of poverty measures proposed by Foster and Greer J (1984). Thereafter referred to as the FGT index. The FGT measure is given by

$$P_\alpha(z,x) = \int_0^z ((z-x)/z)^\alpha f(x) dx \tag{2}$$

If the parameter α equals zero, we have $P_0 = H$, the head count measure. P_1 is the poverty gap which measures the depth of poverty or the aggregate income shortfall of those below the poverty line. P_2 is referred to as the squared poverty gap which measures the severity of poverty because it places greater weight on those far below the poverty line (Heltberg, 2002).

Given the poverty measures, Kakwani (1993) derived the elasticity with respect to mean income growth while holding constant the income distribution. This essentially assumes growth while the entire Lorenz curve is shifted in constant proportion so as to maintain the distribution of income. According the Kakwani (1993) the elasticity to poverty is given by

$$\eta_\theta = \frac{1}{\theta} \int_0^z x \frac{\partial P}{\partial x} f(x) dx \tag{3}$$

For headcount poverty , this implies an elasticity of $\eta_H = -\mu^*/(z - \mu^*)$, which shows the percentage of the poor who will cross the poverty line if all incomes increased by 1 percent (Kakwani, 1993). For the FGT measures where $\alpha \neq 0$, the elasticity is

$$\eta_\alpha = -\frac{\alpha(P_{\alpha-1} - P_\alpha)}{P_\alpha} \tag{4}$$

For the poverty gap measure,$\alpha = 1$, equation 4 gives $\eta_\alpha = -\frac{\mu^*}{(z-\mu^*)}$ where μ^* is the average income of the poor. Since $\frac{\mu^*}{z}$ is the inverse of the depth of poverty, this shows that the poverty elasticity increases (decreases) in absolute terms the lower (higher) is the depth of poverty (Heltberg, 2002).

3.3 The Decomposition of Poverty Changes into Growth and Inequality Components

3.3.1 A Brief on the Frameworks for Growth-Redistribution Decomposition

In recent years Sub-Saharan African countries have experienced sustained economic growth yet poverty has remained high. This is no exception to Zambia. In order to understand the drivers of poverty over time, it is important to assess the extent to which the growth since 2000 has translated or failed to translate into poverty reduction. One of the best way to do this assessment is to decompose the reduction in poverty between any two periods into a growth component and a component driven by inequality.

The study shows that though poverty reduction has been minimal between 2006 and 2015, there has been a reduction which is indeed statistically significant. The question is to what extent is the reduction attributed to economic growth and what proportion is due to inequality. For instance, it is possible to have no growth but have a decrease in poverty due to redistribution of income from the high earners through taxes to low earners through transfers. On the other hand, poverty can reduce when incomes of the poor grow as the country registers growth. But the impact of growth on the poor is higher when the inequality is low (Verme, 2006).

There are studies that have decomposed poverty changes into growth and redistribution components (Shorrocks, 1999; Datt and Ravallion, 1992; Verme, 2006, e.g.). One of the most popular decompositions in empirical work is the method by Datt and Ravallion (1992). This method is applied to two points of time where one time period is taken as a reference period. Observed poverty between two periods is decomposed as follows:

$$\Delta P = P_2 - P_1 = G + D + \epsilon \tag{5}$$

Where

$$G = \left[P\left(\frac{z}{\mu_2}, L_1 \right) - P\left(\frac{z}{\mu_1}, L_1 \right) \right]$$

and

$$D = \left[P\left(\frac{z}{\mu_1}, L_2 \right) - P\left(\frac{z}{\mu_1}, L_1 \right) \right]$$

The ΔP is the total change in poverty, G is the growth component,D is the distribution components, ϵ is the residual, Pt is the poverty measure, at time t, z is the poverty line,μ_t is the mean of income at time t and L_t is a vector of parameters fully describing the Lorenz curve at time t with $t = 1, 2$.

Datt and Ravallion (1992) argue that by averaging the components using the initial and final years of reference the residual could disappear but this according to them is arbitrary. On the other hand using an axiomatic approach Kakwani (1997) reached a conclusion that averaging the components is in fact correct . According to Kakwani (1997) the change in

poverty between two periods would be decomposed as follows:

$$\Delta P = P_2 - P_1 = G + D \tag{6}$$

where

$$G = \frac{1}{2}\left[P\left(\frac{z}{\mu_2}, L_1\right) - P\left(\frac{z}{\mu_1}, L_1\right)\right] + \frac{1}{2}\left[P\left(\frac{z}{\mu_2}, L_2\right) - P\left(\frac{z}{\mu_1}, L_2\right)\right]$$

,

$$D = \frac{1}{2}\left[P\left(\frac{z}{\mu_1}, L_2\right) - P\left(\frac{z}{\mu_1}, L_1\right)\right] + \frac{1}{2}\left[P\left(\frac{z}{\mu_2}, L_2\right) - P\left(\frac{z}{\mu_2}, L_1\right)\right]$$

, As before The ΔP is the total change in poverty, G is the growth component,D is the distribution component.

Using a Sharpley value approach as opposed to the axiomatic approach, Shorrocks (1999) reach the same conclusion as Kakwani (1997). In this study we will use the method by Kakwani (1997).

4   Changes in Poverty 2006-2015

4.1   Poverty Trends

To measure poverty changes over time, we use the Foster-Greer-Thorbecke (FGT) class of poverty measures explained in section 5 subsection 2 (Foster and Greer J, 1984). The FGT class of poverty includes the Headcount Index $P(0)$ which is the proportion of people living below the poverty line, the Poverty Gap, $P(1)$, which is the amount required to move people out of poverty, it measures the depth of poverty and the Squared Poverty Gap Index, $P(2)$ which measures the severity of poverty. While Headcount Index attaches equal weight to all incomes or expenditure of the poor, the Poverty Gap and Squared Poverty Gap attach more weight to incomes or expenditure of the poor that are distant from the poverty line.

To keep our results comparable to government published statistics, we use the national poverty lines as determined in the CSO (2012) and CSO (2016) reports. The poverty lines used are ZMK100,012 for 2006, ZMK146,009 for 2010 and ZMK214.26 for 2015. The Central Statistical office sets the poverty line based on a consumption basket for a family of six. This basket is updated over time to adjust for inflation (CSO, 2012, 2016). Regarding the consumption aggregate used, we used the CSO's Adult Equivalent scales that are computed based on calorie requirements based on different age groups (For details see CSO, 2012). There is no doubt that these scales fail to take into consideration the economies of scale factor in the households. But we use them so as to keep the results comparable and more so for policy purposes.

4.1.1 Changes in National and Regional Poverty

In section 2.2 we showed that the period 2006 to 2015 has been characterized by sustained economic growth at the national level. This subsection shows the changes in poverty over the same period. Trends in the national headcount poverty, poverty gap and and squared poverty gap are shown in tables 4, 5 and 8.

Table 4 shows that the headcount poverty at the national level has decreased by 6.0 percentage points from 66 percent in 2006 to 60 percent in 2010 and then further down to 55 percent in 2015. Rural poverty however has reduced by marginally from 81 percent of the rural dwellers being poor in 2006 to 78 percent in 2010 and 2015. This represents a reduction of only 3 percent in rural poverty. On the other hand, the proportion of people living below the poverty line in urban areas declined significantly over the period. Whereas 36 percent of the urban dwellers were living below the poverty line in 2006, the proportion of poor reduced to 23.0 percentage points in 2015, a reduction of about 13.0 percentage points.

Table 4: Headcount Poverty 2006-2015

	Poverty 2006	Sd	Poverty 2010	Sd	Poverty 2015	Sd
National	0.66	0.01	0.60	0.01	0.55	0.01
Rural	0.81	0.01	0.78	0.01	0.78	0.01
Urban	0.36	0.02	0.27	0.02	0.23	0.02
Central	0.72	0.03	0.61	0.02	0.57	0.03
Copperbelt	0.44	0.03	0.34	0.03	0.30	0.04
Eastern	0.78	0.02	0.78	0.02	0.72	0.02
Luapula	0.75	0.03	0.80	0.02	0.83	0.03
Lusaka	0.30	0.03	0.24	0.02	0.18	0.03
Muchinga	.	.	.	.	0.71	0.03
Northern	0.80	0.02	0.75	0.02	0.83	0.02
Northwestern	0.72	0.03	0.67	0.04	0.65	0.03
Southern	0.76	0.02	0.68	0.02	0.59	0.02
Western	0.86	0.02	0.80	0.02	0.84	0.02

Taking a look at the distribution of headcount poverty across provinces reveals that in provinces that are predominantly urban, poverty is not only lower than in provinces that have large rural populations but also that the predominantly urban provinces had larger reductions in poverty. Thus Table 4 shows that the province with the lowest headcount poverty ratio in 2006 was Lusaka with 30 percent of the population living below the poverty line followed by Copperbelt with a population of 44 percent living below the national poverty line. Lusaka and copperbelt provinces are re predominantly urban. On the other end of the spectrum, Western had the highest proportion of people living below the poverty line at 86 percent in 2006 followed by Northern and Eastern provinces at 80 and 78 percent respectively. From the table, we also observe that the predominantly urban provinces had a reduction in proportions of headcount poverty while rural provinces had either an increase or a very small decline

in poverty. Specifically between 2006 and 2010, Lusaka province registered a decline of 12 percentage points, Copperbelt 14 percentage points, Central 15 percentage points and North-Western province a reduction of 7 percentage points. On the contrary between 2006 and 2015, Western province which has the highest number of poor people registered a marginal decrease from 86 percent in 2006 to 84 percent in 2015. Northern province registered an increase in poverty from 80 percent in 2006 to 83 percent in 2015.

Therefore, the main observation here is that poverty still remains largely a rural phenomenon. In addition, though at national level there is a reduction in poverty, the picture at provincial level varies over the period. Some provinces have registered declines in poverty while in others poverty has either increased or has remained the same at very high levels.

Table 5: Poverty Gap 2006-2015

	Poverty 2006	Sd	Poverty 2010	Sd	Poverty 2015	Sd
National	0.34	0.01	0.28	0.01	0.27	0.01
Rural	0.44	0.01	0.38	0.01	0.41	0.01
Urban	0.14	0.01	0.09	0.01	0.09	0.01
Central	0.36	0.02	0.25	0.02	0.27	0.02
Copperbelt	0.19	0.01	0.12	0.01	0.12	0.02
Eastern	0.39	0.01	0.38	0.02	0.37	0.02
Luapula	0.40	0.02	0.41	0.02	0.47	0.02
Lusaka	0.11	0.01	0.08	0.01	0.06	0.01
Muchinga	.	.	.	.	0.39	0.02
Northern	0.45	0.02	0.37	0.02	0.48	0.02
Northwestern	0.36	0.02	0.31	0.03	0.29	0.02
Southern	0.40	0.02	0.31	0.02	0.25	0.02
Western	0.54	0.02	0.43	0.02	0.50	0.02

Table 5 shows the changes in depth of poverty or the Poverty gap index between 2006 and 2015. It is important to note that the poverty Gap index helps us understand by how much those who are poor fall short of reaching the poverty line. The table reveals that over the period, the depth in poverty at the national level has declined. At national level the Poverty Gap declined by 7 percentage points from 34 percent in 2006 to 27 percent in 2015. Like Headcount poverty, the depth of poverty is higher in rural rather than urban areas. The Poverty Gap was 44 percent in rural areas compared to 14 percent in urban areas. Poverty gap reduced by 3 and 5 percent for rural and urban areas respectively between 2006 and 2015.

Again the picture in terms of changes in the depth of poverty at provincial level is mixed. Central Copperbelt, Eastern, Lusaka, Northwestern and Southern provinces recorded a decline in the depth of poverty between 2006 and 2015. On the contrary in provinces with the highest Poverty Gap indices, there is an increase in depth of poverty. The Poverty Gap increased from 42 percent in 2006 to 48 percent in 2015 in Northern province and from 40 to 47 percent in Luapula province. Lusaka, remains the provinces with the lowest depth of poverty at 6 percent in 2015 followed by Copperbelt at 12 percent.

Table 6: Squared Poverty Gap 2006-2015

	Poverty 2006	Sd	Poverty 2010	Sd	Poverty 2015	Sd
National	0.21	0.01	0.16	0.00	0.17	0.01
Rural	0.29	0.01	0.22	0.01	0.26	0.01
Urban	0.07	0.00	0.04	0.00	0.05	0.01
Central	0.21	0.02	0.13	0.01	0.15	0.01
Copperbelt	0.10	0.01	0.06	0.01	0.06	0.01
Eastern	0.24	0.01	0.22	0.01	0.23	0.02
Luapula	0.25	0.02	0.24	0.02	0.31	0.02
Lusaka	0.06	0.01	0.04	0.01	0.03	0.01
Muchinga	.	.	.	.	0.25	0.02
Northern	0.30	0.02	0.22	0.01	0.33	0.02
Northwestern	0.23	0.02	0.18	0.02	0.17	0.01
Southern	0.26	0.01	0.18	0.01	0.14	0.01
Western	0.40	0.02	0.27	0.02	0.33	0.02

The Squared Poverty Gap places the largest weight on the poorest. Thus it helps measure the severity of poverty. This entails that if more people are far away from the poverty line, their weight will be bigger. So, the larger the Squared Poverty Gap the more severe is the level of poverty. Table 8 shows that there has been a minimal change in the severity of poverty from 2006 to 2010. At national level, the Squared Poverty Gap reduced from 21 percent in 2006 to 17 percent in 2015, a reduction of 4 percentage points. In addition, the table reveals that poverty is more severe in rural areas than it is in urban areas.

The Squared Poverty Gap index was at 5 percent in urban areas compared to 26 percent in rural areas in 2015. Of noteworthy is the fact that the Squared Poverty Gap remained hugely the same in urban areas between 2006 and 2015 reducing by only 2 percentage points while a 3 percentage point reduction was recorded in rural areas. This may suggest a lack of change in the severity of poverty over the period under consideration. At provincial level, most provinces either registered no change or a marginal decline in the severity of poverty. Just like the provincial distribution of Headcount and Poverty Gap, Lusaka, has the lowest Squared poverty Gap at 3 percent followed by Copperbelt at 6 percent. On the other end, Northern and Western provinces had a Squared Poverty Gap of 33 percent each in 2015.

4.1.2 Distribution of Poverty by Sector

In this section, we seek to assess the level of poverty by sector of employment of the head of the household. Since agriculture has been identified as the main sector for reducing poverty in the national plans while mining still remains the mainstay of the economy especially in terms of foreign exchange earnings, these two sectors are included in the analysis. Construction is excluded from other sectors to signify its importance particularly in the last five years which saw a dramatic increase in road construction by government. Like construction, Wholesale and retail sector has seen an increase over the last years particularly in urban areas which has seen

an increase in chain retail and wholesale stores. The other sector included is manufacturing which is important because during the years of structural adjustment in the 1990s, this sector virtually saw collapse due to competition from liberalization and lack of strong government support. Manufacturing however remains the sector with the promise of highly productive jobs if only this sector can improve.

Just like in the previous subsection, the analysis focusses on three measures of poverty looking at changes in the Headcount Poverty, Poverty Gap and Squared Poverty Gap. Table shows the distribution of Headcount poverty by the sector of employment of the head of household. The table reveals that the sector with the highest level of poverty is agriculture where, in 2015, 80 percent of those households with heads earning a living from agriculture were living below the poverty line. In contrast, Mining has the lowest proportion of people living in poverty. Specifically, in 2015, mining had only 6 percent of households earning a livelihood from this sector living below the poverty line. This is compared to manufacturing and Wholesale and Retail sectors at 31 percent each while construction is at 34 percent.

Looking at changes in headcount poverty over time reveals that agriculture has seen very little change in the proportions of poor. This is contrasted with mining that saw a huge reduction over the period. The Headcount poverty in Agriculture sector reduced marginally from 83 percent in 2006 to 80 percent in 2015 while in the mining sector headcount poverty more than halved from 19 percent in 2006 to 6 percent in 2015. Similar significant reductions in headcount poverty were recorded for other sectors. In manufacturing the headcount index reduced from 46 percent to 31 percent from 2006 to 2015 respectively. In the construction sector, the reduction was from 52 percent in 2006 to 34 percent in 2015 a reduction of 18 percent. Lastly, in Wholesale and retail, the reduction was from 45 to 31 percent.

Table 7: Headcount Poverty by Sector of Employment of Head

	Headcount 2006	Std	Headcount 2010	Std	Headcount 2015	Std
Agriculture	0.83	0.01	0.81	0.01	0.80	0.01
Mining	0.19	0.03	0.10	0.03	0.06	0.02
Manufacturing	0.46	0.03	0.41	0.03	0.31	0.04
Construction	0.52	0.04	0.43	0.03	0.34	0.04
Wholesale and Retail	0.45	0.02	0.37	0.02	0.31	0.03
Other Services	0.30	0.02	0.23	0.02	0.18	0.02

The incidence of poverty is highest in the agricultural sector and lowest in the mining sector. Table 8 shows the distribution of Poverty Gap by sector of employment of head of household. The table shows that the Poverty Gap in agriculture was at 42 percent compared to 2 percent in mining. In between for the other sectors, construction and wholesale and retail at 13 percent each and manufacturing closely at 14 percent. This suggests that the depth in poverty is highest in the agriculture sector. Looking at changes in the Poverty Gap over time, the reduction has been small, reducing by 3 percent agriculture and by 4 percent in the mining sectors. The other sectors registered between 5 to 9 percent.

Table 8: Poverty Gap by Sector of Employment of Head

	Poverty Gap 2006	Std	Poverty Gap 2010	Std	Poverty Gap 2015	Std
Agriculture	0.46	0.01	0.39	0.01	0.42	0.01
Mining	0.06	0.01	0.03	0.01	0.02	0.01
Manufacturing	0.21	0.02	0.15	0.01	0.14	0.02
Construction	0.22	0.02	0.16	0.02	0.13	0.02
Wholesale and Retail	0.19	0.01	0.14	0.01	0.13	0.01
Other Services	0.11	0.01	0.08	0.01	0.06	0.01

Agriculture has not only the biggest headcount and poverty gap rates, it also tops the percent of people living in severe poverty. Table 9 shows the distribution of the Squared Poverty Gap which as explained already is a measure of the severity of poverty. The table shows that in 2015, the squared poverty gap in agriculture stood at 27 percent compared to mining at 1 percent. In between are manufacturing at 8 percent and construction and wholesale and retail at 7 percent each. Although all the sectors registered declines in the measure, the decline was minimal in the agriculture and mining sectors

Table 9: Squared Poverty Gap by Sector of Employment of Head

	Squared Gap 2006	Std	Squared Gap 2010	Std	Squared Gap 2015	Std
Agriculture	0.30	0.01	0.23	0.01	0.27	0.01
Mining	0.03	0.01	0.02	0.01	0.01	0.01
Manufacturing	0.13	0.01	0.07	0.01	0.08	0.01
Construction	0.12	0.01	0.08	0.01	0.07	0.01
Wholesale and Retail	0.10	0.01	0.07	0.01	0.07	0.01
Other Services	0.06	0.00	0.04	0.00	0.03	0.00

Interestingly, despite government interventions in the agriculture sector such as the marketing of maize by the Food Reserve Agency and the Farmer Input Support, poverty still remains ubiquitous and a main challenge. There is indeed need for government to rethink its interventions in this sector. Interestingly manufacturing holds that potential to have a real dent on poverty. There is need for concerted efforts for this sector.

5 Growth Elasticity of Poverty

5.1 Literature on Growth Elasticity of Poverty

There is general agreement among most scholars in the new growth literature that for a country to lower its poverty level there must be adequate growth in the economy. However there are still questions on the actual contribution of economic growth to reducing poverty. How much is poverty supposed to reduce following a period of sustained growth? Put differently, how many poor people are lifted out of poverty with a given rate of economic growth? Studies have been conducted to quantify the change in poverty level following a period of growth.

In literature (e.g Ravallion et al., 1998) poverty is shown to be relatively less responsive to economic growth. Ravallion and Chen (1997) investigates the growth-poverty phenomena by regressing the first difference of the log of the proportion of the population living on less than

50% of the mean income (defined as the poor) on the difference in the log of the real value of the mean income. They use a 122 survey panel dataset. An obvious weakness in Ravallion's approach lies in the way economic growth is estimated, they use changes in mean income as calculated from household budget surveys. They find that the growth elasticity of poverty ranges between -2.0 and -3.0 across countries. The growth elasticity has been shown to largely depend on the income level of individuals (Bourguignon, 2003).

Estimates by Bhalla (2002) suggest, that growth elasticities of poverty are higher than the previously reported estimates by Ravallion. She contends that the true growth elasticity of poverty should be about -5.0. The basis of this argument is that elasticity estimates as modelled is incorrect as the shape of the distribution elasticity is not taken into account. The shape of the distribution elasticity plays an important role in translating (or not translating) growth into poverty reduction.

In further analysis,Adams (2004), after controlling for changes in income inequality, estimates the growth elasticity of poverty for developing economies to be -2.79; that is, a 10% increase in the survey mean consumption expenditure will reduce poverty ($1.00/person/day) by 27.9%. Adams findings renders little support for Bhalla's suggestion that the average growth elasticity of poverty should be about -5.0.

In terms of the sectoral poverty elasticity of growth, there is a general belief that growth in specific sectors of an economy is more crucial to poverty reduction compared to overall economic growth. The theoretical underpinning of this conclusion lies in ideals of new structural economics which argues that in order for growth to significantly impact on poverty, countries must aim to grow sectors whose industrial structure fits the economy's factor endowment (Lin, 2014). i.e Labour abundant countries must aim to grow labour intensive sectors. This is empirically supported in the studies of Loayza and Raddatz (2006), who find that for developing countries, growth in unskilled labour intensive sectors such as; agriculture, construction and manufacturing, had a greater influence on the reduction of poverty due to the labour-intensive nature of the growth.

Further, Berardi and Marzo (2015) also argue that the structure of an economy is critical to understanding the growth poverty relationship. In this study, they distinguish six sectors including agriculture and fishing; services, transport and trade; manufacturing; mining and quarrying; construction and utilities; and public administration and government services. Their results show wide variations in the responsiveness of poverty to growth in the different sectors in different countries. Particularly, their sectoral poverty elasticity estimations for Zambia range between -18.49 in the agricultural sector to 0.70 in the services industry for the period 1991 to 1996. They conclude that sectoral composition and characteristics of growth are crucial for poverty reduction.

Notwithstanding the arguments of New Structural economics, some studies make contrary arguments. For example Satchi and Temple (2006) find that growth in labour intensive sectors such as agriculture may increase poverty while growth in the urban sectors may cause it to fall regardless of the country's developmental stage. Conflicting findings and views such as these

indicates that there is no consensus on which sectors are most important for poverty reduction or indeed if growth in some sectors is more important for poverty reduction.

5.2 Estimated Growth Elasticities of Poverty 2006-2015

Summary statistics in the background section suggested a strong annual economic growth for the period 2006 to 2015 in Zambia. However, poverty estimates show that poverty levels have remained high during the same period. Poverty elasticity of growth gives an indication of how effective growth has been in translating growth into poverty reduction, by measuring how poverty rate responds to a percentage change in growth. The approach adopted here gets the distribution of equivalent consumption and increases welfare for each household by 1 percent thus establishing the counter-factual of what the distribution of welfare would be if all welfare grew by 1 percent while the distribution remained the same. With this we are able to assess the poverty elasticity of growth in each year where data is available. Because the distribution of welfare across households changes from one year to another, hence it is expected that the elasticities estimated would not be the same from one year to another. However, we do not expect distribution to change very much in a short period of ten years hence the poverty elasticity of growth should remain comparable. In this section we present our estimated growth elasticity of poverty.

5.2.1 National and Regional Elasticities

Table 10: Headcount Poverty Elasticity of Growth

	Elasticity 2006	Sd	Elasticity 2010	Sd	Elasticity 2015	Sd
National	-0.56	0.02	-0.68	0.03	-0.67	0.03
Rural	-0.49	0.03	-0.68	0.04	-0.70	0.04
Urban	-0.66	0.02	-0.66	0.03	-0.58	0.04
Central	-0.60	0.07	-0.79	0.08	-0.81	0.08
Copperbelt	-0.71	0.05	-0.71	0.04	-0.67	0.07
Eastern	-0.45	0.06	-0.64	0.08	-0.73	0.08
Luapula	-0.57	0.08	-0.66	0.10	-0.48	0.09
Lusaka	-0.59	0.03	-0.64	0.05	-0.51	0.07
Muchinga	.	.	.	.	-0.59	0.08
Northern	-0.46	0.05	-0.59	0.08	-0.55	0.07
Northwestern	-0.58	0.07	-0.79	0.11	-1.00	0.14
Southern	-0.58	0.07	-0.64	0.07	-0.99	0.09
Western	-0.34	0.05	-0.60	0.09	-0.35	0.07

Table 10 shows that at national level, head count poverty elasticity of growth has marginally increased from -0.56 in 2006 to -0.68 in 2010 and -0.67 in 2015. The results imply that one percent of growth reduced poverty by 0.56 percent and 0.68 percent in 2006 and 2010 respectively while in 2015 it reduced by 0.67 percent. Regional analysis reveals that Poverty was more responsive in urban areas compared to rural areas in 2006 and 2010 while the opposite

is found to be the case in 2005. Provincial disaggregation show poverty to be most inelastic in western province. For example in 2015, a unit of growth only reduced poverty by -0.35 percent in western province. This level of responsiveness is low relative to what we find in other provinces such as central whose elasticity in the same year was -0.81. This result seems to explain the consistently higher poverty levels in western province. Overall, the elasticities we find in this study are comparable to the results reported in Grant (2005) who found a national growth elasticity of -0.5 between 1991 and 1998.

Table 11: Poverty Gap Elasticity of Growth

	Elasticity 2006	Sd	Elasticity 2010	Sd	Elasticity 2015	Sd
National	-0.94	0.02	-1.16	0.03	-1.01	0.02
Rural	-1.09	0.03	-1.43	0.04	-1.35	0.04
Urban	-0.65	0.03	-0.65	0.03	-0.53	0.04
Central	-1.06	0.05	-1.28	0.06	-1.12	0.07
Copperbelt	-0.75	0.04	-0.79	0.06	-0.69	0.07
Eastern	-1.14	0.04	-1.42	0.05	-1.28	0.06
Luapula	-1.04	0.05	-1.40	0.06	-1.29	0.07
Lusaka	-0.56	0.04	-0.58	0.05	-0.43	0.06
Muchinga	.	.	.	.	-1.18	0.06
Northern	-1.04	0.04	-1.35	0.06	-1.27	0.06
Northwestern	-1.04	0.05	-1.29	0.07	-1.30	0.07
Southern	-1.05	0.04	-1.30	0.05	-1.23	0.06
Western	-0.93	0.05	-1.34	0.06	-1.24	0.06

Table 11 shows the poverty gap elasticity of growth. As stated earlier, this measure captures the reduction in average distance of the poor to the poverty line following a percentage increase in growth. In 2010 and 2015 the poverty gap elasticity was more than unitary, a percentage point of growth resulted in more than one percent decrease in poverty gap. Poverty gap is more responsive to growth in rural areas compared to urban areas. At provincial level, we observe that the elasticity is most inelastic in Lusaka and Copperbelt, provinces whose poverty level are also lowest. The result suggests that it is much more difficult to get an extra person out of poverty through growth in provinces or regions with low levels of poverty compared to provinces with higher poverty levels.

Table 12: Squared Poverty Gap Elasticity of Growth

	Elasticity 2006	Sd	Elasticity 2010	Sd	Elasticity 2015	Sd
National	-1.18	0.02	-1.50	0.03	-1.24	0.03
Rural	-1.48	0.03	-1.97	0.05	-1.79	0.06
Urban	-0.62	0.03	-0.62	0.04	-0.47	0.04
Central	-1.38	0.06	-1.47	0.07	-1.33	0.08
Copperbelt	-0.76	0.05	-0.79	0.07	-0.66	0.08
Eastern	-1.48	0.05	-2.00	0.07	-1.67	0.07
Luapula	-1.39	0.06	-2.12	0.08	-1.90	0.09
Lusaka	-0.53	0.05	-0.54	0.06	-0.35	0.06
Muchinga	.	.	.	.	-1.67	0.09
Northern	-1.45	0.05	-1.90	0.08	-1.83	0.08
Northwestern	-1.27	0.06	-1.64	0.10	-1.47	0.09
Southern	-1.36	0.05	-1.70	0.07	-1.30	0.07
Western	-1.38	0.06	-1.99	0.08	-1.93	0.08

Squared poverty gap indicates the severity of poverty. The squared poverty gap elasticity to growth therefore is the reduction in severity of poverty following one percent of growth. Like the poverty gap, squared poverty gap is more responsive in rural areas. The poverty severity elasticity measure increased in both urban and rural areas between 2006 and 2010 but reduced between 2010 to 2015. At provincial level, the elasticity is lowest in Lusaka province in all three periods. we observe an increase in elasticity levels in all provinces between 2006 and 2010. However, elasticity decreases across all provinces between 2010 and 2015. In this study we find that the squared poverty gap is more responsiveness to growth compared head count poverty and poverty gaps.

5.2.2 Growth Elasticities of Poverty by Sector

The impact of economic growth on poverty reduction depends on the extent to which growth is inclusive and so benefits the poor. However, the degree to which growth reduces poverty depends on the structure of the economy. This section disaggregates the poverty elasticity of growth based on the sector of employment of head of household. In table 13 we present sectoral head count growth elasticity of poverty.

Table 13: Headcount Poverty Elasticity of Growth by Sector of Employment of Head

	Elasticity 2006	Std	Elasticity 2010	Std	Elasticity 2015	Std
Agriculture	-0.47	0.03	-0.68	0.04	-0.72	0.05
Mining	-0.55	0.07	-0.28	0.05	-0.18	0.05
Manufacturing	-0.64	0.06	-0.89	0.08	-0.55	0.08
Construction	-0.69	0.12	-0.89	0.09	-0.98	0.16
Wholesale and Retail	-0.72	0.04	-0.74	0.05	-0.67	0.07
Other Services	-0.66	0.03	-0.58	0.03	-0.48	0.04

For the period 2006 to 2015, poverty has responded differently to growth in different sectors. Elasticity is consistently found to be more responsive to growth in the construction industry.

A percentage of growth in the construction sector led to 0.69 percent reduction in poverty in 2006. The construction sector elasticity was -0.89 and -0.98 in 2010 and 2015 respectively. Poverty is least responsive to growth in the mining industry. Over the years, elasticity in the mining sector has been decreasing, from a figure of -0.55 in 2006, elasticity reduced to -0.28 in 2010 before decreasing further to -0.18 in 2015. Sector elasticity results in 2015 suggest that head count poverty responds more to growth in sectors with a low capital-labour ratio such as the agricultural and construction sector.

Table 14: Poverty Gap Elasticity of Growth by Sector of Employment of Head

	Elasticity 2006	Std	Elasticity 2010	Std	Elasticity 2015	Std
Agriculture	-1.11	0.03	-1.48	0.04	-1.39	0.05
Mining	-0.39	0.06	-0.24	0.07	-0.12	0.06
Manufacturing	-0.73	0.05	-0.94	0.07	-0.63	0.08
Construction	-0.88	0.07	-0.97	0.08	-0.76	0.09
Wholesale and Retail	-0.77	0.04	-0.82	0.05	-0.68	0.06
Other Services	-0.56	0.03	-0.52	0.04	-0.45	0.04

When poverty is measured using poverty gap as in table 14 , we find that poverty is more responsive to growth in agriculture sector relative to other sectors. Of all the sectors poverty gap elasticity is found to be greater than one in all the three periods while it remained less than unit in all the other sectors. However, the mining sector still maintains as the sector with the least elasticity levels. As was the case with the head count measure, poverty gap elasticity has been on a downward trend in the mining sector from -0.31 in 2006 to -0.24 in 2010 and eventually -0.12 in 2015.

Table 15: Squared Poverty Gap Elasticity of Growth by Sector of Employment of Head

	Elasticity 2006	Std	Elasticity 2010	Std	Elasticity 2015	Std
Agriculture	-1.52	0.04	-2.05	0.05	-1.85	0.06
Mining	-0.31	0.06	-0.21	0.06	-0.11	0.05
Manufacturing	-0.79	0.06	-0.94	0.08	-0.66	0.07
Construction	-0.96	0.08	-1.00	0.09	-0.75	0.09
Wholesale and Retail	-0.77	0.04	-0.89	0.06	-0.67	0.06
Other Services	-0.52	0.03	-0.51	0.04	-0.36	0.04

Poverty severity reduced more in agricultural based households. A unit of growth reduces poverty severity by at least 1.5 percent in all three years. The elasticity is particularly higher in 2010 where poverty decreased twice the amount of growth. This figure is relatively high compared to elasticity in other sectors whose response was less or equal to unit. Notably, elasticity in the mining industry is found to be only -0.11 in 2015 which is more than 10 times lower the elasticity found in the agricultural sector in the same year.

5.3 Sensitivity Analysis of Growth Elasticities of Poverty to Changes in Poverty Line

This subsection deals with a rather important aspect of how sensitive are the growth elasticities of poverty to changes in the poverty lines. All the three figures below show that as the level of poverty reduces or equivalently the higher the poverty line the lower is the responsiveness of poverty to growth changes.

Figure 5: Sensitivity of Growth Elasticities of Poverty 2006
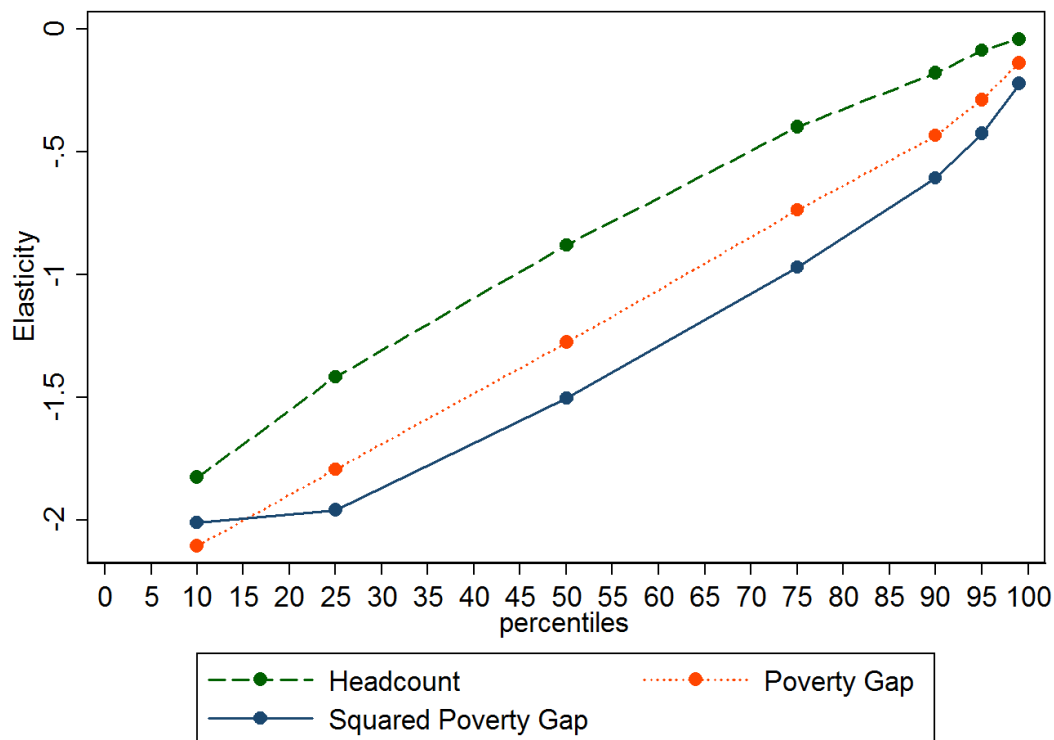

Figures 5, 6 and 7 show the changes in the growth elasticity of poverty for 2006, 2010 and 2015 respectively. On the vertical axis is the growth elasticity of poverty and on the horizontal axis is the percentiles. All the three figures show a downward relationship between the poverty line (level of poverty) and the elasticity levels. As the poverty line is increased from the level that ensures that only 10 percent of the population are poor (tenth percentile) to extreme pole that 99 percent of the population are poor, the elasticity of poverty reduces in absolute terms. The green line is for the headcount poverty, the red for the poverty gap and the blue the squared poverty gap.

As highlighted already, Figure 5 shows the relationship for 2006. When the poverty line is set so that only ten percent of the population are poor, the growth elasticity of poverty would have been close to -2. As the poverty line is increased to a level where 20 percent of the population is poor, the elasticity would reduce to -1.5. This relationship continues so much

that when the poverty line is increased to a level where 95 percent of the population are poor, the elasticity would be very close to zero. Suffice to say the same trend is observed with regard to the poverty gap and the squared poverty gap elasticities. When the poverty line is set at the tenth percentile level the growth elasticity of the poverty gap at -2.6 and when this is increased this elasticity reduces gradually. Similarly, the growth elasticity of the squared poverty gap is between than -2.6 and -3.

Figure 6: Sensitivity of Growth Elasticities of Poverty 2010
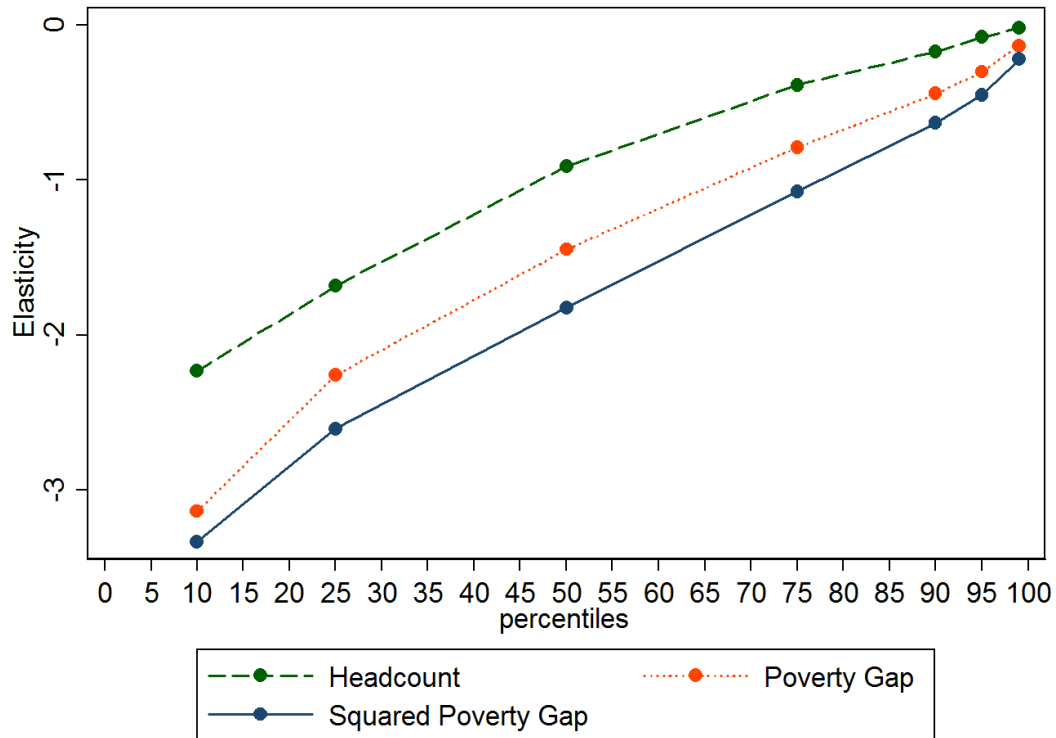
Similarly, Figure 6 shows the negative relationship between elasticities and levels of poverty lines in 2010. However, here we notice that the responsiveness of much more than that existed in 2006. For instance we observe that when the poverty line is set at the tenth percentile, the growth elasticity of headcount poverty is close to -2.2 while both the elasticity of the poverty gap and the squared poverty gap is more than -3. Then these elasticities gradually decline to close to zero as the poverty lines are increased. As very similar picture is observed in Figure 7.

Figure 7: Sensitivity of Growth Elasticities of Poverty 2015
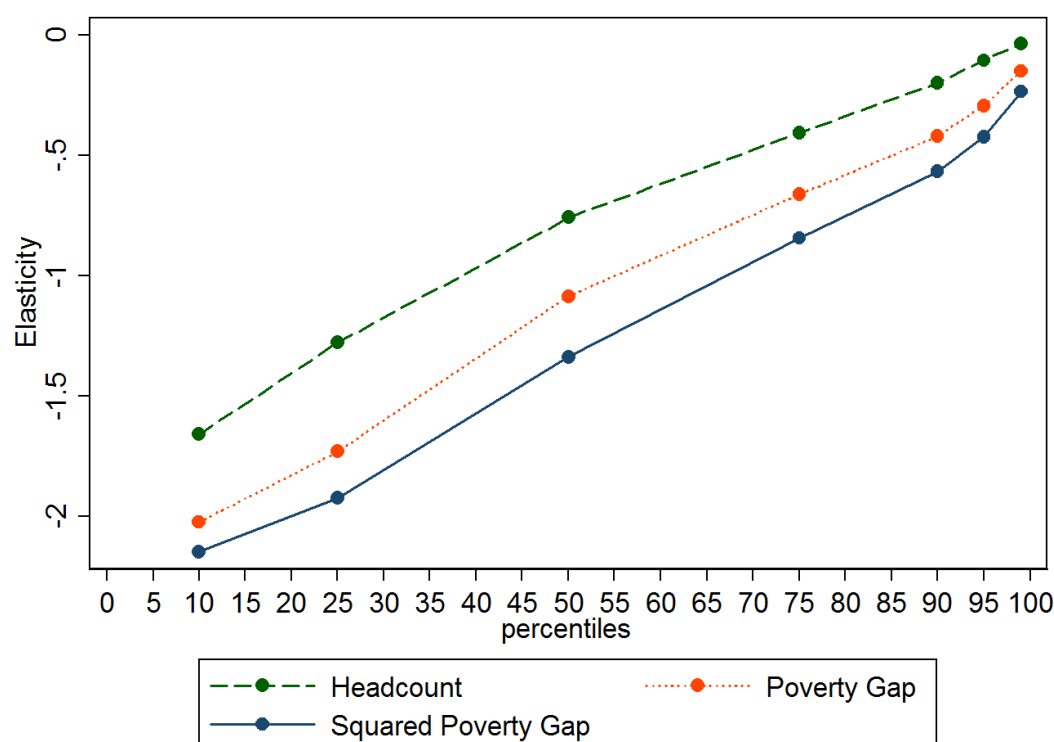
The picture which emerges from this simulation of elasticities using different levels of poverty lines is that in Zambia the squared poverty gap index is the most responsive index to changes to poverty as in all three cases the sensitivity curve lies below that for the poverty gap and the headcount indices. On the other hand the least responsive is the headcount rate. This is regardless of the poverty line set.

The other fact is that growth elasticity of poverty are sensitive to the choice of poverty lines. It is for this reason that this study used the national poverty line to make the results relevant for policy discourse on how to reduce poverty which is nationally measured using the national food basket as established by the Central Statistical Office. This therefore entails that international poverty lines such as the US$1.25 per day recently adjusted to US$1.9 per day in 2011 prices would yield significantly higher elasticities than using the national poverty lines. This is true in cases where international poverty lines are higher than the national poverty lines.

5.4 Growth-Redistribution Decompositions 2006-2016

Using the same adult equivalent expenditure computed by CSO for 2006, 2010 and 2015, we used consumer price indices to adjust the prices into 2015 prices. Similarly, we adjusted the poverty lines for each year using the consumer price index for that particular year.

5.4.1 Poverty Decomposition at National Level :2006-2015

Table 16 shows the poverty decomposition at the national level for the period 2006-2015. In the second column are the decomposition results using 2006 as the base year. The Third column shows the decomposition using 2015 as the base year. Since such decompositions are path-dependent, the results may not be the same. The last column takes the average of the two decompositions. As explained in the methodology section, the average results have no residual or what some refer to as the interaction effect. The table presents the decomposition for the Headcount poverty (P0), Poverty Gap (P1) and Squared Poverty Gap (P2). For each of these poverty indices, there is presented a component due to growth, redistribution and the residual effect. The total change is the change in the poverty index for that period. The table reveals that the total change in headcount poverty between 2006 and 2015 was -10.93 percent. Decomposing this total change into poverty and redistribution and using 2006 as the base shows that growth contributed -6.67 which is 61.0 percent while redistribution accounted for -4.80 which is 43.9 percent. The residual was 0.54 this is unexplained but it takes care of the decomposition so that it adds up to 100 percent. Using 2015 as a base yields similar result. Perhaps more interestingly is the average result. This shows that of the total change, growth accounted for -6.40 which is 58.6 percent while redistribution accounted for the remainder which stood at -4.53 that is 41.4 percent. The main message here is that both growth and redistribution played an important role in the observed reduction in headcount poverty over the period but growth had a greater role.

Table 16: National Poverty Decompositions 2006-2015

	Base 2006	Base 2015	Average
P0	.	.	.
Growth	-6.67	-6.13	-6.40
Redistribution	-4.80	-4.26	-4.53
Residual	0.54	-0.54	0.00
Total change	-10.93	-10.93	-10.93
P1	.	.	.
Growth	-5.57	-5.03	-5.30
Redistribution	-1.45	-0.92	-1.19
Residual	0.53	-0.53	0.00
Total change	-6.49	-6.49	-6.49
P2	.	.	.
Growth	-4.26	-3.93	-4.10
Redistribution	-0.43	-0.11	-0.27
Residual	0.33	-0.33	0.00
Total change	-4.37	-4.37	-4.37

Similarly, the observed reduction in the poverty gap (P0) and Squared Poverty Gap over

the period is attributed more to growth than to redistribution. Focusing only on the average results, we see that the total change in the poverty gap between 2006 and 2015 was -6.49. Of this change, -5.3 (81.7 percent) was due to growth while -1.19 (18.3 percent) was due to redistribution. Regarding the total change in the squared poverty gap, growth accounted for -4.1 (93.8 percent) while redistribution accounted for -0.27 (6.2 percent). Therefore, both growth and redistribution have been key drivers of the observed reduction in poverty over the period 2006 to 2015. It is however important that to reduce poverty, growth will play a greater pivotal role in Zambia.

5.4.2 Sector Poverty Decompositions : 2006-2015

To understand the sectoral variations in terms of how growth in each sector impacts on poverty, it is important to use sector wide data for decompositions. Ideally, to understand how growth in each sector affects poverty, income data would be used as it would capture the sector compositions better. In the absence of reliable income data that is comparable, we make an attempt to explain the effect of growth in each sector by using rough data of sector of employment of the head of household. The weakness with this approach is that in houses where the head is working in a certain sector but other household members are working in other sectors, it would imply that a household may be categorized as for instance an agricultural based household when in actual fact the household depends on other sectors. Other options of looking at the sector of work for the main income earner was not possible given due to data limitations.

Notwithstanding this weakness, poverty decompositions were done for each sector to establish the impact of growth and redistribution on poverty within each sector. Tables 17, 18,19, 20, 21 and 22 show the poverty decompositions for each sector. The first table, Table 17 shows the results for the agriculture sector. The table reveals that the total reduction of poverty of households whose heads work in agriculture was -2.42. The total change is accounted for by redistribution as opposed to growth. Redistribution within the sector was the main driver at -7.8 accounting for over 300 percent of the reduction in poverty. Growth on the other hand countered the reduction in poverty. This is on account of incomes of households in the sector declining rather than increasing. The situation was the same with regard to the poverty gap and squared poverty gap decompositions where the reduction in these indices were driven by redistribution rather than growth. The total change in the poverty gap was -1.8 with redistribution accounting for -6.69. Similarly, the change in the squared poverty gap was -1.16 with redistribution accounting for -5.24. In both cases negative growth of incomes of households was contributing to increasing rather than reducing poverty depth and severity.

Unlike poverty decompositions for agriculture, the mining sector experienced growth over the period 2006 to 2015. Hence growth had a greater effect on reducing poverty in this sector. Table 18 shows poverty decompositions in the mining sector. The table reveals that the total change in headcount poverty between 2006 and 2015 for households that depend on the mining sector was -8.93. Of this, -4.31 (48.3 percent) was due to growth in incomes while the remaining

Table 17: Poverty Decompositions Agriculture Sector of Employment of Head 2006-2015

	Base 2006	Base 2015	Average
Headcount	.	.	.
Growth	3.58	5.38	4.48
Redistribution	-7.80	-6.00	-6.90
Residual	1.81	-1.81	0.00
Total change	-2.42	-2.42	-2.42
Poverty Gap	.	.	.
Growth	4.87	4.90	4.89
Redistribution	-6.70	-6.67	-6.69
Residual	0.03	-0.03	0.00
Total change	-1.80	-1.80	-1.80
Squared Poverty Gap	.	.	.
Growth	4.26	3.89	4.08
Redistribution	-5.05	-5.42	-5.24
Residual	-0.38	0.38	0.00
Total change	-1.16	-1.16	-1.16

-4.62 (51.7 percent) was due to redistribution. The total change in the poverty gap was -1.94 of which growth accounted for -1.30 (67 percent) and redistribution -0.64 (33 percent). Similarly growth was more dominant in reducing the severity of poverty in the mining sector. The total change in the squared poverty gap was -0.46 and all this was accounted for by changes in growth rather than redistribution.

The total changes in poverty for households where the head depends on manufacturing was more accounted for by redistribution rather than growth. Table 19 shows the result of the decomposition results for the manufacturing sector. The table shows that for households whose head work in the manufacturing sector, the headcount poverty reduced by -12.52 between 2006 and 2015. This reduction in poverty is accounted for largely by redistribution at -9.06 (72.4 percent). The remainder -3.46 (27.6 percent) is accounted for by growth. Similarly, the effect of growth on reducing depth and severity of poverty is limited in comparison to redistribution. According to the table, the poverty gap reduced by -4.98 of which redistribution accounts for -2.92 (58.6 percent) while growth accounts for -2.02 (41.4). Finally, the total change in the squared poverty gap was -2.80 of which redistribution accounted for -1.47 and growth -1.33. It is worth noting that the sector had a high reduction in the headcount poverty but limited reduction in the depth and severity of poverty.

As indicated earlier the service sector was split into construction, wholesale and retail and other sectors. The tables that follow show decompositions for these sectors. Table 20 shows the decomposition results for the construction sector. The table shows that the total change in the headcount poverty for households with head working in this sector was -15.76. Interestingly the whole reduction is on account of redistribution. On the contrary, lack of growth accounts for

Table 18: Poverty Decompositions Mining Sector of Employment of Head 2006-2015

	Base 2006	Base 2015	Average
Headcount	.	.	.
Growth	-5.71	-2.91	-4.31
Redistribution	-6.02	-3.22	-4.62
Residual	2.80	-2.80	0.00
Total change	-8.93	-8.93	-8.93
Poverty Gap	.	.	.
Growth	-1.75	-0.85	-1.30
Redistribution	-1.09	-0.19	-0.64
Residual	0.90	-0.90	0.00
Total change	-1.94	-1.94	-1.94
Squared Poverty Gap	.	.	.
Growth	-0.79	-0.47	-0.63
Redistribution	0.01	0.33	0.17
Residual	0.32	-0.32	0.00
Total change	-0.46	-0.46	-0.46

Table 19: Poverty Decompositions Manufacturing Sector of Employment of Head 2006-2015

	Base 2006	Base 2015	Average
Headcount	.	.	.
Growth	-4.33	-2.58	-3.46
Redistribution	-9.93	-8.19	-9.06
Residual	1.74	-1.74	0.00
Total change	-12.52	-12.52	-12.52
Poverty Gap	.	.	.
Growth	-2.36	-1.75	-2.05
Redistribution	-3.23	-2.62	-2.92
Residual	0.61	-0.61	0.00
Total change	-4.98	-4.98	-4.98
Squared Poverty Gap	.	.	.
Growth	-1.48	-1.19	-1.33
Redistribution	-1.61	-1.32	-1.47
Residual	0.29	-0.29	0.00
Total change	-2.80	-2.80	-2.80

some of the increase in headcount poverty. Similarly, all the change in the poverty gap (-5.78) and the squared poverty gap (-3.04) is accounted for by redistribution rather than growth. In all cases, lack of growth contributed to increase in poverty countering the poverty reducing effect of redistribution.

Table 20: Poverty Decompositions Construction Sector of Employment of Head 2006-2015

	Base 2006	Base 2015	Average
Headcount	.	.	.
Growth	0.00	0.46	0.23
Redistribution	-16.22	-15.76	-15.99
Residual	0.46	-0.46	0.00
Total change	-15.76	-15.76	-15.76
Poverty Gap	.	.	.
Growth	0.50	0.34	0.42
Redistribution	-6.13	-6.29	-6.21
Residual	-0.16	0.16	0.00
Total change	-5.78	-5.78	-5.78
Squared Poverty Gap	.	.	.
Growth	0.30	0.21	0.25
Redistribution	-3.24	-3.34	-3.29
Residual	-0.10	0.10	0.00
Total change	-3.04	-3.04	-3.04

Similar to the decomposition results for the construction sector, the reduction in poverty in the wholesale and retail is driven by redistribution rather than growth. Table 21 shows the decomposition results for this sector. The table shows that the total reduction in the headcount poverty, poverty gap and squared poverty gap was -8.90, -2.94, and -1.20 respectively. All these reductions are on account of redistribution rather than growth. Therefore lack of growth contributed to this. On the contrary, growth had a greater impact on reducing poverty in the other service sector which is largely government civil servants. This is shown in Table 22 below. For example, the reduction in headcount poverty was -6.80 and growth accounts for -5.01 which is 73.7 percent with the remainder accounted for by redistribution.

Results in this subsection have shown that though growth was contributing to reduction in poverty at national level, the effect of growth across sectors is varied. The mining and manufacturing sectors that are more formal have a significant effect of growth on poverty reduction. On the contrary, sectors with high levels of informality such as agriculture, construction, wholesale and retail had limited increase or decline in equivalent consumption that contributed to increasing rather than reducing poverty. It is rather surprising that the agriculture sector where the majority are employed recorded declines in equivalent consumption resulting into persistent poverty in the sector.

Table 21: Poverty Decompositions Wholesale and Retail Sector of Employment of Head 2006-2015

	Base 2006	Base 2015	Average
Headcount	.	.	.
Growth	0.00	0.02	0.01
Redistribution	-8.92	-8.90	-8.91
Residual	0.02	-0.02	0.00
Total change	-8.90	-8.90	-8.90
Poverty Gap	.	.	.
Growth	0.06	0.05	0.05
Redistribution	-2.99	-3.00	-2.99
Residual	-0.01	0.01	0.00
Total change	-2.94	-2.94	-2.94
Squared Poverty Gap	.	.	.
Growth	0.04	0.03	0.03
Redistribution	-1.23	-1.24	-1.24
Residual	-0.01	0.01	0.00
Total change	-1.20	-1.20	-1.20

Table 22: Poverty Decompositions Other Services Sector of Employment of Head 2006-2015

	Base 2006	Base 2015	Average
Headcount	.	.	.
Growth	-5.75	-4.27	-5.01
Redistribution	-2.53	-1.05	-1.79
Residual	1.49	-1.49	0.00
Total change	-6.80	-6.80	-6.80
Poverty Gap	.	.	.
Growth	-2.66	-2.42	-2.54
Redistribution	-0.41	-0.17	-0.29
Residual	0.24	-0.24	0.00
Total change	-2.83	-2.83	-2.83
Squared Poverty Gap	.	.	.
Growth	-1.45	-1.30	-1.38
Redistribution	0.06	0.22	0.14
Residual	0.15	-0.15	0.00
Total change	-1.24	-1.24	-1.24

6   CONCLUSION

The paper estimated poverty trends between 2006 and 2015 using comparable consumption aggregate obtained from the household living conditions surveys to establish changes in poverty. It is established that though the period under consideration has registered growth in national output, reduction in poverty has been limited. This is on account of low growth elasticity of poverty that were estimated and are found to be less than minus one percent in relation to the headcount poverty. Estimates of poverty levels according to sector of employment of the head of household revealed that the majority of the households in agriculture live below the national poverty line and that poverty in the agriculture sector has not reduced much. On the contrary a very small proportion of households in the mining sector are poor and there has been a large reduction of poverty in mining over the period 2006 to 2015. The same applies to manufacturing and construction sectors that saw significant reductions in poverty of the period.

Using the Kakwani (1993) methodology that assess the elasticity of poverty with respect to growth while holding the distribution of income constant, we established that at both national and provincial levels the growth elasticity of headcount poverty is low and less than 1 percent. It was also found that the growth elasticity of poverty increases as one moves from headcount poverty to the depth and severity of poverty as measured by the poverty gap and squared poverty gap respectively. The low elasticity suggests that policies that should target poverty reduction should not be limited to the trickle down approach that growth will automatically impact on poverty. Therefore, growth is important for poverty reduction but its effect is limited particularly in sectors that have a larger proportion of its workers in the informal sector.

We also used the methodology of Kakwani (1997) to decompose poverty changes between 2006 to 2015 and the sub-periods of 2006 to 2010 and 2010 to 2015. The main finding is that at national and regional level the growth component is the main driver of reduced poverty. However, at sectors of construction, services of retail and wholesale and manufacturing redistribution plays a role in reducing poverty be it headcount, poverty gap and squared poverty gap. However, the results are not consistent on the sub-periods decomposition where growth dominates reduction in poverty while distribution sometimes contributes to reduced poverty but at other times it is responsible in reducing the effect of growth on poverty reduction. Although the story on poverty decomposition need more sensitivity tests to establish robustness and resolve the mixed results, it is clear from these results that growth is indeed impacting positively on poverty reduction and in some cases the effect of growth will be limited due to adverse distribution.

Despite government focus on programmes such as the Farmer Input Support Programme (FISP) and the maize marketing through the Food Reserve Agency, poverty in agriculture has remained high. This entails that whatever is being done currently is not having a serious dent on poverty. There is need to refocus attention to revamping productivity in agriculture through enhanced extension, research, irrigation, mechanisation diversification and disease and pest control. Also poverty reduction should not just focus on agriculture there is need to

harness the potential of manufacturing and services sectors so as to let dormant labour in the agriculture sector be attracted to these sectors which have lower poverty rates.

7 Study Limitations

The study results have one major limitation, sectoral analysis findings could have been affected by the fact that households where allocated to sectors based on the sector of the head of household and not the main source of income for the household. Sector decomposition using this approach has a limitation in cases where there are more income earners in the household in addition to head of household.

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