Final report

Understanding growth-income inequality interactions in Zambia

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1. Introduction

Zambia is classified as a lower-middle income country, having graduated from low-income country status in 2011, placing it ahead of several other African countries to become a prime example of Sub-Saharan Africa's "economic renaissance". Following years of economic decline during the 1970s and 1980s, Zambia experienced rapid economic growth in the 2000s, driven largely by a rebound in copper production, as well as strong expansion in construction and services industries. Like many other economies on the continent, Zambia is rich in natural resources, a characteristic that has often produced a pattern of growth that is capital-intensive; the concentration of growth in these sectors therefore reduces the potential employment impact of growth. While there has been some reduction in poverty at the national level, rural poverty remains extremely high and inequality has been on the rise. Zambia's pattern of growth thus stands at the centre of the challenge of ensuring sustainable and inclusive growth.

This paper aims to understand why income inequality in Zambia has remained largely unchanged, despite rapid economic growth. We investigate the key drivers of income inequality between 1996 and 2015, and the extent to which these drivers have changed over time. Furthermore, we investigate the pattern of sharing of gains from growth across the income distribution. Using the Living Conditions Monitoring Surveys (LCMS) for the years 1996, 1998, 2004, 2010 and 2015, we first conduct a decomposition of the Gini coefficient, a widely-used measure of inequality, by income source. Through this decomposition we are able to identify those income sources that contribute most to aggregate inequality, as well as isolate the contributions of wage income and social transfers to overall inequality so as to reveal the patterns of employment and earnings that may or may not be responsible for rising income inequality in Zambia. Secondly, we construct Growth Incidence Curves (GICs), using the methodology developed by Ravallion and Chen (2003), to examine how the gains from economic growth over the period have been shared across households and individuals across the income distribution. We also empirically measure the relationship between economic growth, poverty and inequality using the Datt-Ravallion decomposition methodology. By decomposing the measured changes in poverty into growth and inequality components, we are able to estimate the relative impacts of growth and redistribution on poverty reduction.

It should be noted at the outset that, in this paper, we consider only income inequality and its relationship with economic growth; as such, inequalities in the distribution of wealth fall outside of our scope. However, wealth inequality remains an important policy consideration for a variety of reasons, not least of which is the power of inequalities in wealth to intensify other types of inequalities—such as income inequality and inequalities in educational attainment or health—and to sustain inequality inter-generationally. Further, in many respects, wealth inequalities can be viewed as at least partly the accumulation of income inequalities over longer periods of time. For any society concerned with inequality, wealth inequality should therefore not escape attention.

Section 2 of the paper provides a review of the literature on the relationship between growth and inequality, highlighting recent evidence from Sub-Saharan Africa and Zambia. An overview of the Zambian economy is provided in section 3, with a focus on the sectoral pattern of growth and employment as well as the policy interventions aimed at addressing poverty and inequality. Our research approach is discussed in section 4, and empirical findings outlined in section 5. We conclude in section 6.

2. Interactions between Economic Growth and Income Inequality

The relationship between growth and income inequality has been a topic of considerable interest among policymakers in both developed and developing countries, especially in the wake of the global recession. However, the literature on growth and income inequality is vast and inconclusive, suggesting several possible channels through which income inequality and economic growth are interrelated: some theories posit that growth affects inequality (Kuznets, 1955; Adelman and Morris, 1973), while others suggest that it is in fact inequality that shapes growth (Berg and Ostry, 2011; Dollar, Kleinberg and Kraay, 2013; Ostry et al., 2014). This review aims to shed light on the theoretical and empirical literature on growth and income inequality, highlighting recent evidence from Sub-Saharan Africa and Zambia.

2.1. Impact of Economic Growth on Income Inequality

One of the earliest and most widely accepted theories of the relationship between growth and inequality – despite the lack of empirical evidence – was put forward by Simon Kuznets in 1955. Kuznets' hypothesis, also known as the "inverted-U" hypothesis, suggested that in the early phases of growth, inequality would rise as the economy transitioned towards industrialisation; while in the later phases of growth, inequality would stabilise and decline (Kuznets, 1955). Kuznets (1955) proposed that income inequality was driven by the accumulation of savings in the upper end of the income distribution, as well as the process of industrialization and urbanization which shifts activities away from agriculture towards more productive activities in urban centres. As growth increased, an increase in the number of workers moving into rapid-growth and higher-productivity industries, coupled with government-sanctioned redistribution, would force inequality downwards.

There has subsequently been considerable debate on Kuznets' hypothesis, with several studies finding that the hypothesis does not necessarily hold for developing countries. In particular, Saith (1983) finds that for a small sample of least developed countries, an inverted L-curve was a better fit than Kuznets' inverted-U curve, suggesting that for poor countries, inequality was likely to increase as income per capita increased. However, Gallo (2002) argues that even this finding is fraught with weaknesses, as other factors influencing inequality were not taken into account in Saith's work. Instead, Jha (1996) notes that the differences in income distribution across countries are due largely to country-specific characteristics, with growth being insignificant in explaining the distribution of income. Other authors (Ahluwalia, 1976; Fields, 1988; Fields, 1991; Janvry and Sadoulet, 1996) further argue that it is the pattern of growth that affects inequality, rather than growth itself; and that the type of policies, the level of education, the extent of government involvement in the economy, and the importance of agriculture in total production are more significantly associated with inequality.

More recent research (for example, Dollar and Kraay, 2002; Dollar, Kleinberg and Kraay, 2013) also suggests that economic growth has limited effects on inequality. Using a large cross-country dataset of 118 countries, Dollar and Kraay (2002) find that during a period of positive economic growth, the incomes of households in the poorest 20 percent increase equally with average incomes, revealing little correlation between growth and inequality. Dollar, Kleinberg, and Kraay (2013) confirm their earlier findings, showing that as economic growth increases, incomes of the bottom 20 percent and bottom 40 percent of the income distribution generally rise at the same rate as average incomes. However, they note two outlying findings from Latin America and Asia: in Latin America in the 2000s, income growth of the bottom 40 percent was greater than average income growth, suggesting that economic growth in Latin America was correlated with a reduction in inequality. In Asia, on the other hand, rising incomes were correlated with rising inequality, despite the overall growth rate being much higher than in Latin America (Dollar et al., 2013). These opposing findings support earlier assertions that the effect of growth on inequality has more to do with country-specific characteristics, such as the institutional and social context, and the pattern of growth.

That economic growth has an ambiguous effect on inequality is an important finding for policymakers, as growth in and of itself may not be sufficient to reduce inequality. Nevertheless, this does not necessarily negate the reverse relationship, that inequality impacts growth.

2.2. *Impact of Income Inequality on Economic Growth*

While the literature appears to agree that growth has an ambiguous effect on inequality, there is little consensus on whether the reverse relationship is positive or negative. Firstly, inequality is thought to *increase* economic growth, primarily through two channels: incentives and savings. Mirrlees (1971) as well as Lazear and Rosen (1981) suggest that high inequality provides incentives to work hard and take risks, as individuals who do so reap higher rewards from their efforts. Furthermore, high inequality may incentivise greater private investment in education, if the highly educated are perceived to be more productive and able to take advantage of higher rates of return to education (Barro, 2000; Cingano, 2014). The savings-channel theory suggests that high inequality stimulates aggregate savings, which is essential to capital accumulation, and thus essential for economic growth (Cingano, 2014). A key assumption in this line of argument is that the rich have a higher propensity to save than the poor (Kaldor, 1957; Bourguignon, 1981). Therefore, it is argued that an economy with a high concentration of income in the upper-end of the distribution is likely to grow faster than one with a more equal distribution of income (Gallo, 2002).

The empirical evidence supporting the 'inequality is good for growth' argument is relatively thin, although Forbes (2000) finds that in the short to medium term, an increase in income inequality tends to raise economic growth in the subsequent period. Moreover, Barro (2000) shows, interestingly, that for rich countries inequality and growth are positively related, while for poor countries, inequality lowers growth. According to Todaro (1994), the negative relationship between inequality and growth for poor countries may be due to the fact that the rich behave differently in different contexts. That is, high-income groups in poor countries are more likely to consume luxury imported goods, and to save abroad (Todaro, 1994). As a result, high inequality in developing countries results in lower levels of capital accumulation (Gallo, 2002), as well as poor health, housing and education for the majority of the population. This would in turn cause lower levels of productivity and ultimately reduce growth (Todaro, 1994).

In line with Todaro's arguments, recent studies have further challenged the notion that inequality is growth-enhancing, for both developed and developing countries. Theoretically, inequality is noted to harm growth through the following channels: credit market imperfections, political economy, and political instability (Berg and Ostry, 2011). With regard to the credit market channel, imperfect credit markets limit the ability of low-income individuals to invest in education, health, and other income-enhancing activities (Cingano, 2014). This results in lower levels of human capital accumulation, and ultimately hampers growth (Berg and Ostry, 2014; Cingano, 2014). The political economy argument suggests that in unequal societies, political power may be more equally distributed than economic power, resulting in the majority of voters putting pressure on policymakers to raise taxes or implement regulation that creates disincentives to investment. On the other hand, economic elites may instead resist distribution through corruption and rent-seeking, which is also detrimental to economic growth (Barro, 2000; Benhabib, 2003; Stiglitz, 2012). In extreme cases, inequality may lead to political instability and social unrest, which further raises uncertainty, and reduces the incentives to invest and constraining economic growth (Alesina and Perotti, 1996).

There is a fair amount of empirical evidence supporting the the hypothesis that inequality is harmful to economic growth. While Berg and Ostry (2011) concede that some inequality may be integral for investment and growth, they find that overall inequality reduces growth, at least over the medium term. Not only is inequality noted to dampen the rate of growth, but it also impedes the sustainability of growth, as Ostry et al. (2014) find that higher inequality is associated with shorter positive growth

spells. Cingano (2014) further notes that reducing inequality by lowering income disparities at the bottom end of the income distribution has a greater positive effect on growth, than if the focus were on reducing inequality at the top of the income distribution. This finding supports Todaro's theory that rather than increasing incomes of the rich, increasing the incomes of the poor would stimulate domestic demand and production, as lower-income groups are more likely to consume and save locally, thereby spurring growth (Todaro, 1994). On the other hand, Deininger and Squire (1997) find that the effect of income inequality on growth is not very significant, although when inequality in the initial distribution of land is considered, they find a strong negative impact on subsequent growth. Similar findings are shown by Birdsall and Londono (1997), who also note that the unequal distribution of human capital has a negative effect on growth. These findings therefore suggest that a focus on income inequality may miss significant effects on growth that arise from inequalities in physical and human capital.

What are the lessons to be drawn from the literature? First, it appears to be widely accepted that economic growth has a largely ambiguous effect on income inequality, although the pattern of growth may still influence the way the gains from growth are shared amongst the population. Furthermore, it is more likely that inequality is affected by country-specific factors, such as the structure of the economy, the level of education and the types of policies in place, rather than growth itself. Second, there is considerable evidence supporting the notion that inequality impedes growth. While some inequality may be necessary to provide incentives for growth-enhancing activities, several studies have shown that large disparities in income, as well as in physical and human capital, have a significantly negative impact on both the rate and the duration of economic growth. Finally, much of the evidence presented in the literature is drawn largely from cross-country analyses, although there have been notable outliers indicating different relationships at the regional or country level. This suggests that country-specific research may reveal more nuanced results that have more relevance for policymakers seeking to generate sustained and inclusive growth.

2.3. Evidence from Sub-Saharan Africa

As economic growth in countries around the African continent continues apace, one of the key challenges facing African governments is the translation of growth into improvements in the welfare of their populations. For several countries in Sub-Saharan Africa (SSA), the recent boom in economic growth has been accompanied by rising inequality, and little reduction in poverty (African Development Bank, 2012). Given the general lessons provided in the literature, what does the evidence suggest for the relationship between growth and inequality in SSA?

Using data for 35 African countries, Odedokun and Round (2001) find some evidence that high inequality does indeed reduce growth. They suggest that the channels through which inequality affects growth in Africa include a reduction in investment in secondary and tertiary education, a rise in political instability, and an increase in the fertility rate (Odedokun and Round, 2001). In contrast to the theoretical literature, Odedokun and Round (2001) find that inequality does not affect growth through private savings and investment, nor through the size of government or taxation. They further note that that several additional factors drive inequality on the continent, including: regional factors (such as apartheid in South Africa), the proportion of government budget devoted to subsidies and transfers, the share of agricultural sector in the labour force, and the endowment of human and land resources (Odedokun and Round, 2001).

Basdevant, Benicio and Yakhshilikov (2012) apply the work of Berg and Ostry (2011) to the Southern African Customs Union (SACU), and suggest that the high levels of inequality in SACU partly explain weak growth performance. Although Namibia and South Africa have been able to sustain positive growth since the 1990s, that growth is noted to be low (Basdevant et al., 2012). Like Odedokun and Round (2001), Basdevant et al. (2012) note that other factors, such as poor export performance and

the declining quality of democracy in some countries, are significant in explaining low and less sustained growth in the region (Basdevant et al., 2012).

Gakuru and Mathenge (2012) conduct a sectoral analysis to investigate the effects of sectoral interventions on income distribution and poverty in Kenya. They find that as a result of high initial inequality in Kenya, efforts to promote growth in agriculture and manufacturing mainly benefit high-income urban households that own the factors of production, and have relevant skills to benefit from growth (Gakuru and Mathenge, 2012). Specifically, interventions in agriculture are noted to benefit the rural rich, while interventions in manufacturing benefit the urban rich. Overall, it is found that the manufacturing sector generates the least income for households, while agriculture is relatively more important for household income generation (Gakuru and Mathenge, 2012). They argue that policy interventions aimed at spurring growth in labour-intensive sectors such as agriculture and manufacturing need to be appropriately designed if they are to benefit poor households.

Given the high incidence of poverty in SSA, several studies have also investigated the links between growth, inequality and poverty. For instance, Fosu (2008) examines the extent to which inequality influences the impact of growth on changes in poverty for a sample of 24 SSA and 61 non-SSA countries. He finds that in SSA countries, higher levels of inequality result in smaller growth elasticities of poverty, than in non-SSA countries. Reducing poverty in SSA would therefore require larger reductions in inequality, or greater accelerations in growth, than in the rest of the developing world (Fosu, 2008). Furthermore, he finds considerable variation in the growth elasticities among the sample of SSA countries. For Ethiopia, for example, the income-growth elasticity of 1.4 suggests that a 10 percent rise in growth would translate to a 14 percent reduction in poverty; whereas in Namibia, where the income-growth elasticity is 0.6, a 10 percent rise in growth would be associated with only a 6 percent reduction in poverty (Fosu, 2008). Fosu (2008) therefore argues that in SSA countries with high levels of inequality, and thus low growth elasticities, policies should pay attention to understanding and reducing inequality as a way of enhancing poverty reduction; while in low-inequality countries, a greater focus on generating sustainable growth may be more effective in reducing poverty.

Looking at South Africa, Bhorat and Van der Westhuizen (2012) note that while growth was pro-poor in the absolute sense, between 1995 and 2005, it was not pro-poor in the relative sense – that is, individuals in the top 10 percent of the income distribution experienced the highest average growth rates in expenditure compared to the rest of the income distribution (Bhorat and Van der Westhuizen, 2012). Bhorat and Van der Westhuizen (2012) suggest that over the period, the growth in expenditures of the poor was driven largely by the expansion of social grants rather than from the gains of economic growth, which were concentrated at the top-end of the income distribution. They argue that a growth path based on growth that leaves out the middle of the income distribution, with poverty reduction heavily dependent on government spending, is unsustainable (Bhorat and Van der Westhuizen, 2012).

The above studies show that inequality can be a crucial determinant of both growth and poverty reduction in SSA. High levels of inequality not only appear to have a negative impact on growth, but also dampen the impact of growth on poverty reduction. However, as Fosu (2008) argues, approaches taken to address these challenges will have to be tailored to each country context, as promoting growth alone may be sufficient for reducing poverty in some SSA counties, while tackling inequality may have better results for poverty reduction in others.

2.4. Evidence from Zambia

There has been relatively little recent research detailing the Zambian growth experience, particularly in relation to the growth-poverty-inequality nexus. However, a number of authors, including McCulloch, Baulch and Cherel-Robson (2000), Thurlow and Wobst (2004), Mulenga and Van

Campenhout (2008), World Bank (2012), as well as Resnick and Thurlow (2014) have undertaken studies on the growth experience of Zambia from as early as 1960.

McCulloch at al. (2000) analyse the interactions between growth, poverty and inequality for Zambia during the 1990s. They find that poverty increased between 1991 and 1996, despite considerable reduction in inequality during these years; while the reduction in poverty in 1996 and 1998 was associated with an increase in inequality, particularly in rural areas. These findings suggest that growth, rather than inequality, has been largely responsible for changes in poverty in Zambia (McCulloch at al., 2000). They also find different effects in rural and urban areas during the positive growth period: in rural areas, the removal of subsidies in agriculture was in part responsible for reduction in rural poverty, although most of the benefits accrued to households with access to inputs, transport and marketing services; while in urban areas, the recovery was minimal due to the rapid reduction in the size of the public sector which was not accompanied by comparable growth in the private sector (McCulloch at al., 2000). Given the important role that agriculture plays in the rural economy, McCulloch et al. (2000) suggest that the development of labour-intensive export-oriented agro-processing industries, coupled with effective social safety-nets, is likely to be the key driver to sustainable growth and reduction of inequality and poverty. Thurlow and Worbst (2004) find similar results.

Mulenga and Van Campenhout (2008) note that economic activities and wealth were initially concentrated in the urban areas of Zambia, driven by urban-based mining and manufacturing, particularly the export of copper. However, as the world price of copper began to fall from 1975 onwards, this led to insufficient work opportunities in the urban areas. This eventually resulted in the migration of many urban households into the rural economy and increase of national poverty until the mid-1990s. Also, due to the migration of poor urban households into rural areas, the relative contribution of rural areas to aggregate poverty increased.

However, the World Bank (2012) notes that the recent boom in economic growth has had an urban bias, resulting in the rural economy being largely excluded from the benefits of growth. They further indicate that limited job creation, coupled with regressive government spending, has perpetuated high levels of poverty and inequality in Zambia (World Bank, 2012). Specifically, government spending on key services such as healthcare and education has been hampered by inadequate access: that is, where the poor are dispersed in remote and rural areas, the provision of services becomes difficult and expensive, resulting in a large proportion of social spending reaching higher income households in urban or peri-urban areas (World Bank, 2012).

Similarly, Resnick and Thurlow (2014) find that the rapid growth and structural transformation experienced in the 2000s was not accompanied by significant employment growth. In particular, new jobs generated during the period were largely in the informal economy and were characterized by poor pay and weak job security. As a result, the gains from growth were largely captured by a growing class of high-skilled formal workers, leaving few rewards for both the urban and rural poor.

Building on these studies, this paper aims to add to the literature on the Zambian growth experience, by assessing the drivers of inequality between 1996 and 2015, and investigating the linkages between growth, inequality and poverty. It is hoped that this research will provide insight into the impact of specific policies on inequality, with a view to identifying those policies that are likely to have the greatest impact on reducing poverty and inequality in Zambia.

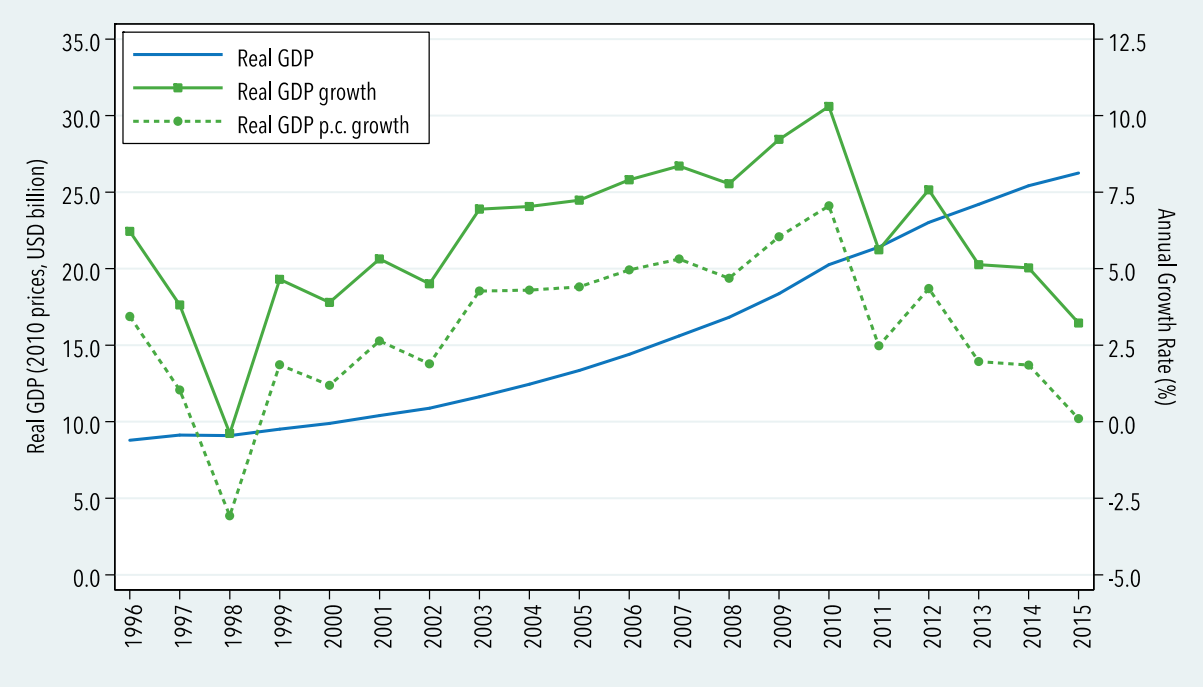
3. Overview of the Zambian Economy, 1996-2015

Following two decades of economic decline and stagnation, Zambia experienced rapid economic growth in the 2000s. By 2011, Zambia had regained its middle-income status, and the country quickly became a shining example of Sub-Saharan Africa's "economic renaissance". Despite this remarkable turnaround, formal employment remains low and there has been limited reduction in poverty and inequality. This chapter provides an overview of the Zambian economy, focusing on the drivers of growth over the 1996-2015 period, and highlighting recent trends in poverty and inequality, as well as the policy interventions that have aimed to address high levels of poverty and growing inequality in the country.

3.1. Macroeconomic Developments

Between 1996 and 2015, Zambia's GDP grew at an average rate of 5.9 percent per year, a significant improvement from the 0.67 percent average growth rate experienced in the preceding 15 years. GDP growth was nevertheless volatile in the late 1990s, largely a result of the deteriorating economic environment and the re-introduction of structural adjustment reforms by the newly-elected Movement for Multi-Party Democracy (MMD) government in 1991 (Thurlow and Worbst, 2004). Zambia's GDP growth rate declined dramatically between 1996 and 1998, before rebounding to 4.7 percent in 1999 (Figure 1). By 2003, GDP growth had risen to 6.9 percent, increasing steadily in the subsequent years to reach 10.3 percent in 2010. Real GDP growth moderated thereafter, falling to 3.2 percent in 2015. Growth in real GDP per capita followed a similar pattern. Thus, by 2015, real GDP per capita (in 2010 constant prices) reached US$ 1 619 in 2015, from US$ 925 in 1996, equivalent to an average annual growth rate of growth of 3.0 percent.[1]

Figure 1. Growth in real GDP and GDP per capita, 1996-2015



Source: World Bank World Development Indicators (2016).

[1] In PPP dollars (constant 2011 prices), Zambia's GDP per capita increased from US$ 2 072 to US$ 3 626 between 1996 and 2015.

Zambia's renewed economic growth has been attributed to a variety of factors, including the boom in commodity prices which boosted Zambia's copper production and exports, favourable weather which supported bumper maize harvests, as well as sustained macroeconomic stability which facilitated a strong expansion of the domestic economy (Resnick and Thurlow, 2014). Table 1 provides an overview of the key macroeconomic indicators for Zambia between 1996 and 2015.

Table 1. Key macroeconomic indicators, 1996-2015

Economic Indicators	1996	2004	2010	2015
Real GDP (US$, millions) (2010 prices)	8 789	12 450	20 266	26 242
Real GDP per capita (US$) (2010 prices)	925	1 062	1 456	1 619
Gross fixed capital formation (% GDP)	-	-	25.9	-
Foreign direct investment, net inflows (% GDP)	3.3	5.9	8.5	7.8
Gross domestic savings (% GDP)	-	-	36.0	-
Cash deficit/surplus (% GDP)	-	1.7	-1.2	-
Exports of goods and services (% GDP)	28.4	33.5	37.0	-
Ores and metals exports (% merchandise exports)	78.4	63.1	86.0	78.2
Imports of goods and services (% GDP)	35.3	37.3	30.9	-
Current account balance (% GDP)	-	-7.1	7.5	-1.4
Consumer Price Inflation (% annual)	43.1	18.0	8.5	10.1
Exchange rate (ZMW/US$, period average)	1.2	4.8	4.8	8.6

Source: *World Bank World Development Indicators (2016).*

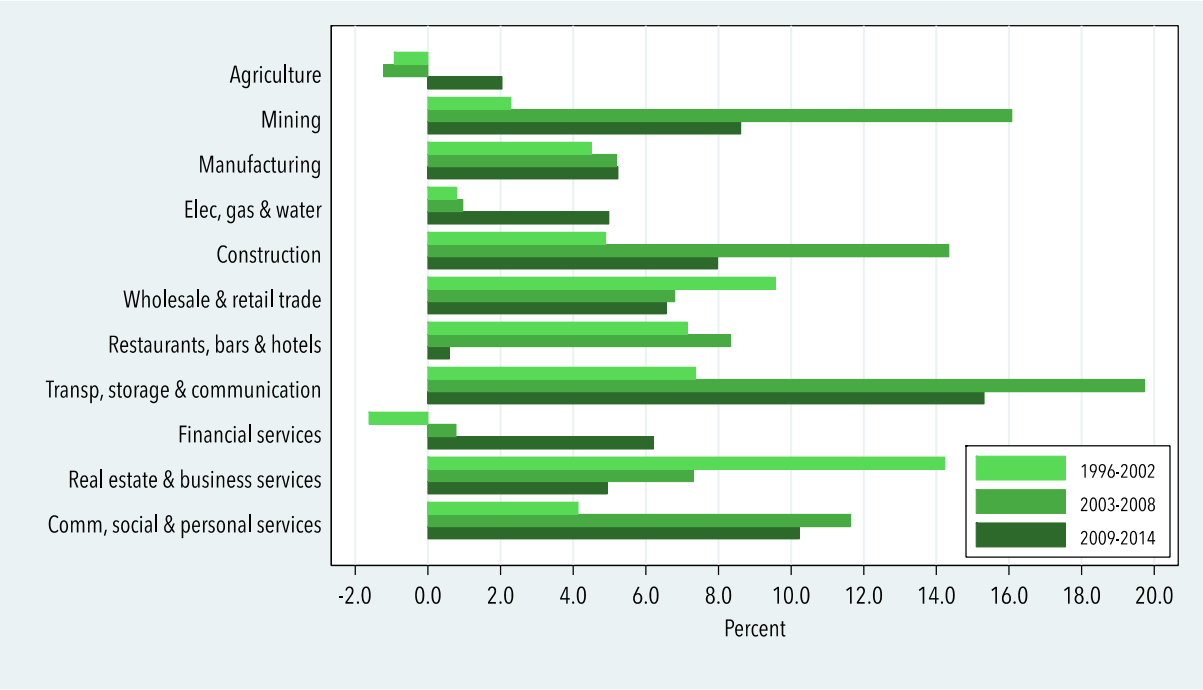
Note: *Where data is not available, this is indicated by a dash (-).*

The trend in macroeconomic indicators over the 1996-2015 period has been largely positive, despite the negative, albeit small, budget balance in 2010. Consumer price inflation declined significantly to single digits in 2010 and just above 10 percent in 2015, and the economy's current account balance improved notably from a deficit of -7.1 percent of GDP in 2004 to -1.4 percent in 2015 (there was a current account surplus of 7.5 percent of GDP in 2010). Export growth and the related improvement in the current account balance is indicative of significant growth in mining exports during the period, as ores and metals exports comprised close to 80 percent of merchandise exports by 2015. The rise in net inflows of foreign direct investment (as proportion of GDP) further reflects increased foreign investment in the mining sector as a result of the boom in commodity prices. Overall, rapid economic growth, coupled with a favourable macroeconomic environment, paved the way for improvements in labour productivity, as well as a shift in the structure of the Zambian economy (Resnick and Thurlow, 2014). The shift in the structure of the economy, and the implications for employment, are discussed in greater detail in below.

3.2. Sectoral Patterns of Growth and Employment

While mining exports played a large role in boosting economic growth in the 2000s, the Zambian economy also became increasingly reliant on construction, transport and communications, and other services for growth during the period under review. Figure 2 illustrates the average annual growth rates for the main economic sectors between 1996 and 2002, 2003 and 2008, and 2009-2014 (the 2015 sectoral GDP data is not available at the time of writing).

Figure 2. Average annual change in real GDP by industry, 1996-2014

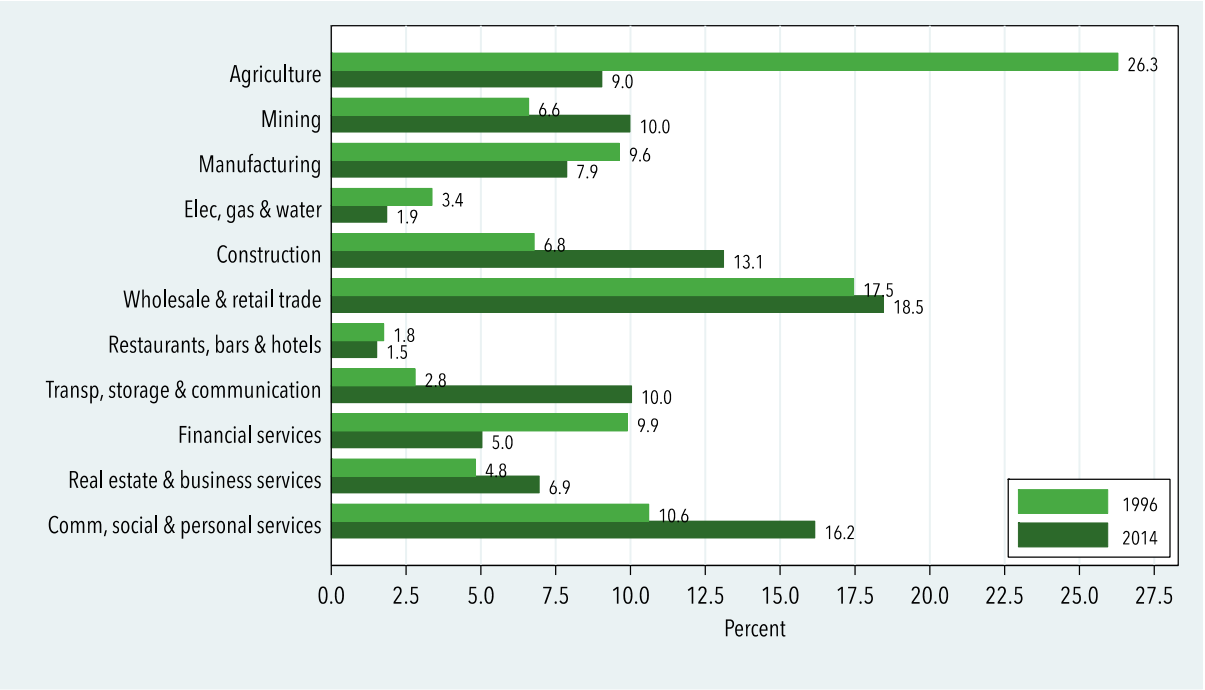


Source: CSO (2016).

Transport, storage and communications sector grew fastest during the 2003-2008 and 2009-2014 periods, at average annual rates of 19.7 percent and 15.3 percent respectively, compared to 7.4 per between 1996 and 2002. Mining growth came in a close second in 2003-2008, rebounding significantly and growing at an annual average rate of 16.1 percent, reflecting increased copper production as a result of favourable copper prices and strong demand from China. Considerable growth was also experienced in the construction industry (with an annual average rate of 14.3 percent in 2003-2008), as public investment in road infrastructure, as well as growing public and private investment in relatively high-end residential and commercial property increased considerably (Resnick and Thurlow, 2014). Community, social and personal (CSP) services growth also increased to an annual average growth rate of 11.6 percent between 2002 and 2008 as well as 10.2 percent between 2009 and 2014, compared to only 4.1 percent in 1996-2002 period. On the other hand, the agriculture sector continued its decline, while the manufacturing, utilities, and financial services sectors failed to achieve significant growth over the period. The poor growth performance of agriculture and manufacturing, in particular, is also reflected in the declining share of these sectors in GDP.

As shown in Figure 3, agriculture's share of GDP fell substantially from 26 percent in 1996 to 9.0 percent in 2014. Severe droughts, poor management of farming subsidies, and limited investment in irrigation and research are considered largely to blame for this trend (Resnick and Thurlow, 2014). While the manufacturing sector enjoyed positive growth over the period, it failed to maintain its share of GDP, as trade liberalisation policies prematurely exposed the sector to foreign competition (Resnick and Thurlow, 2014). As these sectors declined, the composition of GDP shifted towards mining, construction and tertiary services. By 2014, the mining sector contributed 10.0 percent to GDP; construction and real estate services contributed 13.1 percent and 6.9 percent, respectively; and transport and communications' share of GDP stood at 10.0 percent. The wholesale and retail trade and community and other services sectors retained their dominance of GDP, with trade making up 18.5 percent of GDP, and community and other services making up 16.2 percent of GDP in 2014.

Figure 3. Share of GDP by industry, 1996 and 2014



Source: Central Statistics Office (CSO) (2016)

These sectoral growth patterns therefore indicate that Zambia's economic recovery was underpinned by a shift in the composition of GDP away from agriculture and manufacturing, towards mining, construction, and services. In fact, the tertiary sector's growth as a proportion of GDP from 47 percent in 1996 to 58 percent in 2014, was closely matched by a fall in the primary sector's contribution to output from 33 percent to 19 percent. While this shift resulted in economic gains for the country, it did little to improve social conditions for the majority of the population, as will be discussed in section 0.

With regard to employment, the privatisation of state-owned enterprises in the mining and manufacturing sectors during the early 1990s contributed to large-scale job losses that were not fully reversed during the recovery period. The revival of the mining sector occurred on the back of increased capital investment and rising value-added per worker, rather than on growth in new jobs (World Bank, 2011); while rapid growth in construction and transport and communications was similarly capital-intensive in nature, creating few low-skilled jobs (Resnick and Thurlow, 2014). The agriculture sector remained the main employer for most of the Zambian labour force, despite its relative decline over the period; and retail trade and CSP services were responsible for much of the increase in non-agricultural employment. These labour market developments are further highlighted in Table 2 and Figure 4.

Table 2 indicates that the economy generated roughly 1.3 million jobs between 1996 and 2015, an increase of 38.8 percent over the period or 1.7 percent per annum. While employment growth kept pace with growth in the labour force — which increased by slightly less than 1.4 million — it was unable to keep pace with the working-age population (individuals aged 15-65 years). However, expansion of the working-age population was rapid, growing at an average annual rate of 2.6 percent from 5.9 million in 1996 to 9.6 million in 2015, and it was only a declining labour force participation rate that kept labour force growth in check. The labour force participation rate declined from a high of 68 percent in 1996 to just 56 percent in 2015, with the decline particularly rapid in the last five years of the period.

Table 2. Labour market aggregates, 1996-2015

Aggregate / Indicator	1996	2004	2010	2015
Population ('000s)	9 516	10 993	13 064	15 443
Rural areas (%)	63	61	65	58
Urban areas (%)	37	39	35	42
Working-age population ('000s)	5 851	6 696	8 479	9 574
Labour force ('000s)	3 982	4 345	5 234	5 350
Labour force participation rate (%)	68	65	62	56
Rural areas (%)	74	70	66	58
Urban areas (%)	59	55	56	53
Employed persons ('000s)	3 368	3 955	4 544	4 676
Agriculture ('000s)	2 261	2 743	3 029	2 677
Mining ('000s)	60	63	66	82
Industry ('000s)	221	222	229	409
Services ('000s)	753	928	1 042	1 500
Informal employment (%)	74	81	83	80
Formal employment (%)	26	19	17	20
Unemployment rate (%)	15	9	13	13
Rural areas (%)	9	3	5	6
Urban areas (%)	29	21	29	21

Source: *CSO Living Conditions Monitoring Survey (LCMS) reports (1996, 2004, 2010) and authors' calculations using the LCMS 2015 data.*

Note: *Employed persons in Industry is the total of Manufacturing, Electricity, gas and water, and Construction; while employed persons in Services is the total of Wholesale and retail trade, Restaurants and hotels, Transport and communication, Financial services and real estate, and Community and other services.*

Trends in employment should also be assessed in terms of the broader economic and labour market context. One way to do this is to consider the target growth rate (TGR) and the employment absorption rate (EAR). Following Bhorat (2003), the target growth rate measures how fast employment for group k would have needed to have expanded in order to provide work for all net labour market entrants over a given period (between t and $t+1$), and is defined as:

$$TGR_k = \frac{EAP_{k,t+1} - EAP_{k,t}}{L_{k,t}}$$

where EAP is the size of the labour force (or economically active population) and L is employment. The employment absorption rate is the ratio between actual employment growth and the target growth rate, or:

$$EAR_k = \frac{\frac{L_{k,t+1} - L_{k,t}}{L_{k,t}}}{\frac{EAP_{k,t+1} - EAP_{k,t}}{L_{k,t}}} = \frac{EAP_{k,t+1} - EAP_{k,t}}{L_{k,t+1} - L_{k,t}}$$

The EAR indicates the proportion of the net increase in the labour force that is absorbed into employment. An EAR of 100 denotes an increase in employment that fully absorbs the growth in the labour force and that reduces the rate of unemployment, while an EAR of above 100 sees an absolute decline in the number of unemployed individuals. While an EAR of less than 100 indicates that employment growth has been insufficient to absorb all net new entrants into employment, it may still reduce the overall rate of unemployment depending on the initial unemployment rate (i.e. if $EAR > 100 - U$, where U is the unemployment rate).

For the full period from 1996 to 2015, in order for the Zambian labour market to have absorbed all net labour force entrants into employment, employment would have needed to have expanded by

40.6 percent (Table 3). Actual growth in employment came very close (38.8 percent) and, as a result, the employment absorption rate for the period falls just short of 100 percent. This high rate means that the labour market has been able to absorb almost all of the growth in the labour force into employment over the period. The EAR was above 100 percent in two of the three sub-periods: between 1996 and 2004 it was 161.7 percent, and between 2010 and 2015 it was 113.8 percent. In the 2004-2010 sub-period, however, employment growth was low relative to the target growth rate, with the result that the EAR was just 66.3 percent.

Table 3. Employment growth in context, 1996-2015

Indicator	1996-2004	2004-2010	2010-2015	1996-2015
Actual figures				
Change in labour force (%)	9.1	20.5	2.2	34.4
Change in employment (%)	17.4	14.9	2.9	38.8
Target growth rate (%)	10.8	22.5	2.6	40.6
Employment absorption rate (%)	161.7	66.3	113.8	95.6
Assuming constant LFPR from 1996 (68%)				
Change in labour force (%)	14.4	26.6	12.9	63.6
Change in employment (%)	17.4	14.9	2.9	38.8
Target growth rate (%)	17.1	30.7	16.4	54.1
Employment absorption rate (%)	102.2	48.6	17.7	71.7

Source: CSO Living Conditions Monitoring Survey (LCMS) reports (1996, 2004, 2010) and authors' calculations using the LCMS 2015 data.

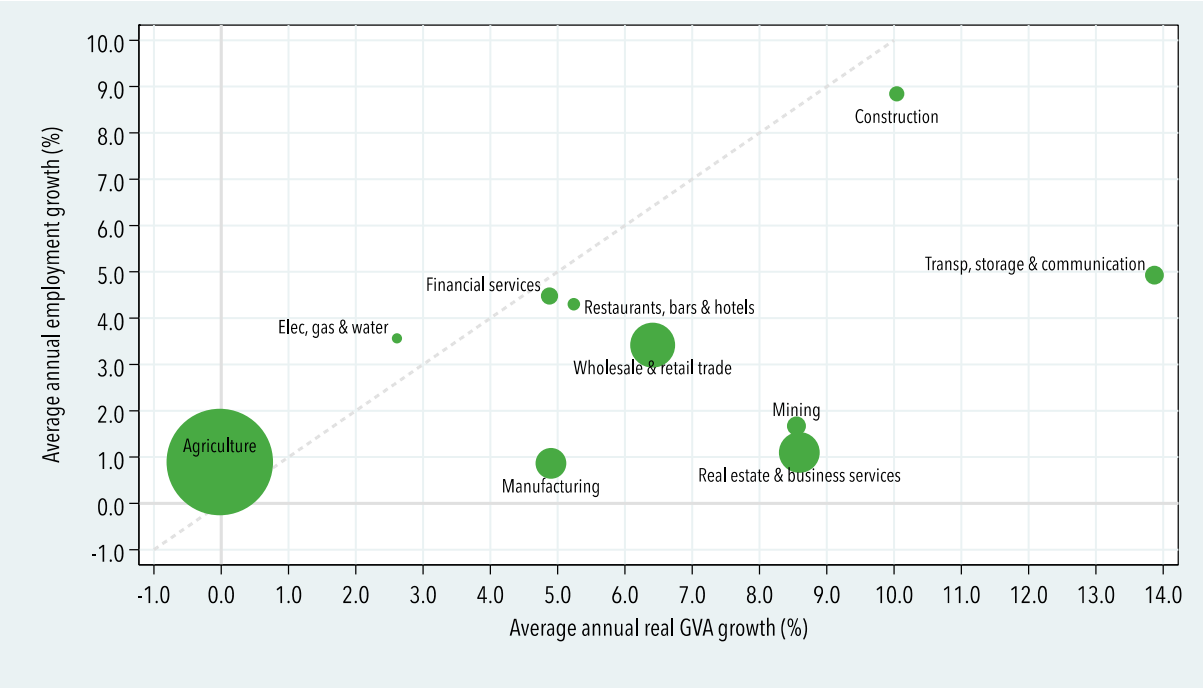
However, as has been noted, the labour force participation rate has declined throughout the 1996-2015 period and, as a result, the conventional TGR and EAR calculations provide a somewhat flattering view of the Zambian labour market. The lower half of the table calculates LFPR-adjusted target growth and employment absorption rates, by holding the labour force participation rate constant at its 1996 level of 68 percent. Had the LFPR held at this level between 1996 and 2015, the labour force would have grown by an additional 1.2 million people; in other words, instead of growing by just under 1.4 million people, the Zambian labour force would have grown by more than 2.5 million people during the 1996-2015 period. These figures clearly demonstrate that, for the period as a whole, the falling labour force participation rate has boosted the EAR by more than 24 percentage points. This is true of each of the sub-periods too as the LFPR-adjusted EAR is significantly lower than the actual EAR, with the difference particularly marked in the 2010-2015 sub-period.

The increase in the urban unemployment rate, between 1996 and 2006, further indicates that the extent of employment growth in the urban non-farm economy was not sufficient to absorb returning workers who had migrated to rural areas during the structural adjustment reform period (Resnick and Thurlow, 2014). For the full 1996-2015 period, employment growth was underpinned by expansion within services, which saw employment double to 1.5 million. Employment in industry expanded by 85 percent over the same period, although the sector is relatively small and accounted for just 8.7 percent of employment in 2015. In contrast, employment in agriculture and mining expanded by just 18 percent and 37 percent respectively over the 19-year period. However, for most of the period, employment in agriculture actually grew at a similar pace to that in services: by 2010, both sectors had added between one-third and two-fifths more jobs than in 1996, but in the ensuing five-year period the fortunes of the two sectors diverged markedly, with employment contracting in agriculture and expanding rapidly in services. The 2010-2015 period was also characterized by rapid expansion in employment in industry (by 79 percent) after a period of stagnation between 1996 and 2010, as well as relatively rapid growth in formal employment overall. By 2015, formal employment accounted for 20 percent of total employment in Zambia, up three percentage points from five years earlier.

Figure 4 relates changes in employment across various industries to growth in value added. The figure plots the average annual rate of gross value added (GVA) growth on the horizontal axis against the

average annual rate of employment growth for each industry on the vertical axis, indicated by the centre of each bubble. Each bubble is sized according to the sector's share of total employment in 1996, with bigger bubbles representing sectors that employ more workers. The dotted 45-degree line represents those points where output and employment grew and the same pace: industries positioned below this line are those where output growth has exceeded employment growth over the period, while those positioned above the line are those where employment growth has exceeded output growth. In other words, industries below the line have seen rising capital intensity of output over time, while those above the line have seen rising labour intensity.

Figure 4. Average annual growth in real Gross Value Added (1996-2014) and employment (1996-2015), by industry



Source: CSO (1996, 2010, 2016) and authors' calculations.

For the period under review, employment growth exceeded output growth only for agriculture and electricity, gas and water. In the case of agriculture, real gross value added declined marginally (by 0.02 percent per annum over the period), while employment expanded by 0.9 percent per annum. The stark contrast between mining output and employment growth is also evident, with gross value added expanding by 8.6 percent per annum, while jobs only increased by 1.7 percent. The industries with the highest employment growth were construction; transport, storage and communications; financial services; and restaurants, bars and hotels: combined, these four industries added 321 000 jobs over the period. Despite employment growth in all industries, they all fall below the 45-degree line, indicating that output growth has been accompanied by declining labour intensity. The only exception is agriculture: it was responsible for the largest absolute increase in employment, adding 416 000 net new jobs between 1996 and 2015 and seeing rising labour intensity. Despite this, this industry's share of total employment dropped from 67 percent to 58 percent. Wholesale and retail trade followed closely behind, adding 342 000 jobs over the period, while construction added 144 000 jobs over the period.

These results further illustrate the Zambian economy's shift away from labour-intensive sectors towards sectors that are typically capital-intensive, urban-biased, and that require few new jobs for growth (Resnick and Thurlow, 2014). In fact, the increasing bargaining power of labour unions in the mining sector especially, and the consequent rise in labour costs, has been noted to be a key

hindrance to employment growth during the economic boom period (Resnick and Thurlow, 2014; World Bank, 2011). Many workers appear to have remained in the rural economy, while large numbers of potential workers choose not to participate in the labour market entirely, with both phenomena slowing progress towards lower rates of poverty and less inequality.

3.3. *Policy Interventions for Poverty and Inequality*

3.3.1. Trends in Poverty and Inequality

Since the mid-1990s, Zambia has made steady progress in reducing poverty, although inequality remains high. As per the CSO estimates in Table 4, roughly 61 percent of Zambians were living in poverty in 2010, down from 78 percent in 1996. However, this national trend masks extremely high levels of poverty in rural areas, and particularly among small-scale farmers. Poverty rates of small-scale farmers decreased relatively slowly from 90 percent to 79.9 percent over the period, while poverty rates for rural households not involved in agriculture declined substantially from 84 percent to 54 percent.

The greatest reduction in poverty over the 1996-2010 was experienced in urban areas. Poverty rates for households in low- and medium-cost urban areas fell significantly, with the poverty rate in urban medium-cost areas falling from 49 percent in 1996 to 8.5 percent in 2010.

These figures suggest firstly that the positive output growth in non-agricultural sectors may have positive influence on poverty rates in urban areas and for non-agricultural rural households, while the decline in agricultural output growth had severe consequences for rural households engaged in agriculture. Secondly, better access to informal employment and social services may explain the sharp reduction in urban poverty relative to rural poverty, despite the higher levels of unemployment in urban areas.

Table 4. Selected official poverty and inequality indicators, 1996-2015

	1996	2006	2010	2015
Poverty Indicators				
Total poverty headcount (%)	78.0	62.8	60.5	54.4
Rural (%)	89.0	80.3	77.9	76.6
Rural small-scale agriculture	90.0	81.5	79.9	
Rural non-agriculture	84.0	68.2	53.5	
Urban (%)	60.0	29.7	27.5	23.4
Urban low-cost areas	64.0	34.7	34.5	
Urban medium-cost areas	49.0	13.8	8.5	
Male (%)	76.0	61.7	60.1	53.8
Female (%)	85.0	67.4	62.4	56.7
Extreme poverty headcount (%)	66.0	42.7	42.3	40.8
Rural (%)	79.0	58.5	57.7	
Urban (%)	44.0	13.0	13.1	
Inequality Indicators				
Share of per capita income (%)	0.5	0.2	0.5	0*
Poorest 10%	18.8	18.4	16.9	15*
Middle 40% (Deciles 4-7)	52.9	51.9	52.6	56*
Richest 10%	0.61	0.60	0.65	0.69
Gini coefficient (per capita expenditure)	0.50	0.56	0.55	0.56
Rural	0.47	0.48	0.46	0.44
Urban	0.44	0.50	0.50	0.49
Gini coefficient (per capita income)	0.61	0.60	0.65	0.69

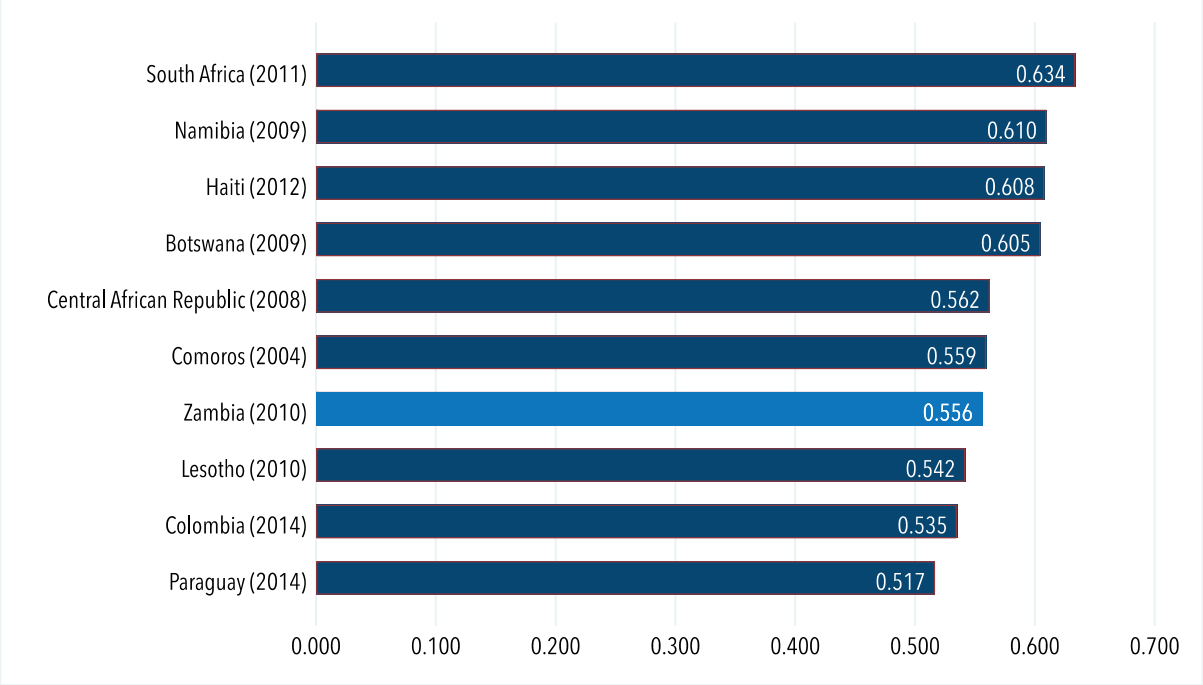
Source: *CSO (1996, 2006, 2010, 2015).*

Note: ** The LCMS 2015 Summary Report does not provide decimal points for decile income shares.*

Table 4 also shows that despite Zambia's progress in reducing national poverty, the distribution of income has remained virtually unchanged over the period. The share of income earned by the poorest and richest 10 percent of the income distribution has remained the same, while the share of income earned by the middle 40 percent declined from 18.8 percent in 1996 to 16.9 percent in 2010. This suggests that the 'middle class' has not benefited from the rapid economic growth experience during the 2000s, and that the gains from growth have in fact accrued to other groups. The Gini coefficient further illustrates that inequality has increased over the period, with inequality rising in urban areas and overall. Specifically, the Gini coefficient using per capita expenditure has increased from 0.50 in 1996 to 0.56 in 2015, with the coefficient in urban areas rising from 0.44 to 0.49 over the same period. The per capita income-based Gini coefficient, though, is substantially higher and has risen more rapidly, from 0.61 in 1996 to 0.69 in 2015.

Within an international context, inequality in Zambia is extremely high. Amongst countries with data since 2000, Zambia is ranked the seventh most unequal country globally based on its 2010 Gini coefficient. This places Zambia in a second tier of five countries with coefficients of between 0.53 and 0.57, behind world leaders South Africa, Namibia, Haiti and Botswana, all four of which have coefficients of more than 0.60. Another seven countries, including Brazil (at 0.515, ranked 11th), have coefficients above 0.50. Given the stability of Zambia's Gini coefficient between 2010 and 2015 and the slow rate of change typically observed for Gini coefficients, it seems unlikely that Zambia's global ranking would have changed substantively since.

Figure 5. Countries with the highest Gini coefficients since 2000



Source: *World Bank, World Development Indicators [Accessed 17 July 2017].*

Note: *The ranking includes all countries with at least one estimate of the Gini coefficient since 2000.*

3.3.2. Policy Interventions

In recognition of the high incidence of poverty and rising inequality, the Government of Zambia has implemented several policies and programmes aimed at facilitating inclusive growth. In 2000, the Government embarked on the Interim Poverty Reduction Strategy Paper (I-PRSP), which set out future strategies for tackling poverty and achieving the Millennium Development Goals. With support

from the World Bank and IMF, the Zambian Government has since launched three PRSPs in 2002, 2006, and 2011. The underlying theme of the PRSPs has been to achieve poverty reduction through economic growth and job creation. Moreover, the PRSPs have consistently emphasised agricultural development as the "engine" of economic growth, as well as income expansion for the poor in rural areas – where weak agricultural markets and limited access to agricultural inputs have been recognised as key impediments to agricultural productivity and poverty reduction (Government of Zambia, 2006: p. 5).

PRSP interventions in the agriculture sector, specifically, have included: reforms and liberalisation of agriculture markets; revisions to land policies which enabled state-owned land to be sold and customary land to be leased; enhancing access to finance for agricultural operators and out-grower schemes; and various other initiatives aimed at improving the infrastructure, technology and policies relating to the agricultural development (Government of Zambia, 2000, 2006). In addition to these initiatives, the Government launched the Food Security Pack Programme (FSPP) in 2000, and the Fertilizer Support Programme (FSP) in 2002. The FSP was succeeded by the Farmer Input Support Programme (FISP) in 2009. The FSSP aimed to provide up to 200,000 vulnerable rural households with a range of agricultural inputs including seed, fertilizer and agricultural lime where needed. Similarly, the objective of the FSP/FISP was to provide small-holder farmers with agricultural inputs in order to increase agricultural productivity, and raise aggregate maize production. The intended beneficiaries of the FSP/FISP increased from 120,000 in 200 to 900,000 in 2010 (Mofya-Mukuka, Kabwe, Kuteya and Mason, 2013).

While a key success of these agricultural policies and programmes has been the significant increase in maize production between 2000 and 2010, these initiatives have had little impact on rural poverty and food security (Moya-Mukuka et al., 2013; World Bank, 2012). The World Bank (2012) notes that for the FSSP, funding constraints resulted in the number of beneficiaries declining drastically from 135,000 in 2001 to 11,500 in 2010. As a result, extreme poverty levels remain highest among small-scale farming households in rural areas. Furthermore, the FSP/FISP requirement for fixed-cost contributions from participating farmers has resulted in benefits accruing mostly to wealthier farmers, despite the programme being aimed at supporting small-scale agriculture (World Bank, 2012). Thus, it appears that the policy focus on agricultural development has not been particularly successful in reducing rural poverty, particularly among agricultural households (as evidenced in Table 3).

Other initiatives, such as the Government-sponsored Social Cash Transfer programme (SCT), have however been fairly successful in reducing poverty and improving food security of economically vulnerable households. Launched with a pilot scheme in Kalomo district in 2003, the SCT programme aims to supplement household income; increase the number of children attending primary school; reduce the rate of child mortality and morbidity; and improve food security and asset ownership for vulnerable households (Ministry of Community Development, Mother and Child Health, 2016). The SCT programme is currently running in 50 districts, reaching 151,000 households (Ministry of Community Development, Mother and Child Health, 2016). Recent evaluations of the programme indicate that the intervention has had positive impact on welfare, at least at the district and household level. The programme has been noted to increase consumption expenditure, increase school enrollment rates, improve the quantity and quality of nutrition, as well as increase ownership of assets and small livestock for beneficiary households (Schüring, Michelo and Boonstockel, 2007; Tembo, Freeland, Chimai and Schüring, 2014; American Institutes for Research, 2014).

Despite the relative success of the SCT programmes compared to the FSSP and FSP/FSIP, UN Zambia (2013) notes that government expenditure for social transfer programmes amounts to roughly 0.6 percent of GDP, while the expenditure on the FISP amounts to 2.6 percent of GDP. It has also been suggested that government expenditures on other key social services – education and health – have been insufficient to address the rising inequality in the country. For instance, public spending on

education accounts for 4 percent of GDP, in line with other countries in SSA, whereas public spending on healthcare accounts for 2 percent of GDP – well below the SSA average (World Bank, 2012). World Bank (2012) further notes that public spending on education and healthcare in Zambia has been neither progressive, nor pro-poor. In education, spending per student at the tertiary level was noted to be 35 times greater than spending per student at the primary level, suggesting that despite improvements in primary and secondary school enrollment rates, the benefits of education continue to accrue to wealthier households with access to tertiary institutions (World Bank, 2012). Similarly, public spending on health care is also noted to disproportionately benefit the rich in urban areas, with rural households facing limited access to healthcare facilities (2012).

Overall, Zambia has achieved a remarkable turnaround in economic growth over the 1996-2015 period. Following decades of declining and lacklustre growth, rapid growth in the 2000s was accompanied by a sustained increase in per capita incomes and considerable progress in poverty reduction. However, the pattern of growth, which was largely capital-intensive in nature, did not generate enough new jobs, resulting in high unemployment and rising inequality, particularly in urban areas; and the decline in agriculture output perpetuated the extreme levels of poverty among small-scale farming households in rural areas. The lack of job opportunities during the boom period resulted in slowed migration from rural areas to urban areas, while many workers simply opted out of the labour market. Thus, the gains from Zambia's economic boom have largely accrued to highly-skilled high-income individuals, while lower- and middle-income households in both rural and urban areas have seen limited improvement in their job prospects and overall well-being.

The limitations in the poverty reduction and agricultural support policies continue to perpetuate the high levels of poverty and inequality. Revisions to the targeting and monitoring of the agricultural support programmes are necessary to ensure that sustained poverty reduction and improved food security in rural areas. In addition to expanding social safety nets for vulnerable households in both urban and rural areas, economic policies that promote output growth in labour-intensive sectors will be necessary to ensure the gains from growth are shared equitable among the population.

4. Data and Methodology

4.1. Data

In order to assess the empirical relationship between growth and inequality in Zambia, data from the Living Conditions Monitoring Survey (LCMS), conducted by the Central Statistical Office (CSO) of Zambia, was used. Between 1996 and 2015, seven waves of the survey took place: in 1996, 1998, 2002, 2004, 2006, 2010 and 2015. For this study, data from the 1996, 1998, 2004, 2010 and 2015 surveys are used.[2] With the exception of the 2010 and 2015 surveys which took place in January-April and April-May respectively, all other LCMSs took place in October-December. Approximately 11 000, 16 600, 19 300, 19 400 and 12 300 households participated in the respective surveys.

Although there have been changes in the questionnaire structure throughout the years, in general, the following categories of questions were included in each survey:

- Demographic information;
- Health status;
- Highest educational attainment and attendance at educational institutions;
- Labour market status and work activities;
- Income earned from various sources;
- Household expenditure (the information was captured from 1998 onwards);
- Household amenities, housing conditions, household access to facilities and household ownership of assets (the information from 1998 onwards); and
- Fertility and mortality in the household (the information was captured from 1998 onwards).

As far as income sources are concerned, the survey questions were asked very similarly in 1998, 2004, 2010 and 2015. These income sources have therefore been classified into seven broad categories as shown in Table 5. Specifically, the respondents were first asked to report income earned from the sale of own produced crops (e.g. maize, rice, bean, vegetables), livestock and livestock products (e.g. cattle, goats, pigs, milk, cheese) and poultry (e.g. chickens, turkeys, rabbits, eggs) as well as other farming income (such as lease of tractor and agricultural land). Respondents were then asked to report income earned from non-agricultural business activities. For those working as employees, they were asked to report gross income earned (including allowances) from the main and second jobs. Looking at income earned from non-labour activities, respondents were asked to report income earned from various additional sources, ranging from interest on savings and investment, remittances and rent, to in-kind income, grants, pensions and borrowings.

Two exceptions should be noted in the 1998 survey: firstly, the respondents were only asked to report the savings/interest they had in the bank (i.e. a stock variable) at the time of the survey, rather than interest earned on savings (a flow variable – as in the other three surveys); secondly, the respondents were only asked to report the amount they had in form of shares and bonds at the time of the survey (i.e. once again a stock variable), instead of interest/dividends earned on investment (a flow variable – as in the other three surveys). Hence, it is not possible to derive and include interest earned on savings and investments in the estimation of total household income for 1998.

[2] Upon examining the 2006 data, it was found an unusual abrupt decline of real total household income took place between 2004 and 2006. In fact, the 2006 real income was way below the 1998 real income. It was further found that the serious under-estimation of the 1998 real income was mainly attributed to the under-capturing of self-employment non-agricultural income, wage employment income and capital income. Hence, the 2006 data would not be used for this study.

Table 5. Broad income categories in each Living Conditions Monitoring Survey (LCMS)

Category	Income Source	1996	1998	2004	2010	2015
Self-employment (Agricultural)	Sale of own produced crops	✓	✓	✓	✓	✓
	Sale of livestock and livestock products	✓	✓	✓	✓	✓
	Sale of poultry	✓	✓	✓	✓	✓
	Other farming income		✓	✓	✓	✓
Self-employment (Non-agricultural)	Main non-farm businesses	✓	✓	✓	✓	✓
	Other non-farm businesses	✓	✓	✓	✓	✓
Wages	Gross salary (including regular allowances) from work	✓				
	Non-regular allowances from work	✓				
	Gross salary (including regular allowances) from main job		✓	✓	✓	✓
	Non-regular allowances from main job		✓	✓	✓	✓
	Gross salary (including regular allowances) from second job		✓	✓	✓	✓
	Non-regular allowances from second job		✓	✓	✓	✓
Remittances	Remittances received	✓	✓	✓	✓	✓
Government	Grants		✓	✓	✓	✓
Capital	Rental income		✓	✓	✓	✓
	Pension payment		✓	✓	✓	✓
	Interest on savings		#	✓	✓	✓
	Interest/Dividends on investment		##	✓	✓	✓
Other	In-kind income		✓	✓	✓	✓
	Borrowing		✓	✓	✓	✓
	Income from any other sources		✓	✓	✓	✓
Transfer payments	Transfer payments such as grants, pension, interest on savings	✓				

Notes: *[#] The respondents were only asked to report the amount of savings and interest they had in the bank or other institutions.*

[##] The respondents were only asked to report the amount they had in the form of shares, securities, bond and treasury bills.

While data on incomes was generally collected consistently over time, the 1996 LCMS stands as an important exception. Specifically, the 1996 income items were not captured as precisely as in the other three surveys. For example, respondents were not asked to report in-kind income and income from borrowing. Also, they were asked to report an aggregate amount on total transfer payments (which include grants, pension and interest on savings), while in the other surveys, respondents were asked to report the amount earned from each these sources separately. These are important differences in the structure of the questionnaires that should be borne in mind when considering the results below.

In all five surveys, respondents were asked to report the following income in annual terms: (1) sale of own produced crops; (2) sale of livestock; (3) sale of poultry; (4) other farming income; (5) interest/dividends on investment (for 2004, 2010 and 2015). For the other income items, respondents were asked to report them in monthly terms. In constructing our total income variable, the monthly amounts were multiplied by 12 to be converted into annual amounts, before calculating annual household income, per capita income and per adult equivalent income. Consequently, our income variable differs from the official income variables contained in the datasets. It should be noted that the poverty and inequality estimates presented below using our constructed income variable will differ from those shown in Table 4, since the latter are based on the official consumption variables.

One of the issues in working with income (or consumption) data relates to the existence of outliers in the data that may influence the results. This is particularly true where the focus of the research is on inequality, as opposed to poverty for example, since all data points are relevant. A simple box plot of total household income (Figure 6), reveals two points: first, as identified by the box plot, there are outliers in each of the years at both ends of the distribution; and second, at the upper end of the distribution, there appears to be significant variation in the number of extreme values across years, with only one identified in 2015. The latter point means that simply trimming the upper end of the distribution and omitting some small constant proportion of households in each year would arguably result in the omission of too many households in some years and too few in others.

Figure 6. Box plot of total household income, 1996-2015

Source: Authors' own calculations.

To deal with this problem, we choose to omit in each year those households that are more than three standard deviations above the mean. This means that between 0.02 percent (2015) and 0.32 percent (2004) of households (unweighted) are omitted from the sample for the analysis below. Unsurprisingly, as Table 6 reveals, omitting these outliers has a relatively large impact on mean per capita and per adult equivalent incomes, but virtually no impact on the medians. Importantly from the perspective of this paper, excluding outliers has a statistically significant impact on the individual-level Gini coefficients, without substantially altering the trends over time. All the income-related analysis that follows is based on these trimmed distributions.

While we rely on income for the analysis below, this is a less common approach with respect to the analysis of poverty, in which the majority of research relies on expenditure or consumption data. From a poverty perspective, the use of expenditure or consumption data is preferable due to the greater degree of stability in consumption than is the case for income. However, one of the objectives of the current research is to assess the degree to which different income sources contribute to overall inequality and such analysis is not possible using consumption or expenditure data.

Table 6. Outliers in the income data, 1996-2015

	1996		1998		2004		2010		2015	
Identified outliers	8		20		61		49		2	
Proportion (%)	0.07		0.12		0.32		0.25		0.02	
	Incl.	Excl.	Incl.	Excl.	Incl.	Excl.	Incl.	Excl.	Incl.	Excl.
Mean (Kwacha, thousands)										
Per capita	1 917	1 836	2 332	2 047	3 555	2 597	3 181	2 583	2 580	2 575
Per ad.equivalent	2 041	1 956	2 493	2 192	3 791	2 776	3 392	2 743	2 750	2 744
Median (Kwacha, thousands)										
Per capita	701	701	785	781	747	743	738	736	689	689
Per ad.equivalent	758	757	848	845	814	809	808	806	752	752
Gini Coefficients (individual-level)										
Per capita	0.713	0.700	0.737	0.702	0.817	0.753	0.788	0.741	0.736	0.735
Per ad.equivalent	0.709	0.697	0.734	0.699	0.815	0.750	0.785	0.737	0.732	0.731

Source: *Authors' own calculations.*

Note: *In each year, the difference between the Gini coefficients calculated without identified outliers and those calculated without removing outliers are statistically significant at the 95 percent level.*

4.2. Methodology

This study uses a number of approaches to identify and analyse the specific drivers of inequality in Zambia. This paper first provides a demographic profile of households, and describes the income earned from each source across these households and how these changed over time. Afterwards, the study moves on to examine the extent of inequality in Zambia in each survey year, by looking at the Gini coefficients, Lorenz curves, and income share of each household decile. Growth incidence curves (GICs) are also derived to examine where along the income distribution individuals have benefited most (or least) from economic growth during the period under study. The inequality examination is further investigated by decomposing the Gini coefficient by income source, by means of the 1985 Lerman and Yitzhaki approach, with the aid of the Distributive Analysis Stata Package (DASP). This decomposition enables us to identify the income sources that contribute most to aggregate inequality, as well as assess the changes in these relative contributions over time.

We also measure the relationship between economic growth, poverty and inequality with the aid of the Datt-Ravallion decomposition, so as to reflect on the link between growth, poverty and inequality by decomposing changes in poverty into the growth and redistribution components. For this approach, the Foster–Greer–Thorbecke (FGT) indices are derived, using the food poverty lines and overall poverty lines.

A question that arises when using the money-metric approach to measure standards of living, poverty or inequality is whether income or expenditure should be used. The general argument (Haughton and Khandker 2009: 30) is that most rich countries use the income variable, as most income is earned from salaries and wages, and hence is comparatively easy to measure, while it is difficult to quantify expenditure in terms of the volumes and amounts of purchases. In contrast, income is volatile and harder to measure in poor countries, as much of it comes from self-employment in informal activities; while expenditure is more straightforward and easier to estimate. Since we decompose inequality by income source, we decided to use the income variable to conduct the forthcoming empirical analysis.

Unless stated otherwise, per adult equivalent income is used for the analysis. Deaton (1997) argues that while it is true that children may consume special goods, they surely require less of most things than adults do. Hence, it is more appropriate to assign different weights for the household members whereby children count some fraction of an adult, with the fraction being dependent on age. The adult equivalence scales to be applied are shown in Table 7. Note that these scales are also applied by

Zambia's Central Statistics Office (CSO), and they assume no adjustment is made for possible economies of scale within the household.

Table 7. Adult equivalent scale

Age Group	Pre-2015 Weights	2015 Weights
0-3 years	0.37	0.36
4-6 years	0.64	0.62
7-9 years	0.79	0.76
10-12 years	0.80	0.78
13+ years	1.00	1.00

Source: MacDonald 2012: 7; World Bank 2015: 9.

The annual per adult equivalent income in nominal terms in each survey was converted into constant prices (base month: 2009 June), using the consumer price index (CPI) data from the Central Statistics Office of Zambia. The CPIs were 11.4067, 17.5767 and 58.1978 in 1996, 1998 and 2004 respectively (using the average of the October-December monthly CPIs in each corresponding year), 106.1250 in 2010 (using the average of the January-April monthly CPIs in this year) and 150.1400 in 2015 (using the average of the April-May monthly CPIs in this year).

The food poverty line is derived after identifying a basket of food that will deliver the minimum nutritional requirement, a calorie requirement of 2 800 calories per adult equivalent per day (MacDonald, 2012: 9). To obtain the overall poverty line, both food and non-food consumption requirements are taken into consideration. For both poverty lines, the absolute approach is adopted as the poverty lines stand for the monetary value required for achieving a minimum level of welfare; the person is defined as poor if his/her per adult equivalent income is below the poverty line. The nominal and real values of the poverty lines used in this paper are detailed in Table 8.

Table 8. Poverty lines (per annum per adult equivalent, kwacha)

Year	Food Poverty Line	Overall Poverty Line	Food Poverty Line	Overall Poverty Line
	Nominal Prices		Constant Prices (2009 June)	
1996	200 916	335 820	1 761 386	2 944 059
1998	288 744	493 608	1 642 766	2 808 309
2004	672 144	1 149 036	1 154 930	1 974 363
2010	1 243 332	2 125 476	1 171 573	2 002 804
2015	1 824 000	2 568 000	1 214 866	1 710 404
Restated equivalence scale	1 788 000	2 532 000	1 190 888	1 686 426

Source: MacDonald 2012: 12 & 17; World Bank 2015: 9; authors' own calculations.

For comparative purposes, we have chosen to restate the 2015 poverty lines in terms of the pre-2015 equivalence scale. Details of the calculation can be found in Table 25 in the Appendix. In essence, we have recalculated the monthly food poverty line per adult equivalent from the original cost of the food basket per family of 6, which is 4.52 adult equivalents under the 2015 scale and 4.60 adult equivalents under the previous scale. Unfortunately, it is not possible to adjust the non-food component of the poverty line and we therefore leave it unadjusted. The net result of the restatement is that the food and overall poverty lines are lower by 36 000 kwacha in nominal terms (or roughly 24 000 kwacha in 2009 June prices).

5. Findings

5.1. Demographic Profile of Households

The demographic profile of the households in each survey is presented in Table 9, and the key highlights are discussed here. Overall, the number of households in Zambia has grown significantly over the almost two decades under review, rising from 1.8 million in 1996 to 3.0 million in 2015. This is equivalent to an average annual rate of growth of 2.7 percent per annum and is marginally above the average annual rate of population growth (2.6 percent per annum).

In terms of the spatial distribution of households, the Copperbelt province accounts for the highest share of households in the first four surveys, despite its share not being particularly high, ranging between 14.8 percent and 17.3 percent. By 2015, however, Lusaka had overtaken it with its 19.7 percent share.[3] Overall, 57.3 percent of households were resident in the four largest provinces—Lusaka, Copperbelt, Eastern and Southern. At the same time, the 19-year period was characterised by a continuous decrease in the proportion of households residing in rural areas, with this share dropping from 64.9 percent in 1996 to 57.0 percent in 2015. Not surprisingly, this trend parallels the gradual rise in the urbanisation rate of the general population noted in Table 9.

The overwhelming majority of Zambian households are headed by men. Male-headed households have consistently accounted for just over three-quarters of all households throughout the period, except for 2004 when the proportion of male-headed households is estimated to have been 70.6 percent.

More than half of household heads were aged between 25 and 44 years. Again, this is not particularly surprising given the youthful Zambian population. There is some indication that household heads are gradually becoming older on average, with the mean age of household heads rising from just over 41 years to just under 43 years over the period. Again, 2004 is something of an outlier in that the mean age of household heads fell to 39.7 years.

One encouraging finding regarding the highest education attainment of household heads was that the proportion without secondary education has shown a continuous downward trend, declining from 65.0 percent in 1996 to 48.3 percent in 2015. Nonetheless, the share with GCE-A level or above remained low throughout the years, despite more than doubling from 5.3 percent in 1996 to 11.0 percent in 2015.

The vast majority of household heads are employed, with the employment rate having risen from 84.2 percent in 1996 to 92.3 percent in 2015. Accordingly, labour force participation amongst household heads remained consistently very high, ranging between 92.7 percent (2004) and 96.7 percent (2010), while the unemployment rate was very low (between 1.4 percent in 2004 and 3.7 percent in 1998).

While the mean household size was relatively stable at just above 5 members in each of the five surveys, there has been some instability in the breakdown of households across size categories. Thus, for example, the modal household size was 3 persons in 1996, 4 persons in 1998, 1 person in 2004, 5 persons in 2010 and 4 persons in 2015.

[3] In 2015, Zambia was rather divided into 10 (instead of 9) provinces, with the new province Muchinga being added.

Table 9. Demographic profile of Zambian households

		1996		1998		2004		2010		2015	
		Number	Share (%)	Number	Share (%)	Number	Share (%)	Number	Share (%)	Number	Share (%)
TOTAL		1 803 102	100.0	1 870 120	100.0	2 099 477	100.0	2 481 485	100.0	3 008 939	100.0
Province	Central	171 852	9.5	184 898	9.9	204 630	9.8	248 791	10.0	291 544	9.7
	Copperbelt	299 262	16.6	323 241	17.3	310 348	14.8	367 577	14.8	450 250	15.0
	Eastern	246 006	13.6	258 177	13.8	288 697	13.8	341 639	13.8	341 643	11.4
	Luapula	133 396	7.4	137 828	7.4	170 854	8.1	190 576	7.7	206 957	6.9
	Lusaka	280 681	15.6	265 005	14.2	308 304	14.7	365 038	14.7	591 353	19.7
	Muching									174 246	5.8
	Northern	211 435	11.7	233 025	12.5	273 764	13.0	316 497	12.8	253 102	8.4
	North Western	110 147	6.1	104 111	5.6	126 107	6.0	136 999	5.5	163 474	5.4
	Southern	188 898	10.5	204 211	10.9	251 432	12.0	309 752	12.5	337 748	11.2
	Western	161 425	9.0	159 624	8.5	165 341	7.9	204 616	8.3	198 622	6.6
Area Type	Rural	1 169 309	64.9	1 203 252	64.3	1 280 955	61.0	1 596 286	64.3	1 714 819	57.0
	Urban	633 793	35.2	666 868	35.7	818 522	39.0	885 199	35.7	1 294 120	43.0
Gender of Household Head	Male	1 371 113	76.0	1 438 758	76.9	1 482 960	70.6	1 897 403	76.5	2 312 315	76.8
	Female	431 989	24.0	431 362	23.1	599 131	28.5	584 082	23.5	696 624	23.2
	Unspecified					17 386	0.8				
Age of Household Head	Below 25 years	135 260	7.5	135 598	7.3	283 440	13.5	131 896	5.3	161 402	5.4
	25-34 years	568 869	31.6	578 205	30.9	635 086	30.3	768 504	31.0	813 448	27.0
	35-44 years	432 324	24.0	471 348	25.2	489 694	23.3	673 378	27.1	868 830	28.9
	45-54 years	293 692	16.3	331 448	17.7	313 989	15.0	432 592	17.4	529 152	17.6
	55-64 years	214 525	11.9	202 043	10.8	193 842	9.2	260 077	10.5	336 000	11.2
	65+ years	158 432	8.8	151 478	8.1	183 426	8.7	215 038	8.7	300 107	10.0
	Mean age	41.8		41.4		39.7		41.9		42.9	

(cont.)

		1996		1998		2004		2010		2015	
		Number	Share (%)	Number	Share (%)	Number	Share (%)	Number	Share (%)	Number	Share (%)
Educational Attainment of Household Head	None	287 644	16.0	292 383	15.6	242 492	11.6	244 319	9.9	267 883	8.9
	Incomplete primary	526 961	29.2	476 663	25.5	512 145	24.4	546 648	22.0	645 518	21.5
	Complete primary	357 159	19.8	366 314	19.6	394 730	18.8	445 802	18.0	539 576	17.9
	Incomplete secondary	370 720	20.6	407 558	21.8	502 435	23.9	637 547	25.7	810 486	26.9
	Complete secondary	157 735	8.8	196 313	10.5	259 271	12.4	286 070	11.5	367 569	12.2
	GCE-A					12 540	0.6				
	GCE-A + Cert/Dip	89 620	5.0	105 354	5.6			119 100	4.8	113 384	3.8
	Cert/Dip + Degree					136 370	6.5				
	Degree	5 635	0.3	15 822	0.9			143 905	5.8	215 321	7.2
	Other/Unspecified	7 628	0.4	9 713	0.5	39 494	1.9	58 094	2.3	49 202	1.6
Labour Market Status of Household Head	Not working age	142 138	7.9	138 694	7.4	252 240	12.0	191 639	7.7	0	0.0
	Inactive	74 712	4.1	96 536	5.2	132 878	6.3	76 043	3.1	166 808	5.5
	Employed	1 517 675	84.2	1 575 279	84.2	1 671 368	79.6	2 165 267	87.3	2 777 215	92.3
	Unemployed	41 527	2.3	59 611	3.2	23 796	1.1	48 536	2.0	64 916	2.2
	Not specified	27 050	1.5	0	0.0	19 195	0.9	0	0.0	0	0.0
	Labour force participation rate [##]	95.4		94.4		92.7		96.7		94.5	
	Unemployment rate [##]	2.7		3.7		1.4		2.2		2.3	
Household Size	1 person	115 016	6.4	102 426	5.5	356 639	17.0	128 142	5.2	155 790	5.2
	2 persons	197 194	10.9	184 583	9.9	112 215	5.3	204 668	8.3	248 021	8.2
	3 persons	276 988	15.4	259 951	13.9	179 124	8.5	326 896	13.2	408 525	13.6
	4 persons	275 406	15.3	272 552	14.6	248 297	11.8	394 259	15.9	495 960	16.5
	5 persons	262 676	14.6	262 313	14.0	273 171	13.0	396 663	16.0	480 464	16.0
	6 persons	209 448	11.6	215 051	11.5	259 393	12.4	328 648	13.2	435 935	14.5
	7 persons	162 626	9.0	182 073	9.7	211 150	10.1	265 953	10.7	309 043	10.3
	8+ persons	303 748	16.9	391 171	20.9	459 488	21.9	436 256	17.6	475 201	15.8
	Mean Household Size	5.0		5.4		5.2		5.2		5.1	

Source: Authors' own calculations.

Note: [#] *The 2004 categorisation of educational attainment is not comparable with the other surveys.*

[##] *Includes only household heads aged 15 to 65 years.*

To conclude, Zambian households over the period averaged five members, were typically located in rural areas and tended to be headed by males between the ages of 25 and 44 years at the time of the survey.

5.2. Income Profile of Households

Table 10 presents an overview of the sources of households incomes. Specifically, the table indicates the proportion of households earning non-zero income from each source. It is important to note here that changes in the questionnaires have resulted in the addition or loss of particular income sources or categories over time. This makes it difficult to make completely accurate comparisons, although it does allow for the discernment of major trends in income sources. Note that, since households may receive income from a variety of sources, the proportions do not add to 100 percent.

First, it can be observed that self-employment is a source of income for a large proportion, if not the majority, of households in Zambia, whether in agricultural or non-agricultural activities. With the exceptions of 1996 and 2015 when proportions were 38.9 percent and 46.0 percent, about 55 percent of households reported earning at least some income from self-employment in agricultural activities. Self-employment outside of agriculture is also a source of income for a relatively large proportion of households: the proportion of households with non-zero income from non-agricultural self-employment ranged between 35 percent and 49 percent over the period.

Second, while wage income is a less commonly cited source of income amongst Zambian households, between one-quarter and one-third of households report receiving at least some wage income over the period. Thus, the share of households earning non-zero income from wages ranged from as low as 27.4 percent in 2015 to as high as 31.1 percent in 1996.

Third, the next major income source in terms of widespread receipt is remittances. The proportion of households reporting receiving remittances peaked at between 22 and 24 percent in 2004 and 2010, but this was true of only 14 to 18 percent of households in the other three years. Less than two percent of households reported earning income from government grants in any of the years. While, between 5 and 7 percent of households reported earning capital income, although this type of income is notoriously difficult to collect and so these proportions may be an underestimate.

These proportions relate, though, simply to whether or not a household receives a particular type of income: they do not indicate the relative importance of different income sources within households' total income. To gauge this, Table 11 presents the breakdown of total household income across each source. Focusing on the income amounts in constant 2009 June prices, the data shows that the most important source of income relative to households' total income is wage income: in each year, wage income is the largest contributor to total household income and, from 2004 onwards, by a substantial margin. Wages' share of total household income ranges between 39.9 percent in 1998 to 51.2 percent in 2015. This is followed in each year by non-agricultural self-employment, which accounts for between 25 percent and 37 percent of total household income, depending on the year. In contrast, agricultural self-employment contributes between 5 percent and 9 percent of total household income over the period.

Table 10. Proportion of households receiving non-zero income by income source, 1996-2015

		1996	1998	2004	2010	2015
Self-employment (Agricultural)	Sale of own produced crops	31.6	38.0	44.1	46.0	39.0
	Sale of livestock	7.9	14.8	13.0	15.3	19.7
	Sale of poultry	13.0	40.6	39.6	37.1	12.6
	Other farming income		0.5	0.6	1.6	0.0
	Total: Self-employment (agricultural)	*38.9*	*54.9*	*55.9*	*56.3*	*46.0*
Self-employment (Non-Agricultural)	Main non-farm businesses	39.0	32.6	31.9	33.1	47.7
	Other non-farm businesses	2.6	8.0	5.4	4.0	2.8
	Total: Self-employment (non-agricultural)	*39.0*	*37.5*	*35.1*	*35.0*	*48.4*
Wages	Gross salary (including regular allowances) from work	30.9				
	Non-regular allowances from work	5.5				
	Gross salary (including regular allowances) from main job		27.1	29.1	28.2	26.7
	Non-regular allowances from main job		5.2	6.9	4.5	4.9
	Gross salary (including regular allowances) from second job		0.8	1.0	1.2	0.5
	Non-regular allowances from second job		0.3	0.5	0.5	0.2
	Total: Wages	*31.1*	*27.5*	*29.7*	*29.0*	*27.4*
Remittances	*Total: Remittances received*	*17.7*	*16.2*	*23.6*	*22.6*	*14.5*
Government	*Total: Grants*		*1.0*	*1.1*	*0.7*	*1.5*
Capital	Rental income	2.2	3.7	3.8	4.2	4.1
	Pension payment		2.0	0.9	0.9	0.8
	Interest on savings			1.9	2.0	1.3
	Interest/Dividends on investment			0.2	0.3	0.5
	Total: Capital		*5.5*	*6.2*	*6.8*	*6.1*
Other	In-kind income		5.7	4.3	4.5	4.0
	Borrowing		15.3	12.3	16.6	9.8
	Income from any other sources		11.4	14.1	18.3	10.7
	Total: Other	*9.3*	*27.6*	*26.3*	*32.4*	*20.2*
Transfer payments	*Total: Transfer payments*	*1.5*				

Source: Authors' own calculations.

Table 11. Aggregate income across all households from each source and proportion of households receiving non-zero income from each source, 1996-2015

Income Source	1996		1998		2004		2010		2015		Ave. Ann. Growth Rate (%), 1996-2015
	Kwacha (billions)	Share (%)	Kwacha (billions)	Share (%)	Kwacha (billions)	Share (%)	Kwacha (billions)	Share (%)	Kwacha (billions)	Share (%)	
	Nominal Prices										
Self-employment: agriculture	95	5.0	302	8.3	1 311	7.9	2 431	6.8	3 359	5.6	20.6
Self-employment: non-agriculture	690	36.2	1 297	35.7	4 697	28.3	8 973	25.1	19 911	33.3	19.4
Wage income	889	46.6	1 447	39.9	7 444	44.9	16 752	46.8	30 639	51.2	20.5
Remittances	92	4.8	155	4.3	943	5.7	2 112	5.9	1 795	3.0	16.9
Grants			14	0.4	78	0.5	84	0.2	231	0.4	-
Capital income			101	2.8	713	4.3	1 569	4.4	1 694	2.8	-
Other			314	8.6	1 393	8.4	3 842	10.7	2 199	3.7	-
Transfer payments	142	7.5									-
TOTAL	1 907	100.0	3 631	100.0	16 578	100.0	35 763	100.0	59 829	100.0	19.9
	Constant Prices (2009 June)										
Self-employment: agriculture	834	5.0	1 720	8.3	2 253	7.9	2 290	6.8	2 238	5.6	5.3
Self-employment: non-agriculture	6 045	36.2	7 382	35.7	8 070	28.3	8 455	25.1	13 262	33.3	4.2
Wage income	7 792	46.6	8 235	39.9	12 790	44.9	15 785	46.8	20 407	51.2	5.2
Remittances	804	4.8	882	4.3	1 620	5.7	1 990	5.9	1 195	3.0	2.1
Grants			78	0.4	134	0.5	80	0.2	154	0.4	-
Capital income			574	2.8	1 225	4.3	1 478	4.4	1 128	2.8	-
Other			1 784	8.6	2 393	8.4	3 621	10.7	1 465	3.7	-
Transfer payments	1 247	7.5									-
TOTAL	16 721	100.0	20 656	100.0	28 486	100.0	33 699	100.0	39 849	100.0	4.7

Source: Authors' own calculations.

These rankings differ markedly from the rankings of the proportions of households reporting receiving non-zero incomes from these sources, presented in Table 10. Thus, although a higher proportion of households report earning income from agricultural and non-agricultural self-employment than from wages, wages contribute a significantly larger proportion of total income than is the case for either of these two sources. Indeed, wages account for 51.2 percent of total household income in 2015, which is almost twice the proportion of households that report earning wages (27.4 percent). Together, wages and non-agricultural self-employment account for 84.5 percent of total household income in 2015, up slightly from 82.8 percent in 1996.

As expected, government grant income accounted for a negligible share of total income, never rising above 0.5 percent of total household income. Capital income's share was also quite low (2.8 percent in 1998 and 4.4 percent in 2010), while remittances accounted for between 3 percent (2015) and 6 percent (2010) of total household income.

Based on the estimates presented, of the various income sources total income from agricultural self-employment increased most rapidly, growing at an average annual rate of 5.3 percent between 1996 and 2015. Wage income grew at a very similar rate (5.2 percent), while income from non-agricultural self-employment grew slightly more slowly at 4.2 percent per annum over the 19-year period.

Table 12 provides more information by showing the share of each income source in each household decile (derived using per capita income). In all five surveys, agricultural self-employment income accounts for the highest share of total income in the poorest deciles, but this proportion declines as one moves up the income distribution. In contrast, the share accounted for by wages shows the opposite trend, rising relative to total income as income rises. It is interesting that the share represented by non-agricultural self-employment income was the greatest in the mid-distribution deciles (deciles 4, 5, 6, 6 and 7 in 1996, 1998, 2004, 2010 and 2015 respectively). Finally, government grants accounted for a very negligible proportion of total income in all surveys under this study, even for the poorest deciles (less than 1 percent).

To conclude, wage income and self-employed non-agricultural income account for the largest shares of household income, although the above analysis indicated that the former's share increased over the period (rising from 46.6 percent in 1996 to 51.2 percent in 2015) while the opposite occurred for the latter's share (which fell from 36.2 percent to 33.3 percent). Additionally, agricultural self-employment income represented a greater share of total income in the poorer deciles, while wage income and non-agricultural self-employment income accounted for the majority of total income in the richer deciles.

Table 12. Income share of each source by household decile, 1996-2015

	Self-employment: Agricultural	Self-employmnet: Non-agricultural	Wages	Remittances	Government	Capital	Other	Transfer payments
				1996				
Decile 1#	-	-	-	-	-	-	-	-
Decile 2	76.2	11.2	0.0	9.7	-	-	-	2.9
Decile 3	50.8	30.0	1.0	12.3	-	-	-	5.9
Decile 4	31.9	41.5	6.3	13.2	-	-	-	7.0
Decile 5	19.2	39.6	23.6	9.9	-	-	-	7.7
Decile 6	12.4	36.9	37.3	8.2	-	-	-	5.2
Decile 7	6.7	33.9	46.9	6.1	-	-	-	6.3
Decile 8	3.5	28.4	54.4	7.2	-	-	-	6.4
Decile 9	2.8	30.9	54.7	5.3	-	-	-	6.3
Decile 10	2.3	39.9	46.5	2.7	-	-	-	8.6
Total	5.0	36.2	46.6	4.8	-	-	-	7.5
				1998				
Decile 1	96.1	0.6	0.0	1.8	0.0	0.0	1.4	-
Decile 2	77.9	9.7	0.2	4.8	0.0	0.3	7.0	-
Decile 3	59.0	19.4	1.6	6.7	0.6	1.0	11.7	-
Decile 4	41.7	29.9	5.6	8.5	0.1	1.6	12.7	-
Decile 5	26.6	34.7	15.9	9.4	0.5	1.1	11.8	-
Decile 6	16.6	33.7	32.3	6.3	0.2	1.3	9.6	-
Decile 7	10.0	31.5	39.7	4.9	0.4	2.6	10.9	-
Decile 8	8.6	30.4	43.7	4.2	0.2	3.5	9.4	-
Decile 9	4.8	34.3	43.2	3.8	0.4	3.6	9.8	-
Decile 10	4.2	39.2	42.7	3.5	0.4	2.7	7.2	-
Total	8.3	35.7	39.9	4.3	0.4	2.8	8.6	-
				2004				
Decile 1	86.2	5.0	0.1	4.8	0.0	0.5	3.5	-
Decile 2	70.2	12.7	0.9	6.9	0.1	0.5	8.8	-
Decile 3	47.6	21.4	3.8	12.1	0.3	1.1	13.7	-
Decile 4	34.4	26.9	12.2	13.3	0.4	1.0	11.9	-
Decile 5	21.9	32.2	21.7	11.2	0.3	1.6	11.1	-
Decile 6	12.7	33.7	32.3	9.3	0.5	1.7	9.9	-
Decile 7	8.5	30.6	41.8	8.7	0.1	2.3	8.0	-
Decile 8	6.9	30.9	44.8	7.5	0.3	2.3	7.2	-
Decile 9	5.4	25.6	51.8	5.4	0.5	2.7	8.6	-
Decile 10	5.0	28.0	48.3	3.9	0.6	6.1	8.1	-
Total	7.9	28.3	44.9	5.7	0.5	4.3	8.4	-
				2010				
Decile 1	86.2	3.5	0.0	3.5	0.0	0.0	6.7	-
Decile 2	66.8	12.1	0.9	5.4	0.0	0.7	14.1	-
Decile 3	47.7	19.1	3.9	9.7	0.4	1.4	17.7	-
Decile 4	33.2	28.3	9.6	12.5	0.3	0.9	15.3	-
Decile 5	23.5	29.2	16.9	13.1	0.2	1.9	15.3	-
Decile 6	17.1	32.2	23.3	10.6	0.2	3.1	13.4	-
Decile 7	11.0	32.0	30.1	11.4	0.1	2.5	12.8	-
Decile 8	7.9	30.7	39.1	8.4	0.3	3.0	10.7	-
Decile 9	4.6	24.3	53.0	5.4	0.2	3.2	9.5	-
Decile 10	2.9	23.0	54.0	4.0	0.3	5.7	10.2	-
Total	6.8	25.1	46.8	5.9	0.2	4.4	10.7	-

(cont.)

	Self-employment: Agricultural	Self-employmnet: Non-agricultural	Wages	Remittances	Government	Capital	Other	Transfer payments
				2015				
Decile 1#	-	-	-	-	-	-	-	-
Decile 2	87.9	7.8	0.1	2.1	0.0	0.2	1.9	-
Decile 3	67.8	19.4	0.5	5.3	0.0	0.7	6.4	-
Decile 4	45.8	32.7	1.9	8.2	0.1	0.7	10.6	-
Decile 5	31.8	44.7	5.5	7.9	0.1	1.4	8.6	-
Decile 6	19.1	47.2	14.7	7.8	0.1	2.2	9.0	-
Decile 7	9.5	48.2	24.5	6.6	0.4	3.4	7.4	-
Decile 8	5.2	45.2	36.7	4.6	0.7	3.0	4.6	-
Decile 9	2.2	34.4	53.7	2.8	0.6	3.0	3.4	-
Decile 10	1.8	26.7	64.7	1.4	0.3	2.9	2.2	-
Total	5.6	33.3	51.2	3.0	0.4	2.8	3.7	-

Source: Authors' own calculations.

Note: # Total income in this decile was nil in both 1996 and 2015 (also see Table 12). Deciles are household-level deciles, with households ranked by per capita income.

5.3. Inequality Analysis

This section analyses the changes in inequality over the study period, using the Gini coefficients and Lorenz curves for each survey year. The Gini coefficient is an aggregate numerical measure of income inequality, ranging between 0 (perfect equality) and 1 (perfect inequality). The higher the value of this coefficient, the higher the inequality of income distribution, and vice versa (Todaro & Smith, 2011: 777). On the other hand, the Lorenz curve is a graph which depicts the variance of the size distribution of income from perfect equality: the further the curve is away from the diagonal line of perfect equality (illustrated graphically in Figure 7 by the dotted diagonal line), the greater the degree of inequality and subsequently the greater the Gini coefficient (Todaro & Smith, 2011: 207). Simply stated, the size of the Gini coefficient denotes the size of the gap between the Lorenz curve and the line of perfect equality.

Estimates of the Zambian Gini coefficient using either per capita income or income per adult equivalent reveal the same trends (Table 13). The data suggests that income inequality initially worsened during the 1996-2004 period, before improving somewhat between 2004 and 2015. Nevertheless, the coefficients in 2010 and 2015 remained higher than the 1996 and 1998 aggregates, with the implication that inequality increased overall between 1996 and 2015. These findings may support the Kuznets invert-U hypothesis as discussed in Section 2.1 (i.e. inequality would initially increase before declining, while economic growth takes place). The Gini coefficients are slightly lower using per adult equivalent income compared to the results using per capita income.

Table 13. Gini coefficients, 1996-2015

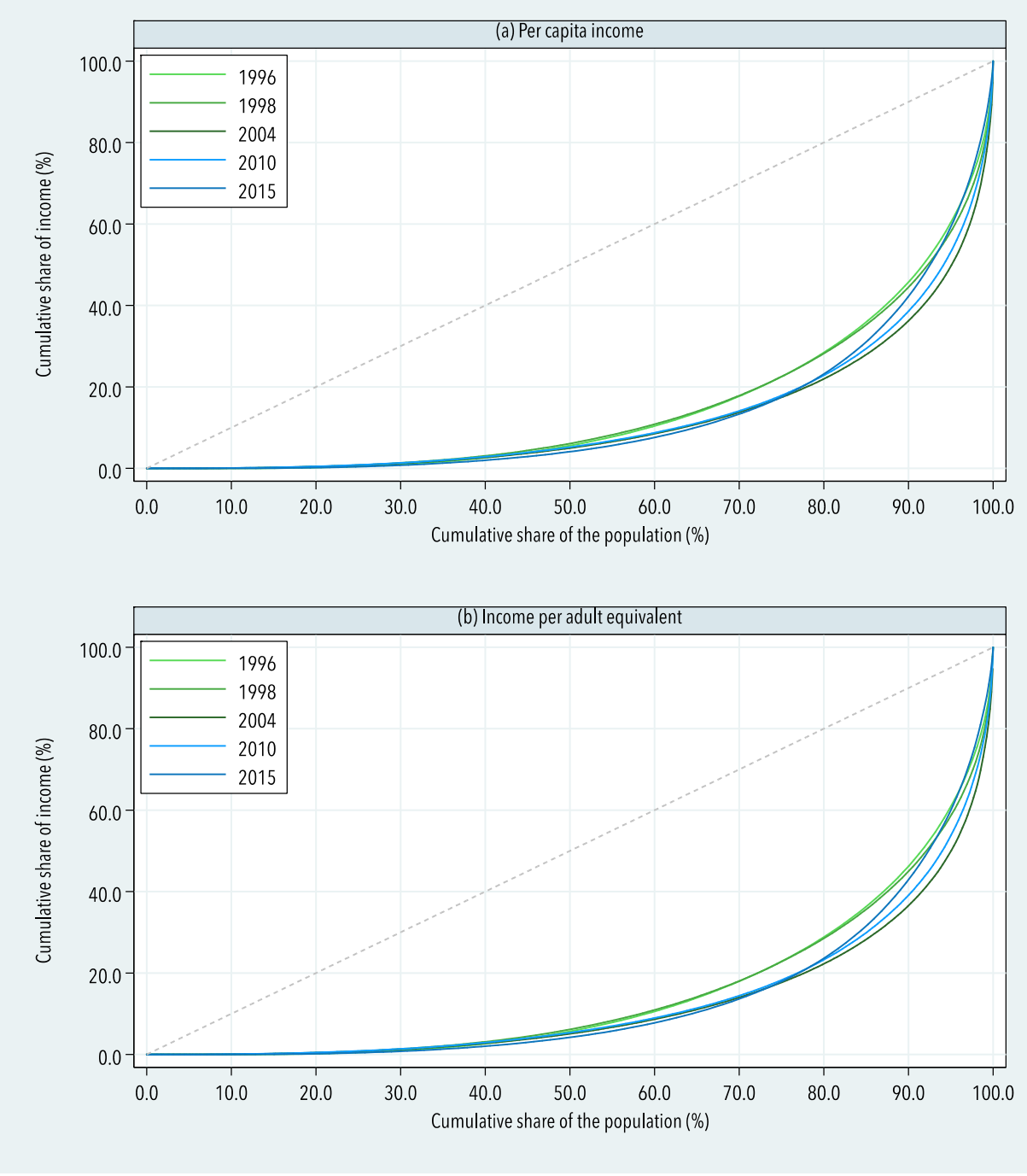
Year	Gini coefficient using per capita income		Gini coefficient using income per adult equivalent	
	Estimate	95% Conf. Int.	Estimate	95% Conf. Int.
1996	0.700	[0.690 ; 0.711]	0.697	[0.687 ; 0.707]
1998	0.702	[0.692 ; 0.712]	0.699	[0.689 ; 0.709]
2004	0.753	[0.745 ; 0.761]	0.750	[0.743 ; 0.758]
2010	0.741	[0.731 ; 0.751]	0.737	[0.727 ; 0.747]
2015	0.735	[0.728 ; 0.743]	0.731	[0.724 ; 0.739]

Source: Authors' own calculations.

The Gini coefficients presented in Table 13 are considerably higher than those published by Zambia's CSO, which are reproduced in Table 4. First, these coefficients are higher than the CSO's estimates based on per capita expenditure due to the fact that expenditure typically has a narrower range than income. For example, few if any households report zero expenditure/consumption, while reporting of zero incomes is relatively more common. At the upper end of the distribution, households generally do not consume all of their income. Second, these coefficients are higher than the CSO's estimates based on per capita income due to the fact that the CSO excludes zero-income households from their analysis of household incomes and, as a result, from their estimates of the Gini coefficient (CSO, 2016: 77).

Figure 7 shows the Lorenz curves in each year and similar results could be found. That is, the 2004 curve is furthest away from the 45-degree line of perfect equality, and this implies that inequality was most severe in this year, compared to the other years.

Figure 7. Lorenz curves, 1996-2015



Source: Authors' own calculations.

Another way to examine the extent of income inequality in Zambia is to look at the income share and population share in each household decile. These results are presented in Table 14. First, the bottom five deciles accounted for slightly above 50 percent of the population, but only about 5 to 7 percent of total income in each of the five years under study (note that the income share of the poorest decile was 0 percent in 1996 and 2015). In contrast, the richest decile accounted for 49.9 percent of total income in 1996. This share increased continuously and reached 55.7 percent in 2010, before falling to 50.8 percent by 2015 (a level last seen in 1998). These trends would support a similar conclusion to that reached above: that inequality increased initially, but decreased in the latter part of the period.

Table 14. Population share and share of total income by household decile, 1996-2015

Decile	Population		Income		Population		Income	
	Share (%)	Cumul. %	Share (%)	Cumul. %	Share (%)	Cumul. %	Share (%)	Cumul. %
	1996				1998			
Decile 1	10.4	10.4	0.0	0.0	8.8	8.8	0.0	0.0
Decile 2	8.4	18.9	0.1	0.1	10.7	19.6	0.4	0.4
Decile 3	10.5	29.4	0.7	0.9	10.7	30.2	1.0	1.4
Decile 4	10.6	39.9	1.7	2.6	10.8	41.0	1.9	3.3
Decile 5	10.7	50.6	3.2	5.8	10.4	51.4	3.4	6.7
Decile 6	11.3	61.9	5.7	11.5	11.2	62.7	5.8	12.4
Decile 7	10.7	72.6	8.5	20.1	10.4	73.0	8.2	20.6
Decile 8	9.7	82.3	11.6	31.7	10.1	83.1	11.8	32.4
Decile 9	9.4	91.8	18.4	50.1	9.0	92.1	17.2	49.5
Decile 10	8.2	100.0	49.9	100.0	7.9	100.0	50.5	100.0
	2004				2010			
Decile 1	11.1	11.1	0.1	0.1	10.6	10.6	0.1	0.1
Decile 2	11.5	22.6	0.5	0.6	11.3	21.8	0.5	0.6
Decile 3	11.4	34.0	1.1	1.7	10.6	32.5	1.0	1.6
Decile 4	11.2	45.2	2.0	3.7	10.9	43.4	1.9	3.5
Decile 5	11.0	56.2	3.2	7.0	10.5	53.9	2.9	6.4
Decile 6	10.6	66.8	4.9	11.8	10.2	64.1	4.2	10.7
Decile 7	10.3	77.1	7.3	19.2	9.6	73.7	6.1	16.8
Decile 8	9.2	86.3	10.7	29.9	9.3	83.0	9.7	26.5
Decile 9	8.0	94.3	17.4	47.2	9.3	92.3	17.8	44.3
Decile 10	5.7	100.0	52.8	100.0	7.7	100.0	55.7	100.0
	2015							
Decile 1	9.4	9.4	0.0	0.0				
Decile 2	11.1	20.6	0.2	0.2				
Decile 3	10.9	31.5	0.7	0.9				
Decile 4	11.0	42.4	1.5	2.4				
Decile 5	10.8	53.2	2.6	5.0				
Decile 6	10.3	63.5	4.2	9.3				
Decile 7	10.3	73.7	7.1	16.4				
Decile 8	9.0	82.7	10.8	27.1				
Decile 9	9.6	92.3	22.1	49.2				
Decile 10	7.7	100.0	50.8	100.0				

Source: Authors' own calculations.

Note: Deciles are household-level deciles, with households ranked by per capita income.

Figure 8 and Figure 10 in the Appendix present the growth incidence curves (GICs) for Zambia over the survey years. The GIC curve shows where along the income distribution the individuals benefited most (or least) over a particular period, by showing the average annual growth rate of real per capita income for every percentile of the income distribution between two points in time. Bhorat and Van der Westhuizen (2012) argue that pro-poor growth may be defined in two ways. First, growth is pro-poor in an absolute sense if the change in income levels of the poor, as defined by a chosen poverty line, over a period of time is larger than zero. That is, the income levels of the poor have increased in absolute terms. This is represented graphically by a GIC that is located above zero along the whole distribution. Second, growth is pro-poor in a relative sense if the change in the income levels of the poor is larger than that of the non-poor. This is represented graphically by a GIC that is downward-sloping. This pro-poor growth would lead to the reduction of income inequality.

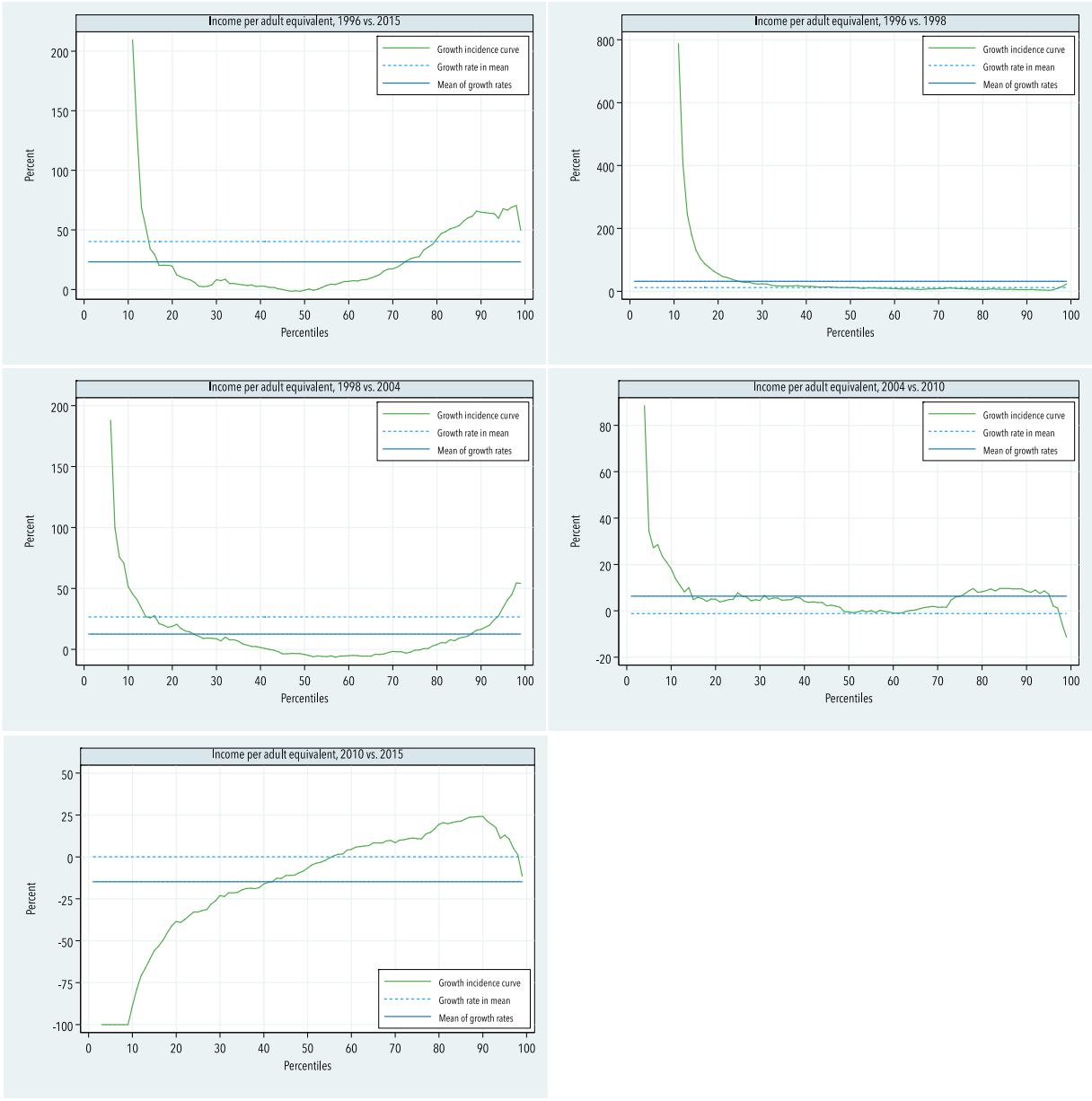


Figure 8. Growth Incidence Curves, 1996-2015

Source: Authors' own calculations.

The GICs for the 1996-2015 period indicate that, regardless of whether real per capita income or real per adult equivalent income was used, the GIC was above zero on the y-axis. This implies that pro-poor growth took place in an absolute sense. The GIC was downward-sloping up to the 50th percentile (it was very steep at the bottom 20 percentiles), before turning upward. This result suggests that pro-poor growth took place in relative terms during the 1996-2015 period for the bottom 50 percent of the income distribution. When considering the 1996-1998 period (the second row of figures), the 1998-2004 period (the third row), as well as the 2004-2010 period (the fourth row), the shape of the GICs suggest fairly strong pro-poor growth in both absolute and relative terms for the poorest half of the population in the income distribution. In contrast, the 2010-2015 period (the final row of figures) was characterized by an upward-sloping growth incidence curve between the 10th and 90th percentiles and was positive only from about the 60th percentile onwards.

GICs for the urban and rural population between 1996 and 2015 are presented in Figure 11 in the appendix. The figures reveal starkly different experiences between the two groups. In rural areas, the growth incidence curve is downward sloping, with much higher rates of income growth at the bottom end of the distribution. In contrast, the curve is upward sloping in urban areas, with groups at the upper end of the income distribution seeing the most rapid gains in income over the period.

5.4. Decomposition of Inequality by Income Source

In Table 13, we presented estimates of the Gini coefficient for Zambia between 1996 and 2015. Since the Gini coefficient is a summary statistic, though, it is not able to tell us what factors or processes were underlying changing inequality. In order to understand the evolution of the Gini coefficient over time, we decompose the coefficient by income source, using the Lerman and Yitzhaki (1985) approach. By using this decomposition technique, we are able to identify which income sources underpin inequality and how they have changed over time. This is done by considering the absolute and relative contributions of each income source to the Gini coefficient. From the results presented in Table 15 and Table 26 in the Appendix, it is clear that the use of per capita income or income per adult equivalent does not impact substantively on the results. We will therefore discuss the results in terms of per capita income, unless otherwise stated.

Unsurprisingly, given its dominance within total household income, wage income is found to be the income source with the greatest contribution to the Gini coefficient, and there is an indication that it has become an increasingly important driver of inequality over the period. Thus, wage income has increased its relative contribution from 49.2 percent in 1996 to 58.9 percent in 2015. In absolute terms, wage income contributed 0.3447 points to the total Gini coefficient in 1996; by 2015, this had increased to 0.4329 points. This is an important finding particularly when we consider that it is only around three in ten households that report receiving any wage income. Indeed, this is at least partly the reason for the large contribution to inequality: the fact that there are a large number of individuals with no wage income at all.

Income from non-agricultural self-employment is found to be the second largest contributor to income inequality, but its contribution to the Gini coefficient fell between 1996 and 2015: its absolute contribution decreased from 0.2600 points in 1996 to 0.2274 points in 2015 while its relative contribution decreased from 37.1 percent to 30.9 percent. This latter proportion was, though, somewhat higher than it had been in 2004 (28.2 percent) and 2010 (24.3 percent).

The relative contribution of agricultural self-employment income to the Gini coefficient varied within a band of 4 percentage points: it peaked in 1998 (a relative contribution of 4.1 percent) and was at its lowest in 2015 (contributing a mere 1.9 percent to overall inequality). These low contributions are primarily the result of this category's small share of total income.

These results suggest that income earned from wage work and non-agricultural self-employment not only accounted for the majority of total income (Table 11 and Table 12), but are also the two biggest drivers of income inequality.

In order to provide some further detail on wage income's contribution to inequality, we include a more detailed decomposition of the Gini coefficient in the appendix (see Table 28 and Table 29). In these decompositions, instead of simply looking at wage income as a single income source, we disaggregate wages by industry. Thus, we can see the contribution of wages from a particular sector to overall inequality.

Table 15. Gini decomposition by income source, per capita income, 1996-2015

Year	Income Source	Gini Correlation	Gini Index	Absolute Contribution	Relative Contribution
1996	Self-employment: agriculture	0.3359	0.8821	0.0148	2.1
	Self-employment: non-agriculture	0.8229	0.8740	0.2600	37.1
	Wage income	0.8829	0.8377	0.3447	49.2
	Remittances	0.5690	0.9369	0.0256	3.7
	Transfer payments	0.7724	0.9619	0.0554	7.9
	TOTAL			0.7005	100.0
1998	Self-employment: agriculture	0.4066	0.8400	0.0284	4.1
	Self-employment: non-agriculture	0.8402	0.8761	0.2631	37.5
	Wage income	0.8803	0.8688	0.3049	43.5
	Remittances	0.6300	0.9526	0.0256	3.7
	Grants	0.7628	0.9978	0.0029	0.4
	Capital income	0.7733	0.9776	0.0210	3.0
	Other	0.7135	0.9029	0.0556	7.9
	TOTAL			0.7016	100.0
2004	Self-employment: agriculture	0.5207	0.8585	0.0354	4.7
	Self-employment: non-agriculture	0.8327	0.9003	0.2124	28.2
	Wage income	0.9167	0.8930	0.3676	48.8
	Remittances	0.6600	0.9366	0.0352	4.7
	Grants	0.8324	0.9974	0.0039	0.5
	Capital income	0.8946	0.9884	0.0380	5.1
	Other	0.7719	0.9372	0.0608	8.1
	TOTAL			0.7532	100.0
2010	Self-employment: agriculture	0.4054	0.8225	0.0227	3.1
	Self-employment: non-agriculture	0.8055	0.8887	0.1796	24.3
	Wage income	0.9301	0.8917	0.3885	52.5
	Remittances	0.6445	0.9323	0.0355	4.8
	Grants	0.7635	0.9982	0.0018	0.2
	Capital income	0.8648	0.9832	0.0373	5.0
	Other	0.7643	0.9178	0.0754	10.2
	TOTAL			0.7407	100.0
2015	Self-employment: agriculture	0.2969	0.8293	0.0138	1.9
	Self-employment: non-agriculture	0.8500	0.8038	0.2274	30.9
	Wage income	0.9594	0.8811	0.4329	58.9
	Remittances	0.5682	0.9372	0.0160	2.2
	Grants	0.7547	0.9946	0.0029	0.4
	Capital income	0.7920	0.9747	0.0219	3.0
	Other	0.6136	0.9106	0.0205	2.8
	TOTAL			0.7354	100.0

Source: Authors' own calculations, based on Lerman and Yitzhaki (1985).

The estimates suggest an interesting change in inequality that to some extent parallels structural economic shifts over the period. In 1996, wage income in agriculture was the largest single contributor to inequality (within wage income), contributing 11.7 percent to the Gini coefficient. It was followed by transport, storage and communication (5.6 percent contribution), wholesale and retail trade (5.2 percent) and financial services (4.7 percent). In 2004, it was financial services (9.8 percent) that was the largest contributor, followed by wholesale and retail trade (6.7 percent), transport, storage and communication (6.3 percent), agriculture (6.0 percent) and utilities (4.8 percent). In 2010, financial services contributed 21.2 percent to total income inequality, followed by private households (8.2 percent), utilities (5.8 percent) and wholesale and retail trade (5.5 percent). By 2015, financial services accounted for 26.3 percent of total inequality, followed by utilities (9.6 percent), private households (7.7 percent) and wholesale and retail trade (4.9 percent).

There does, therefore, seem to be a shift away from the primary sectors and, to a lesser extent, secondary sectors and towards the tertiary sectors in terms of contribution to overall income inequality, at least in terms of wage income. Wholesale and retail trade ranks in the top four industries in each year in terms of wage income's contribution to total inequality, while the contribution of the top-ranked sector in 2010 and 2015 is at least twice the contribution of the top-ranked sector (agriculture) in 1996.

5.5. Poverty Analysis

The poverty analysis is conducted using cumulative density functions (CDF) and Foster-Greer-Thorbecke (FGT) poverty indices for the five survey years. In a CDF, the vertical axis shows the percentage of the population with real income that is equal to or lower than the real income value on the horizontal axis. As real income increases, the corresponding cumulative proportion of population will also increase. One advantage of the CDF is that it enables the comparison of changes in poverty from one period to the next, without having to rely on a single (sometimes contested) poverty line. If the CDF for a given period lies entirely above the CDF for the previous period, this means that poverty has increased regardless of the chosen poverty line, as the percentage of population with a certain real income or less has increased; if the opposite happens, poverty has decreased at all poverty lines. If, however, the two CDFs cross each other, this implies that comparisons of poverty estimates between two periods are sensitive to the poverty line chosen, i.e. conclusions in terms of poverty changes are only valid within given ranges.

Figure 9 presents the CDFs of per capita income and per adult equivalent income respectively, for each of the five years. Note that the two vertical lines in the lower panel represent the 2010 food poverty line (1 171 573 kwacha) and the overall poverty line (2 002 804 kwacha).

It can be seen in both figures that, up to about 600 000 kwacha, the 1996, 1998, 2004 and 2010 CDFs do not cross one another, with the 1996 CDF clearly lying above the other three CDFs. In fact, it can be seen that for the poorest 10 percent of the population in 1996 and 2015, income was zero, as indicated by the vertical shape of the CDF at zero kwacha (also refer to the results in Table 14). The 1998 CDF lies slightly above the 2004 and 2010 CDFs. On the other hand, the 2004 and 2010 CDFs lie very close to each other, although there is indication that former curve still lies slightly above the latter curve. Furthermore, the 1996 and 2015 CDFs almost overlap each other. Nonetheless, as income increases, the 2015 CDF clearly becomes flatter and eventually lies below the CDFs of the other four earlier years. In fact, at the overall poverty line (i.e. the second vertical line in the lower panel), the 1996 CDF clearly lies above the other CDFs, the 1998, 2004 and 2006 CDFs are very close to one another, while the 2010 CDF clearly lies below the others.

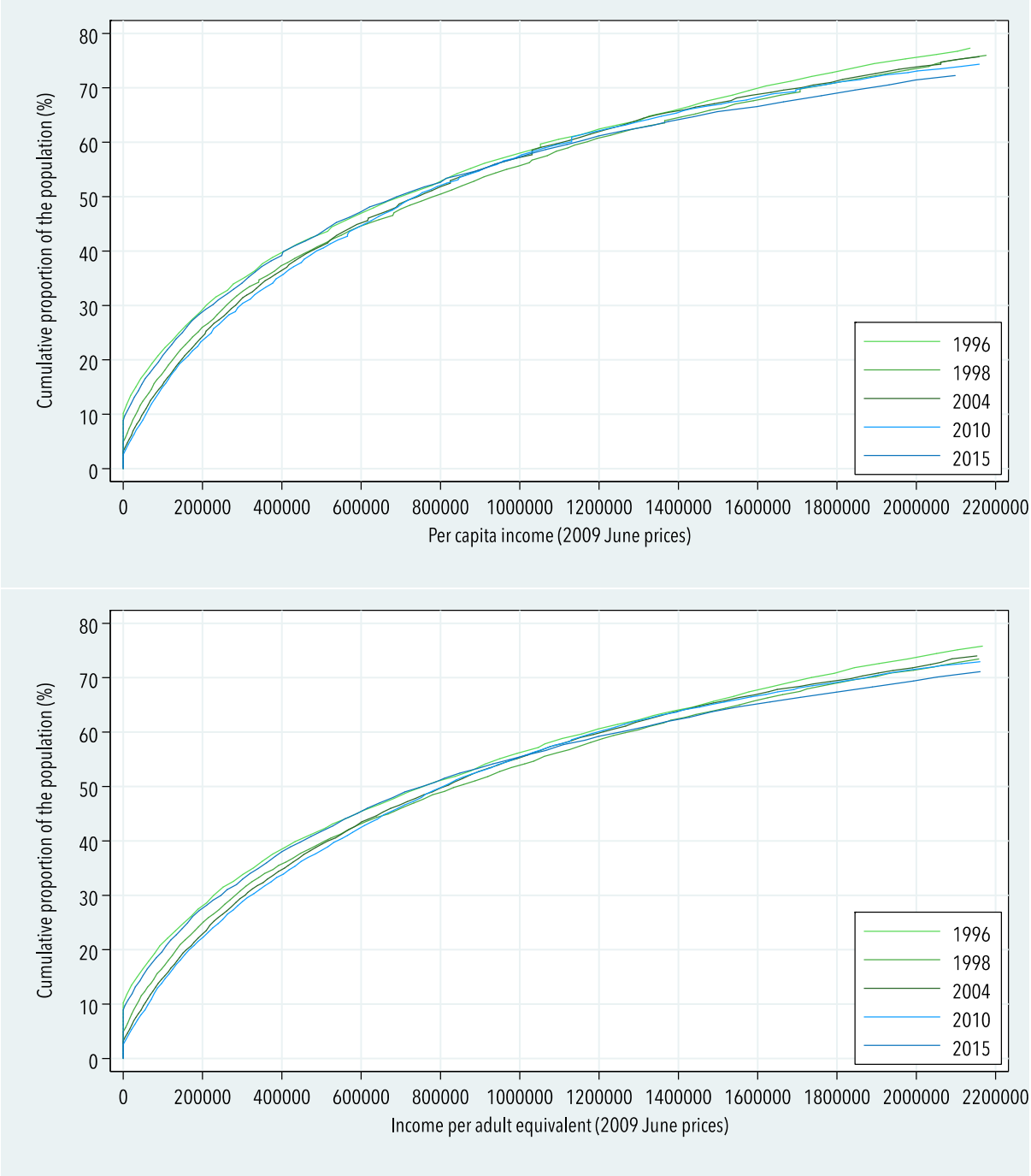


Figure 9. Cumulative Density Functions

Source: Authors' own calculations.

In addition to the CDFs, the FGT poverty indices were derived using various poverty lines. These indices can be expressed by means of the following equation:

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^\alpha \Bigg| (y_i \le z)$$

where

P_α = measure of poverty

q = number of poor people

n = total number of people

z = poverty line

y_i = income of the i-th person in the population

The headcount ratio (P_0) is simply the proportion of the population that is poor, that is, $H = P_0 = \frac{q}{n}$. Although the index is relatively easy to interpret by showing the incidence of poverty, it ignores the extent of which the poor fall below the poverty line, because it does not indicate how poor the poor are. Hence, the index does not change even if people below the poverty line become poorer (World Bank 1990:27; Haughton and Khandker 2009: 69).

Poverty gap ratio (P_1) reflects the depth of poverty by adding up the extent to which the poor on average fall below the poverty line (Haughton and Khandker 2009: 70), and is equal to the total amount of income necessary to raise everyone who is below the poverty line up to that line (i.e., poverty gap), as a proportion of the total income of the population if their income had been equivalent to the poverty line. That is, $P_1 = \frac{1}{n}\sum_{i=1}^{q}\frac{z-y_i}{z}$. In other words, this index reflects the depth of poverty. Finally, the squared poverty gap ratio (P_2) measures the severity of poverty by taking both poverty and inequality amongst the poor into account. More weight is put on observations that fall well below the poverty line, as indicated by the squared sign in the equation: $P_2 = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^2$.

Table 16. Foster-Greer-Thorbecke Poverty Indices

	Food Poverty Line			Overall Poverty Line		
	Poverty Headcount Ratio (P_0)	Poverty Gap Ratio (P_1)	Squared Poverty Gap Ratio (P_2)	Poverty Headcount Ratio (P_0)	Poverty Gap Ratio (P_1)	Squared Poverty Gap Ratio (P_2)
Using different poverty lines for each survey						
1996	0.706	0.500	0.415	0.828	0.610	0.511
1998	0.666	0.462	0.375	0.803	0.577	0.476
2004	0.590	0.392	0.309	0.716	0.504	0.406
2010	0.595	0.390	0.304	0.716	0.503	0.404
2015	0.589	0.421	0.347	0.662	0.482	0.401
Using the 2010 poverty lines for each survey						
1996	0.600	0.424	0.351	0.738	0.527	0.438
1998	0.579	0.396	0.320	0.715	0.503	0.411
2004	0.593	0.395	0.311	0.719	0.507	0.409
2010	0.595	0.390	0.304	0.716	0.503	0.404
2015	0.587	0.418	0.345	0.697	0.513	0.429

Source: Authors' own calculations.

Table 16 presents the FGT poverty indices using the poverty lines as shown in Table 8. Focusing on the results using the 2010 overall and food poverty lines across all four surveys, regardless of the whether the food or overall poverty lines were used, there was a slight decline in all three FGT indices between 1996 and 1998. In addition, it is interesting that P_0 increased slightly but P_2 ratio fell between 1998 and 2004, using the food poverty line, although the measures were virtually unchanged using the overall poverty line. Between 2004 and 2010, the three indices were very similar, at both poverty lines. Furthermore, P_0 decreased slightly but P_1 and P_2 increased between 2010 and 2015. Finally, when comparing 1996 and 2015, it can be seen that all three poverty indices were slightly lower in 2015. To conclude, despite the fluctuations of the poverty indices across the

five surveys, the overall conclusion is that there was a slight reduction of poverty during the 19-year period.

Table 17 provides additional information by presenting the poverty headcount ratios by province and area type of residence as well as gender in the four surveys, using the 2010 food poverty line and overall poverty line. The results indicate that the highest poverty rates are typically experienced by female-headed households, those residing in rural areas, and those living in the Luapula, Eastern, Northern and North Western provinces. While poverty rates are estimated to have declined slightly overall, progress was uneven. Thus, while poverty rates declined in urban areas between 1996 and 2015, they rose marginally in rural areas. Similarly, poverty rates are found to have declined in the Central, Copperbelt, Lusaka, North Western, and Southern provinces, but were broadly unchanged or slightly higher in the other provinces.

Table 17. Foster-Greer-Thorbecke poverty headcount ratios by province, area type and gender, using the 2010 poverty lines

		1996	1998	2004	2010	2015
		Food Poverty Line				
TOTAL		0.6001	0.5789	0.5934	0.5948	0.5865
Province	Central	0.6297	0.6353	0.6531	0.5573	0.6065
	Copperbelt	0.3989	0.3577	0.3845	0.3767	0.3733
	Eastern	0.7521	0.7817	0.6630	0.7922	0.7877
	Luapula	0.7497	0.7382	0.7859	0.7937	0.8136
	Lusaka	0.2480	0.2127	0.3082	0.2612	0.1967
	Muchinga					0.7590
	Northern	0.7514	0.7489	0.7335	0.7422	0.8046
	North Western	0.7889	0.7492	0.6944	0.6774	0.6438
	Southern	0.7045	0.6002	0.6377	0.6258	0.7083
	Western	0.7989	0.8091	0.7325	0.7408	0.8114
Area Type	Rural	0.7853	0.7721	0.7808	0.7641	0.8030
	Urban	0.2880	0.2518	0.3011	0.2760	0.2855
Gender of Head	Male	0.5726	0.5559	0.5764	0.5854	0.5784
	Female	0.7125	0.6743	0.6410	0.6330	0.6201
		Overall Poverty Line				
TOTAL		0.7381	0.7140	0.7178	0.7153	0.6971
Province	Central	0.7895	0.7416	0.7699	0.7192	0.7459
	Copperbelt	0.5665	0.5431	0.5574	0.5451	0.5033
	Eastern	0.8600	0.8819	0.7770	0.8680	0.8629
	Luapula	0.8794	0.8488	0.8678	0.8609	0.8939
	Lusaka	0.4473	0.4090	0.5012	0.4472	0.3625
	Muchinga					0.8141
	Northern	0.8639	0.8514	0.8164	0.8281	0.8806
	North Western	0.9010	0.8488	0.8034	0.7711	0.7869
	Southern	0.8152	0.7574	0.7530	0.7416	0.8044
	Western	0.8786	0.8783	0.8244	0.8279	0.8720
Area Type	Rural	0.8877	0.8693	0.8687	0.8538	0.8928
	Urban	0.4866	0.4529	0.4860	0.4571	0.4250
Gender of Head	Male	0.7196	0.6984	0.7050	0.7063	0.6870
	Female	0.8147	0.7822	0.7597	0.7565	0.7388

Source: Authors' own calculations.

5.6. Decomposition of Changes in Poverty

The interplay between economic growth, poverty and inequality is complex and shifts in one of the three factors can influence the strength and the nature of the relationship between the other two. Thus, while growth may have a beneficial impact on poverty, a shifting income distribution can

undermine or reverse poverty gains. In this section, we focus on decomposing shifts in poverty in Zambia over the period into two components, namely a growth component and a redistribution component.

Table 18 presents the results of two decompositions of the change in poverty headcount ratios (i.e. poverty rates, or P_0) between 1996 and 2015, and for a number of sub-periods within that time. The two approaches—the Datt and Ravallion approach, and the Shapley approach—decompose the change in poverty into a growth and a redistribution component.

Table 18. Decomposition of poverty headcount ratios into growth and redistribution components, using the 2010 poverty lines

Period	Component	Food Poverty Line		Overall Poverty Line	
		Estimate	Share (%)	Estimate	Share (%)
1996 (t=1) vs. 2015 (t=2)	Datt & Ravallion approach (Reference period: t=1)				
	Growth	-0.0827	641.5	-0.0946	235.2
	Redistribution	0.0572	-443.4	0.0235	-58.4
	Residual	0.0127	-98.2	0.0309	-76.8
	P_0 difference	-0.0129	100.0	-0.0402	100.0
	Datt & Ravallion approach (Reference period: t=2)				
	Growth	-0.0701	543.4	-0.0637	158.4
	Redistribution	0.0698	-541.5	0.0544	-135.2
	Residual	-0.0127	98.2	-0.0309	76.8
	P_0 difference	-0.0129	100.0	-0.0402	100.0
	Shapley approach				
	Growth	-0.0764	592.4	-0.0792	196.8
	Redistribution	0.0635	-492.4	0.0389	-96.8
	P_0 difference	-0.0129	100.0	-0.0402	100.0
1996 (t=1) vs. 1998 (t=2)	Datt & Ravallion approach (Reference period: t=1)				
	Growth	-0.0631	75.3	-0.0709	93.3
	Redistribution	-0.1095	130.5	-0.0981	129.1
	Residual	0.0887	-105.8	0.0931	-122.5
	P_0 difference	-0.0839	100.0	-0.0760	100.0
	Datt & Ravallion approach (Reference period: t=2)				
	Growth	0.0256	-30.5	0.0221	-29.1
	Redistribution	-0.0208	24.7	-0.0051	6.7
	Residual	-0.0887	105.8	-0.0931	122.5
	P_0 difference	-0.0839	100.0	-0.0760	100.0
	Shapley approach				
	Growth	-0.0188	22.4	-0.0244	32.1
	Redistribution	-0.0651	77.6	-0.0516	67.9
	P_0 difference	-0.0839	100.0	-0.0760	100.0
1998 (t=1) vs. 2004 (t=2)	Datt & Ravallion approach (Reference period: t=1)				
	Growth	-0.0705	8 854.0	-0.0715	934.8
	Redistribution	0.0451	-5 664.7	0.0385	-503.5
	Residual	0.0246	-3 089.3	0.0253	-331.2
	P_0 difference	-0.0008	100.0	-0.0077	100.0
	Datt & Ravallion approach (Reference period: t=2)				
	Growth	-0.0459	5 764.7	-0.0462	603.5
	Redistribution	0.0697	-8 753.9	0.0639	-834.8
	Residual	-0.0246	3 089.3	-0.0253	331.2
	P_0 difference	-0.0008	100.0	-0.0077	100.0
	Shapley approach				
	Growth	-0.0582	7 309.3	-0.0589	769.1
	Redistribution	0.0574	-7 209.3	0.0512	-669.1
	P_0 difference	-0.0008	100.0	-0.0077	100.0

(cont.)

Period	Component	Food Poverty Line		Overall Poverty Line	
		Estimate	Share (%)	Estimate	Share (%)
2004 (t=1) vs. 2010 (t=2)	Datt & Ravallion approach (Reference period: t=1)				
	Growth	0.0023	145.0	0.0041	-156.2
	Redistribution	-0.0011	-68.8	-0.0043	164.0
	Residual	0.0004	23.7	-0.0024	92.2
	P_0 difference	0.0016	100.0	-0.0026	100.0
	Datt & Ravallion approach (Reference period: t=2)				
	Growth	0.0026	168.8	0.0017	-64.0
	Redistribution	-0.0007	-45.1	-0.0067	256.2
	Residual	-0.0004	-23.7	0.0024	-92.2
	P_0 difference	0.0016	100.0	-0.0026	100.0
	Shapley approach				
	Growth	0.0024	157.0	0.0029	-110.1
	Redistribution	-0.0009	-57.0	-0.0055	210.1
	P_0 difference	0.0016	100.0	-0.0026	100.0
2010 (t=1) vs. 2015 (t=2)	Datt & Ravallion approach (Reference period: t=1)				
	Growth	0.0352	98.3	0.0282	190.7
	Redistribution	0.0523	145.9	0.0307	207.7
	Residual	-0.0517	-144.2	-0.0441	-298.4
	P_0 difference	0.0358	100.0	0.0148	100.0
	Datt & Ravallion approach (Reference period: t=2)				
	Growth	-0.0165	-45.9	-0.0159	-107.7
	Redistribution	0.0006	1.7	-0.0134	-90.7
	Residual	0.0517	144.2	0.0441	298.4
	P_0 difference	0.0358	100.0	0.0148	100.0
	Shapley approach				
	Growth	0.0094	26.2	0.0061	41.5
	Redistribution	0.0265	73.8	0.0086	58.5
	P_0 difference	0.0358	100.0	0.0148	100.0

Source: Authors' own calculations.

Between 1996 and 2015, the P_0 difference is negative since poverty declined. The decompositions show that the effect of economic growth over the period was to lower poverty—the growth component accounted for between 150 percent and 240 percent of the total reduction in poverty—while the effect of the changing income distribution was to increase the poverty rate. During the 1996-1998 sub-period, the results suggest that the impact of growth and redistribution worked in the same direction, serving to reduce poverty. In contrast, during the 1998-2004 sub-period, growth and the changing income distribution worked strongly against each other: with virtually no change in the poverty headcount ratio, growth exerted a strong effect reducing poverty while the changing income distribution exerted a strong effect that raised poverty. Between 2004 and 2010, poverty declined slightly and, again, growth and the changing income distribution worked in opposite directions, with growth exerting a poverty-reducing effect. Finally, although P_0 increased slightly between 2010 and 2015, the two components worked in the same direction to generally raise poverty.

Overall, the changing Zambian income distribution served to raise the poverty rate during the 1998-2004, the 2004-2010 and the 2010-2015 sub-periods, but served to lower the poverty rate during the 1996-1998 sub-period. Thus, for the full period as a whole, the changing income distribution served to raise the poverty rate. The observed decline in the poverty rate for the full 1996-2015 period was, then, driven by economic growth, with the changing distribution slowing down progress towards reducing poverty.

5.7. Assessing Potential Inequality Impacts of Policy Interventions

In this section, we examine the simulated impact on inequality and poverty related to a policy intervention and a change in the labour market. The details of these two scenarios is presented

below. It is, though, important to note that these are very simple simulations that do not take into account dynamic or second round impacts of the hypothetical shocks. The intention is not to model these changes in minute detail; instead, our aim is to show the types of effects on inequality and poverty that can be expected.

5.7.1. Impact of extending the Child Grant Programme (CGP)

The first simulation involves an expansion of the Child Grant Programme (CGP). In 2010, the Ministry of Community Development, Mother and Child Health (MCDMCH) began implementation of the Child Grant Program in three districts with the highest child mortality rates (Kalabo, Kaputa and Shongombo). Households in these districts would receive 55 000 kwacha per month or 660 000 kwacha per annum per household (irrespective of household size, household income and the total number of eligible children in the household), providing there was at least one child aged 0-4 years in the household.[4] This amount is sufficient to purchase one meal a day for an average-sized household for one month (Handa et al., 2014: p. 8; UNICEF 2016).

Table 10 shows that a very low proportion of households reported receiving government grant income (in 2010, 0.7 percent of households reported non-zero grant income, rising to 1.5 percent in 2015). These rates are significantly lower than the proportion of eligible households: in 2010, 7.9 percent of households had at least one member aged between 0 and 4 years, and in 2015 this proportion was 5.6 percent (Table 19). In this first set of simulations, we vary three aspects of the programme and investigate the impact on poverty and inequality: first, we assume that take-up amongst age-eligible children is complete (100 percent); second, we extend the eligibility age from 4 years, to 7,10, 13 and then 17 years; and third, we allocate the grant to children—thereby allowing multiple children per household to receive the grant—rather than the current single allocation at the household level. This gives rise to the following 10 simulations:

[1] Holding the eligible age range unchanged, and assuming each eligible household receives 660 000 kwacha child grant income per annum;

[2] Holding the eligible age range unchanged, and assuming each eligible child in the household receives 660 000 kwacha child grant income per annum;

[3] Assuming the eligible age range is extended to 0-7 years, and each eligible household receives 660 000 kwacha child grant income per annum;

[4] Assuming the eligible age range is extended to 0-7 years, and each eligible child in the household receives 660 000 kwacha child grant income per annum;

[5] Assuming the eligible age range is extended to 0-10 years, and each eligible household receives 660 000 kwacha child grant income per annum;

[6] Assuming the eligible age range is extended to 0-10 years, and each eligible child in the household receives 660 000 kwacha child grant income per annum;

[7] Assuming the eligible age range is extended to 0-13 years, and each eligible household receives 660 000 kwacha child grant income per annum;

[8] Assuming the eligible age range is extended to 0-13 years, and each eligible child in the household receives 660 000 kwacha child grant income per annum;

[4] At current exchange rates, this is equivalent to roughly US$ 10.30 and US$ 123.85 respectively.

[9] Assuming the eligible age range is extended to 0-17 years, and each eligible household receives 660 000 kwacha child grant income per annum; and

[10] Assuming the eligible age range is extended to 0-17 years, and each eligible child in the household receives 660 000 kwacha child grant income per annum.

Table 19. Proportion of households with at least one eligible child

	1996	1998	2004	2010	2015
0-4 years	8.2	7.5	8.4	7.9	5.6
0-7 years	45.4	47.6	44.6	47.7	50.6
0-10 years	59.0	62.1	61.2	64.4	64.6
0-13 years	67.9	71.2	69.8	73.0	73.4
0-17 years	77.0	79.4	77.2	81.0	81.0

Source: Authors' own calculations.

For the purposes of the simulations, we assume that the CGP was in place for the entire period (i.e. since at least 1996) and that the grant amounts remained constant in real terms over the period at 621 908 kwacha in constant 2009 June prices. Notably, policy shifts in this area typically come with significant additional costs to the fiscus. We do not, though, explicitly consider the fiscal feasibility or sustainability of the policy changes here, nor do we consider the various other political economy considerations that would make such changes feasible to implement or not. Further, we do not take into account the potential impacts of these programmatic changes to the dynamics of household formation.

In conducting the simulations, grant income is adjusted at the household level according to the adjusted eligibility criteria and the adjusted programme design. Since the process of intrahousehold resource allocation is complex, we assume that these additional resources are allocated on either a per capita or an adult equivalent basis (in line with our estimates throughout this paper). We then compare the original poverty and inequality estimates (the baseline estimates) with the new estimates derived on the basis of this additional income.

The Gini coefficients after the simulation exercises in the five surveys are presented in Table 20. First, there are only negligible changes in the coefficients between the baseline estimates and the estimates under the current eligibility criteria (i.e. simulation [1]). Even if one of the eligibility criteria is relaxed (each eligible child instead of household would receive the grant income, i.e. simulation [2]), the Gini estimates are virtually unchanged compared with estimates derived from simulation [1]. However, with the extension of the eligible age range, the Gini coefficients begin to fall. Inequality is lowest in simulation [10], where each eligible child receives the grant income, and the eligible age is extended to 17 years. For instance, using income per capita, the 1996 Gini coefficient drops from the baseline estimate of 0.700 to 0.614 (using the revised income variable derived from simulation [10]), while the decline in 2015 is from 0.735 to 0.662. Furthermore, regardless of which simulation is conducted, the overall inequality trend remains the same: the Gini coefficient first shows an upward trend until 2004 and falls thereafter, but the 2015 estimate remains above the 1996 estimate.

Table 20. Gini coefficients assuming changes to the Child Grant Programme

Year	Simulation										
	Baseline	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Per capita income										
1996	0.700	0.697	0.696	0.680	0.673	0.673	0.653	0.669	0.634	0.666	0.614
1998	0.702	0.699	0.698	0.684	0.677	0.678	0.658	0.674	0.641	0.672	0.621
2004	0.753	0.750	0.750	0.738	0.732	0.733	0.714	0.730	0.699	0.728	0.683
2010	0.741	0.738	0.738	0.724	0.718	0.719	0.700	0.716	0.685	0.714	0.668
2015	0.735	0.733	0.733	0.718	0.712	0.713	0.694	0.711	0.679	0.709	0.662
	Income per adult equivalent										
1996	0.697	0.693	0.693	0.675	0.669	0.669	0.648	0.665	0.629	0.662	0.609
1998	0.699	0.696	0.695	0.680	0.674	0.674	0.654	0.671	0.637	0.668	0.618
2004	0.750	0.747	0.747	0.735	0.728	0.729	0.710	0.727	0.695	0.725	0.679
2010	0.737	0.734	0.733	0.719	0.713	0.714	0.694	0.712	0.679	0.710	0.662
2015	0.731	0.729	0.729	0.713	0.706	0.709	0.688	0.706	0.673	0.704	0.656

Source: Authors' own calculations.

Similar findings are observed in terms of poverty headcount ratios (Table 21). There is a negligible decrease in the ratios even if the current eligibility criteria are applicable nationally (i.e. simulation [1]). However, as the criteria are relaxed, greater poverty impacts are observed. The biggest decline takes place in simulation [10]: for example, at the food poverty line, the 1996 poverty rate is 0.600 in the baseline scenario and falls to 0.530 in simulation [10]; similarly, the 2015 baseline poverty headcount ratio is 0.587, falling to 0.524 in simulation [10]. Finally, the poverty trend over time in all 10 simulations is quite similar to what is observed using the baseline estimates: a negligible decrease in poverty takes place using the food poverty line (the poverty headcount ratio drops by less than 0.020 in each scenario), while a slightly bigger decrease is found using the overall poverty line (the ratio decreases by approximately 0.040 in most scenarios).

Table 21. Poverty headcount ratios using the 2010 poverty lines, assuming changes to the Child Grant Programme

Year	Simulation										
	Baseline	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
	Per capita income										
1996	0.600	0.598	0.598	0.587	0.581	0.585	0.566	0.582	0.549	0.580	0.530
1998	0.579	0.578	0.578	0.564	0.560	0.561	0.544	0.559	0.528	0.557	0.509
2004	0.593	0.590	0.590	0.579	0.572	0.574	0.554	0.572	0.537	0.571	0.516
2010	0.595	0.592	0.592	0.580	0.574	0.576	0.556	0.573	0.536	0.570	0.512
2015	0.587	0.585	0.585	0.574	0.568	0.569	0.552	0.567	0.540	0.566	0.524
	Income per adult equivalent										
1996	0.738	0.737	0.737	0.730	0.728	0.729	0.719	0.727	0.708	0.725	0.696
1998	0.715	0.713	0.713	0.708	0.704	0.707	0.697	0.706	0.690	0.705	0.678
2004	0.719	0.718	0.718	0.712	0.710	0.710	0.701	0.709	0.693	0.708	0.685
2010	0.716	0.715	0.715	0.710	0.706	0.707	0.698	0.706	0.692	0.705	0.683
2015	0.697	0.696	0.696	0.689	0.687	0.686	0.677	0.686	0.671	0.684	0.664

Source: Authors' own calculations.

To conclude, it is clear that a grant programme such as the CGP can have a significant impact on inequality and poverty in Zambia, as has been the experience in various other developing countries. In contexts where receipt of the grant is not conditional on passing a means test, broadening eligibility and increasing the grant value are two of the key mechanisms in ensuring a non-negligible impact on inequality and poverty. The results of the simulations presented here show that the incarnation of the CGP that would have the most significant impact on inequality and poverty reduction is simulation [10], the simulation that pays the largest grant amount to children who fall within the widest age

range. These gains in terms of inequality and poverty, though, would come at a significant cost to the state (Table 22).

Table 22. Cost associated with changes to the Child Grant Programme, billions of kwacha (constant 2009 June prices)

Year	Simulation									
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1996	92.0	95.2	511.1	675.3	663.6	1 198.6	764.1	1 693.3	865.7	2 325.3
1998	87.6	101.1	555.6	760.5	725.9	1 366.0	831.1	1 928.2	927.8	2 643.5
2004	110.3	114.6	584.0	808.8	802.8	1 516.0	915.9	2 158.4	1 012.4	2 902.1
2010	122.9	130.4	738.7	991.0	997.1	1 836.2	1 130.1	2 572.2	1 254.3	3 511.7
2015	105.6	109.3	948.7	1 283.7	1 211.3	2 267.1	1 376.5	3 142.9	1 518.4	4 230.5

Source: Authors' own calculations.

Note: Costs calculated with grant value of 621 908 kwacha (constant 2009 June prices).

5.7.2. Impact of greater labour absorption of the highly educated labour force

From the analysis in Section 5.2, it was found that wage income as proportion of total household income increased over the period between 1996 and 2015 (Table 12), and that wage income was the income source with the greatest contribution to the Gini coefficient (Table 15). However, despite the structural changes in the economy and increased demand for more educated workers in the services industries in particular (see Figure 4), it is surprising that there was an upward trend (in both absolute and relative terms) of households with at least one unemployed member with at least complete secondary education (Table 23). Thus, while in 1996 only 1.9 percent of households had at least one unemployed member who had at least complete secondary education, by 2015 this had risen to 7.4 percent.

Table 23. Proportion of households with at least one unemployed member with at least complete secondary education

	1996	1998	2004	2010	2015
Number of households	33 560	60 461	17 437	137 558	223 562
Proportion of households (%)	1.9	3.2	0.8	5.5	7.4
Mean additional annual household income, affected households only (Kwacha millions, June 2009 prices)	11.3	13.1	13.0	14.0	19.8
Mean additional annual household income, all households (Kwacha millions, June 2009 prices)	0.2	0.4	0.1	0.8	1.5

Source: Authors' own calculations.

Unemployment represents a significant loss at both the individual and societal level. At the individual level, unemployed workers are unable to earn wage income in the labour market, with potentially significant effects on both individual and household welfare. At the societal level, unemployment results in lost production and lost tax revenue, with households affected by unemployment often being reliant on assistance from the state. In both instances, unemployment represents—at some level—a loss in terms of the investments made by individuals, households and society in education, which are larger the higher the educational attainment of the unemployed. Hence, a second simulation exercise is conducted here by investigating the impact on inequality and poverty had the unemployed with at least completed secondary education been able to successfully find wage employment.

In conducting these simulations, we assume that all unemployed individuals with at least complete secondary education find wage employment and earn wage income. We therefore effectively assume full employment for this group of individuals conditional on their labour force participation, i.e. these

individuals must be unemployed in the data as opposed to being not economically active. The wage that is assigned to these individuals is equal to the median wage of the employed with the same broad level of educational attainment. For example, the median wage for employed individuals with bachelor degrees, for example, in a given year is allocated unemployed individuals with bachelor degrees when we shift them into employment in the simulation. As with the CGP simulations, we allocate this additional wage income at the household level, meaning that it is shared by all members of the household.

The results of the simulation are presented in Table 24, and it can be seen that the effects of such a change in the labour market would generally have only a very small impact on inequality and poverty. The results are not surprising, given the high likelihood that highly educated unemployed individuals are members of households at the upper end of the income distribution, and that the number of affected individuals is small. In other words, in order to more significantly reduce inequality and poverty, a more appropriate policy would be increasing the education and skills levels of the less educated labour force coming from the households at the lower end of the income distribution, and subsequently their likelihood to find wage employment.

Table 24. Gini coefficients and poverty headcount ratios assuming changes in reducing unemployment amongst those with at least complete secondary education, using per capita income

Year	Gini Coefficient		Poverty Headcount Ratio	
	Baseline	Simulation	Baseline	Simulation
1996	0.7005	0.6983	0.6001	0.5927
1998	0.7016	0.6997	0.5789	0.5688
2004	0.7532	0.7522	0.5934	0.5904
2010	0.7407	0.7369	0.5948	0.5785
2015	0.7354	0.7273	0.5865	0.5600

Source: Authors' own calculations.

6. Conclusion

Zambia, like many other developing countries around the world, faces significant challenges in achieving a pattern of inclusive growth that leads to rising incomes, falling rates of poverty and a more equitable distribution of resources. This is particularly true in the current era of slowing global growth. Zambia's challenge is compounded by the current environment of lower commodity prices and export volumes.

This primary focus of this paper is the changing patterns of income inequality in Zambia over the past two decades, and the interactions between economic growth, income inequality and poverty. Income inequality was found to have increased during the first part of the period—the Gini coefficient rose from 0.700 in 1996 to 0.753 in 2004—and declined thereafter, falling to 0.735 in 2015. Nevertheless, income inequality was slightly higher in 2015 than it was in 1996, despite a near doubling of real GDP per capita from US$ 925 to US$ 1 619 (2010 prices) as the Zambian economy shifted away from labour-intensive sectors towards sectors that are typically capital-intensive, urban-biased, and that require few new jobs for growth.

In line with rapid growth in real GDP per capita, aggregate wage income expanded quickly over the period, averaging 5.2 percent per annum. Self-employment income also expanded relatively rapidly, with incomes in agriculture growing at 5.3 percent per annum compared with 4.2 percent for non-agricultural self-employment income. Despite this, only a minority of Zambian households report receiving wage income at all. In 2015, just 27.4 percent of households reported receiving wage income. In contrast, 46.0 percent of households reported receiving agricultural self-employment income, while 48.4 percent reported receiving non-agricultural self-employment income. In aggregate terms, government grants play virtually no role in contributing to aggregate household income: just 1.5 percent of households reported non-zero grant income in 2015, while grants accounted for just 0.4 percent of total household income in the same year.

The very unequitable distribution of income in Zambia is illustrated by the fact that, in 2015, 50.8 percent of income accrues to the richest ten percent of households, which are home to just 7.7 percent of the population. This is largely on the back of a steep gradient in terms of access to wage income across the household income distribution: in decile 10 (the richest 10 percent of households), 64.7 percent of total household income derives from wages, compared to 24.5 percent in decile 7 and just 1.9 percent in decile 4. Poor households typically rely on agricultural self-employment income, with this income source accounting for 87.9 percent of total household income in decile 2.

Despite this, the growth incidence curve analysis suggests that growth between 1996 and 2015 was pro-poor in relative terms in that the most rapid rates of income growth are observed for the poorest households. However, income growth between the 20th and 60th percentiles was relatively slow, but accelerates as one moves up the income distribution from the 60th percentile onwards. This suggests a compression of the lower end of the income distribution, with the poorest households 'catching up' to households in the middle of the distribution, combined with a stretching of the upper end of the income distribution.

While a relatively small proportion of households reported receiving wage income, wages are identified as one of the primary drivers of inequality through the decomposition of the Gini coefficient by income source. Wage income accounts for 49.2 percent of income inequality in 1996, rising to 58.9 percent in 2015. Non-agricultural self-employment accounts for 30.9 percent of inequality in 2015; thus, together, these two income sources account for 89.8 percent of total income inequality. A more detailed decomposition that accounts for the industries in which wages are earned mirrors the broader economic shift away from primary and, to a lesser extent, secondary sectors towards the

tertiary sector. Wage income from agriculture accounted for 11.7 percent of inequality in 1996, and by 2015 it was financial services that contributed 26.3 percent to total inequality.

In terms of poverty, the data shows a gradual decline in poverty rates over the period, when using the 2010 poverty line for all surveys, and a more rapid decline when using year-specific poverty lines. Both the Datt and Ravallion decomposition and the Shapley decomposition point to the fact that changes in the Zambian income distribution served to raise the poverty rate during the three out of the four sub-periods (1998-2004, 2004-2010 and 2010-2015), but served to lower the poverty rate only during the 1996-1998 sub-period. However, for the full 1996-2015 period, changes in the income distribution served to slow the decline in poverty driven by economic growth.

The final section of the paper considered the impact on inequality and poverty of expanding the Child Grant Programme, and of achieving full employment amongst unemployed individuals with at least completed secondary education. The results of the former set of simulations suggest that poverty and inequality could be reduced by expanding the CGP, whether in terms of age eligibility or in terms of allocating grants per child rather than per household. However, these gains would come at significant cost to the state. The latter set of simulations finds no real benefit in terms of either income inequality or poverty, since the targeted unemployed individuals are typically located within relatively high income households.

What, then, do these findings suggest for policymakers? First, the results suggest that raising incomes for the self-employed in agriculture has the potential to make significant impacts on both inequality and poverty. This is because of the large proportion of households that report receiving agricultural self-employment income, even though only 5.6 percent of total household income is derived from this source in 2015. Improvements here are likely to have strong poverty-reducing effects—whether in terms of poverty rates, or the depth of poverty—given the heavy reliance of the poorest households on this source of income, with positive implications for inequality.

Second, the importance of wage income in enabling households to escape poverty is clear, with the contribution of wage income to total household income in the bottom five deciles being in the low single digits in 2015. Thus, providing an environment that is conducive to the creation of wage employment should arguably be a key priority for the Zambian government. Importantly, though, care should be taken to ensure that capital-intensive industries with low labour-absorptive capacity should not be prioritised at the expense of more labour-intensive industries. At the same time, attention should be paid to ensuring that Zambia capitalises on the skills that exist within the country.

Finally, from the perspective of addressing income inequality, attention should be paid to inequality within the wage income sectors, with the Gini decompositions suggesting that financial services, utilities, and wholesale and retail trade probably deserve particular attention. These industries are key drivers of overall income inequality: wage income from these three sectors alone account for almost 41 percent of overall inequality.

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Appendix

Table 25. Poverty lines (per annum per adult equivalent, kwacha)

	Pre-2015 Weights		2015 Weights		
	Monthly	Annually	Monthly	Annually	Annually (June 2009 prices)
Cost of food basket per family of 6	686 000	8 232 000	686 000	8 232 000	
Adult equivalents per family of 6	4.52	4.52	4.60	4.60	
Food poverty line per AE	152 000	1 824 000	149 000	1 788 000	1 190 888
Non-food component per AE	62 000	744 000	62 000	744 000	495 537
Total poverty line per AE	214 000	2 568 000	211 000	2 532 000	1 686 426

Source: MacDonald 2012: 12 & 17; World Bank 2015: 9; authors' own calculations.

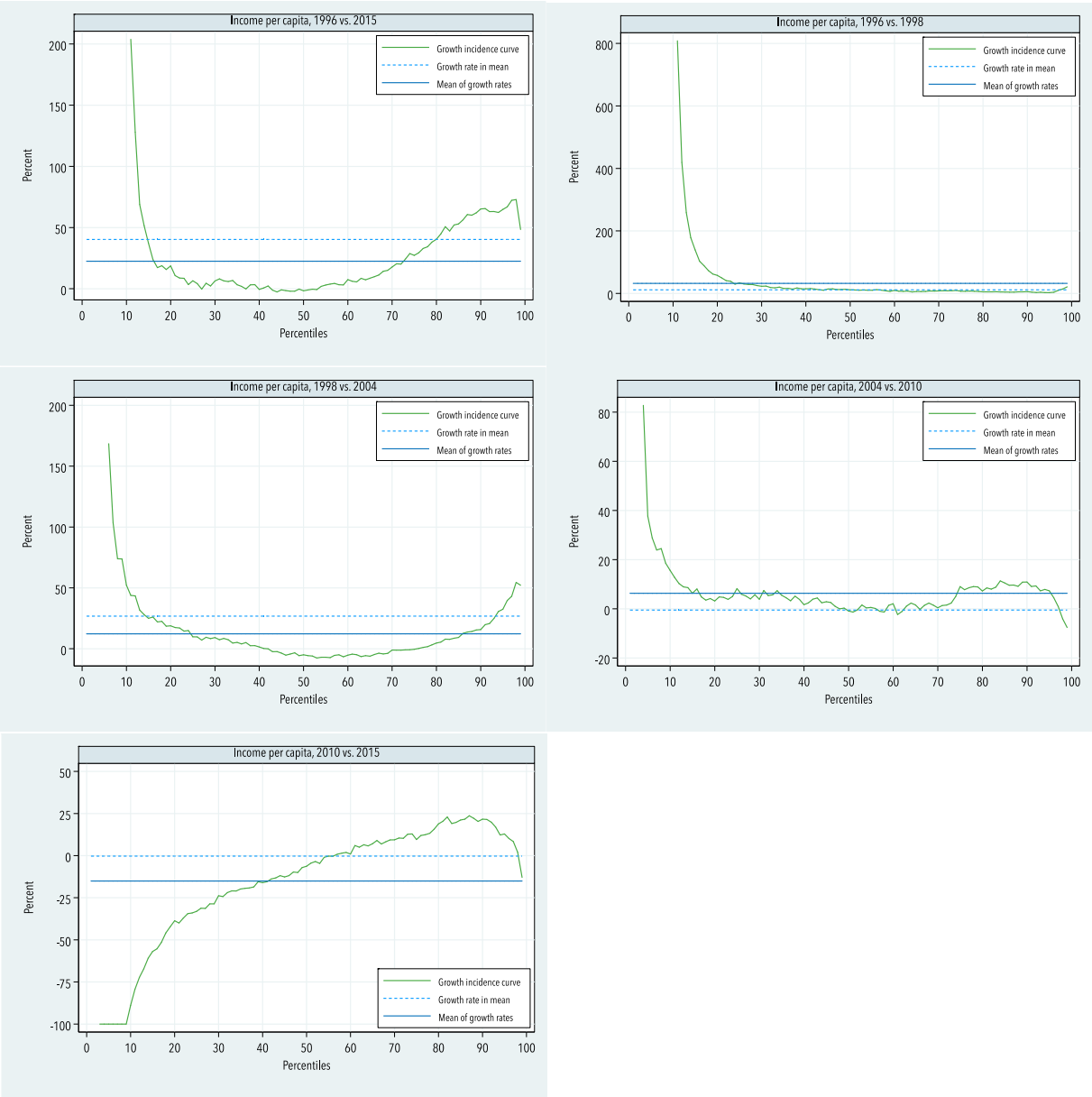
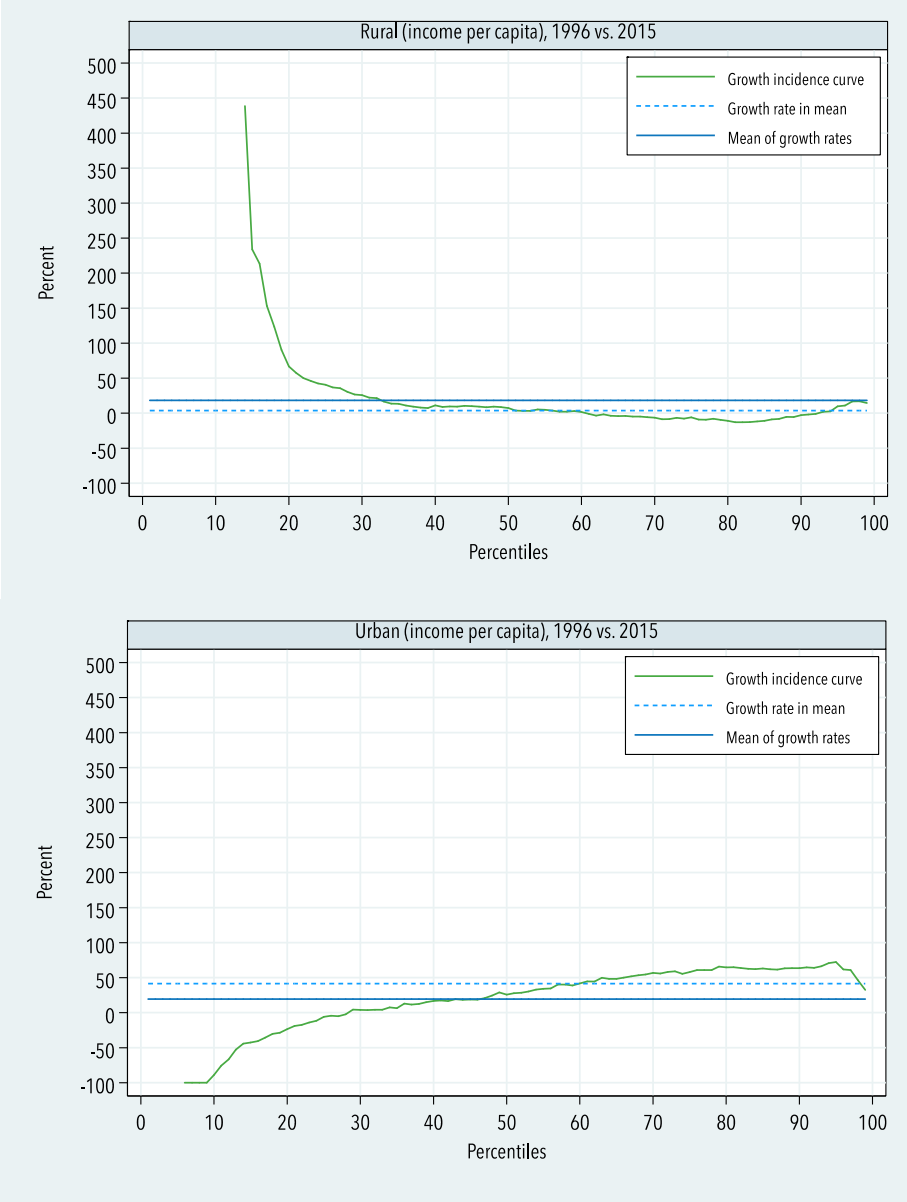


Figure 10. Growth Incidence Curves, using per adult equivalent income

Source: Authors' own calculations.

Figure 11. Growth Incidence Curves by area type using per capita income, 1996 vs. 2015



Source: Authors' own calculations.

Table 26. Gini decomposition by income source using income per adult equivalent

Year	Income Source	Gini Correlation	Gini Index	Absolute Contribution	Relative Contribution
1996	Self-employment: agriculture	0.3319	0.8820	0.0146	2.1
	Self-employment: non-agriculture	0.8207	0.8728	0.2590	37.1
	Wage income	0.8817	0.8360	0.3435	49.3
	Remittances	0.5613	0.9357	0.0252	3.6
	Transfer payments	0.7698	0.9615	0.0552	7.9
	TOTAL			0.6975	100.0
1998	Self-employment: agriculture	0.4041	0.8397	0.0283	4.0
	Self-employment: non-agriculture	0.8389	0.8753	0.2624	37.5
	Wage income	0.8800	0.8679	0.3045	43.5
	Remittances	0.6254	0.9521	0.0254	3.6
	Grants	0.7574	0.9977	0.0029	0.4
	Capital income	0.7692	0.9772	0.0209	3.0
	Other	0.7115	0.9024	0.0555	7.9
	TOTAL			0.6998	100.0
2004	Self-employment: agriculture	0.5172	0.8585	0.0351	4.7
	Self-employment: non-agriculture	0.8310	0.8996	0.2118	28.2
	Wage income	0.9157	0.8914	0.3665	48.8
	Remittances	0.6547	0.9357	0.0348	4.6
	Grants	0.8310	0.9974	0.0039	0.5
	Capital income	0.8928	0.9882	0.0380	5.1
	Other	0.7695	0.9367	0.0606	8.1
	TOTAL			0.7506	100.0
2010	Self-employment: agriculture	0.3982	0.8224	0.0223	3.0
	Self-employment: non-agriculture	0.8025	0.8877	0.1787	24.3
	Wage income	0.9288	0.8892	0.3869	52.5
	Remittances	0.6367	0.9311	0.0350	4.8
	Grants	0.7617	0.9981	0.0018	0.2
	Capital income	0.8606	0.9827	0.0371	5.0
	Other	0.7607	0.9169	0.0749	10.2
	TOTAL			0.7367	100.0
2015	Self-employment: agriculture	0.2877	0.8285	0.0134	1.8
	Self-employment: non-agriculture	0.8471	0.8015	0.2259	30.9
	Wage income	0.9586	0.8785	0.4313	59.0
	Remittances	0.5594	0.9360	0.0157	2.2
	Grants	0.7491	0.9945	0.0029	0.4
	Capital income	0.7856	0.9739	0.0217	3.0
	Other	0.6079	0.9097	0.0203	2.8
	TOTAL			0.7312	100.0

Source: Authors' own calculations, based on Lerman and Yitzhaki (1985).

Table 27. Gini coefficients and poverty headcount ratios assuming changes in reducing unemployment amongst those with at least complete secondary education, using income per adult equivalent

Year	Gini Coefficient		Poverty Headcount Ratio	
	Baseline	Simulation	Baseline	Simulation
1996	0.6971	0.6947	0.7383	0.7305
1998	0.6987	0.6966	0.7147	0.7012
2004	0.7505	0.7495	0.7192	0.7156
2010	0.7366	0.7327	0.7162	0.6957
2015	0.7312	0.7227	0.6971	0.6659

Source: Authors' own calculations.

Table 28. Gini decomposition by income source with employment industry detail, using income per capita

Year	Income Source	Income Share	Gini Correlation	Gini Index	Absolute Contribution	Relative Contribution
1996	Self-employment: agriculture	5.0	0.3359	0.8821	0.0148	2.1
	Self-employment: non-agriculture	36.2	0.8229	0.8740	0.2600	37.1
	Wage income	46.6				49.2
	- Agriculture (main job)	10.0	0.8468	0.9705	0.0819	11.7
	- Mining (main job)	2.5	0.7524	0.9902	0.0183	2.6
	- Manufacturing (main job)	0.5	0.7686	0.9977	0.0041	0.6
	- Elec, water, gas (main job)	2.1	0.7485	0.9921	0.0156	2.2
	- Construction (main job)	2.7	0.6922	0.9845	0.0185	2.6
	- Wholesale & retail (main job)	4.7	0.7930	0.9828	0.0365	5.2
	- Transp, stor, comm (main job)	5.5	0.7408	0.9762	0.0395	5.6
	- Financial services (main job)	5.2	0.6644	0.9642	0.0330	4.7
	- CSP services (main job)	2.2	0.6760	0.9869	0.0145	2.1
	- Private households (main job)	2.0	0.4879	0.9807	0.0095	1.4
	- Other/unspecified (main job)	0.0	0.7342	0.9999	0.0000	0.0
	- Secondary job	9.4	0.8266	0.9459	0.0731	10.4
	Remittances	4.8	0.5690	0.9369	0.0256	3.7
	Miscellaneous	7.5	0.7724	0.9619	0.0554	7.9
	TOTAL	100.0			0.7005	100.0
2004	Self-employment: agriculture	7.5	0.5119	0.8585	0.0328	4.3
	Self-employment: non-agriculture	26.7	0.8239	0.9003	0.1981	26.1
	Wage income	48.1				52.5
	- Agriculture (main job)	5.6	0.8178	0.9838	0.0451	6.0
	- Mining (main job)	1.3	0.7983	0.9960	0.0101	1.3
	- Manufacturing (main job)	0.5	0.8749	0.9991	0.0044	0.6
	- Elec, water, gas (main job)	4.0	0.8977	0.9946	0.0361	4.8
	- Construction (main job)	2.6	0.7606	0.9879	0.0192	2.5
	- Wholesale & retail (main job)	5.9	0.8686	0.9877	0.0506	6.7
	- Transp, stor, comm (main job)	5.9	0.8248	0.9811	0.0478	6.3
	- Financial services (main job)	9.2	0.8343	0.9683	0.0741	9.8
	- CSP services (main job)	2.8	0.7791	0.9898	0.0219	2.9
	- Private households (main job)	2.3	0.6703	0.9852	0.0155	2.0
	- Other/unspecified (main job)	0.0	0.5212	0.9999	0.0000	0.0
	- Secondary job	7.9	0.9329	0.9924	0.0733	9.7
	Remittances	5.4	0.6519	0.9366	0.0327	4.3
	Grants	0.4	0.8280	0.9974	0.0037	0.5
	Capital income	4.1	0.8915	0.9884	0.0357	4.7
	Other	7.9	0.7665	0.9372	0.0569	7.5
	TOTAL	100.0			0.7580	100.0

(cont.)

Year	Income Source	Income Share	Gini Correlation	Gini Index	Absolute Contribution	Relative Contribution
2010	Self-employment: agriculture	6.8	0.4054	0.8225	0.0227	3.1
	Self-employment: non-agriculture	25.1	0.8055	0.8887	0.1796	24.3
	Wage income	46.9				52.5
	- Agriculture (main job)	1.4	0.7923	0.9951	0.0110	1.5
	- Mining (main job)	0.8	0.8270	0.9975	0.0067	0.9
	- Manufacturing (main job)	1.7	0.8809	0.9961	0.0150	2.0
	- Elec, water, gas (main job)	5.8	0.7705	0.9743	0.0432	5.8
	- Construction (main job)	2.4	0.8577	0.9949	0.0208	2.8
	- Wholesale & retail (main job)	4.3	0.9375	0.9949	0.0404	5.5
	- Transp, stor, comm (main job)	0.5	0.8532	0.9985	0.0043	0.6
	- Financial services (main job)	18.6	0.8881	0.9510	0.1572	21.2
	- CSP services (main job)	1.6	0.7160	0.9894	0.0114	1.6
	- Private households (main job)	7.5	0.8216	0.9780	0.0606	8.2
	- Other/unspecified (main job)	0.5	0.8336	0.9987	0.0037	0.5
	- Secondary job	1.7	0.8476	0.9933	0.0141	1.9
	Remittances	5.9	0.6445	0.9323	0.0355	4.8
	Grants	0.2	0.7635	0.9982	0.0018	0.2
	Capital income	4.4	0.8648	0.9832	0.0373	5.0
	Other	10.7	0.7643	0.9178	0.0754	10.2
	TOTAL	100.0			0.7407	100.0
2015	Self-employment: agriculture	5.6	0.2969	0.8293	0.0138	1.9
	Self-employment: non-agriculture	33.3	0.8500	0.8038	0.2274	30.9
	Wage income	51.2				58.9
	- Agriculture (main job)	1.3	0.7691	0.9950	0.0097	1.3
	- Mining (main job)	1.1	0.8386	0.9965	0.0096	1.3
	- Manufacturing (main job)	2.0	0.8570	0.9948	0.0170	2.3
	- Elec, water, gas (main job)	8.9	0.8217	0.9652	0.0705	9.6
	- Construction (main job)	1.8	0.7764	0.9928	0.0135	1.8
	- Wholesale & retail (main job)	4.0	0.9101	0.9923	0.0359	4.9
	- Transp, stor, comm (main job)	0.4	0.9086	0.9991	0.0039	0.5
	- Financial services (main job)	22.0	0.9216	0.9520	0.1934	26.3
	- CSP services (main job)	1.4	0.7109	0.9895	0.0098	1.3
	- Private households (main job)	6.8	0.8494	0.9790	0.0567	7.7
	- Other/unspecified (main job)	0.0	0.0000	0.0000	0.0000	0.0
	- Secondary job	1.5	0.8638	0.9948	0.0130	1.8
	Remittances	3.0	0.5682	0.9372	0.0160	2.2
	Grants	0.4	0.7547	0.9946	0.0029	0.4
	Capital income	2.8	0.7920	0.9747	0.0219	3.0
	Other	3.7	0.6136	0.9106	0.0205	2.8
	TOTAL	100.0			0.7354	100.0

Source: *Authors' own calculations, based on Lerman and Yitzhaki (1985).*

Note: *Comparable figures for 1998 are not possible due to data problems.*

Table 29. Gini decomposition by income source with employment industry detail, using income per adult equivalent

Year	Income Source	Income Share	Gini Correlation	Gini Index	Absolute Contribution	Relative Contribution
1996	Self-employment: agriculture	5.0	0.3319	0.8820	0.0146	2.1
	Self-employment: non-agriculture	36.2	0.8207	0.8728	0.2590	37.1
	Wage income	46.6				49.3
	- Agriculture (main job)	10.0	0.8463	0.9703	0.0818	11.7
	- Mining (main job)	2.5	0.7490	0.9901	0.0182	2.6
	- Manufacturing (main job)	0.5	0.7678	0.9977	0.0041	0.6
	- Elec, water, gas (main job)	2.1	0.7453	0.9920	0.0156	2.2
	- Construction (main job)	2.7	0.6895	0.9843	0.0184	2.6
	- Wholesale & retail (main job)	4.7	0.7917	0.9826	0.0365	5.2
	- Transp, stor, comm (main job)	5.5	0.7386	0.9760	0.0394	5.7
	- Financial services (main job)	5.2	0.6620	0.9640	0.0329	4.7
	- CSP services (main job)	2.2	0.6726	0.9868	0.0144	2.1
	- Private households (main job)	2.0	0.4794	0.9804	0.0093	1.3
	- Other/unspecified (main job)	0.0	0.7106	0.9999	0.0000	0.0
	- Secondary job	9.4	0.8238	0.9451	0.0728	10.4
	Remittances	4.8	0.5613	0.9357	0.0252	3.6
	Miscellaneous	7.5	0.7697	0.9615	0.0552	7.9
	TOTAL	100.0			0.6975	100.0
2004	Self-employment: agriculture	7.5	0.5082	0.8585	0.0325	4.3
	Self-employment: non-agriculture	26.7	0.8220	0.8996	0.1974	26.1
	Wage income	48.1				52.6
	- Agriculture (main job)	5.6	0.8158	0.9837	0.0450	6.0
	- Mining (main job)	1.3	0.7956	0.9959	0.0101	1.3
	- Manufacturing (main job)	0.5	0.8734	0.9991	0.0044	0.6
	- Elec, water, gas (main job)	4.0	0.8969	0.9946	0.0360	4.8
	- Construction (main job)	2.6	0.7560	0.9876	0.0191	2.5
	- Wholesale & retail (main job)	5.9	0.8664	0.9875	0.0505	6.7
	- Transp, stor, comm (main job)	5.9	0.8223	0.9808	0.0477	6.3
	- Financial services (main job)	9.2	0.8309	0.9676	0.0738	9.8
	- CSP services (main job)	2.8	0.7771	0.9898	0.0218	2.9
	- Private households (main job)	2.3	0.6684	0.9851	0.0154	2.0
	- Other/unspecified (main job)	0.0	0.5253	0.9999	0.0000	0.0
	- Secondary job	7.9	0.9324	0.9923	0.0732	9.7
	Remittances	5.4	0.6464	0.9357	0.0324	4.3
	Grants	0.4	0.8266	0.9974	0.0036	0.5
	Capital income	4.1	0.8897	0.9882	0.0356	4.7
	Other	7.9	0.7639	0.9367	0.0567	7.5
	TOTAL	100.0			0.7554	100.0

(cont.)

Year	Income Source	Income Share	Gini Correlation	Gini Index	Absolute Contribution	Relative Contribution
2010	Self-employment: agriculture	6.8	0.3982	0.8224	0.0223	3.0
	Self-employment: non-agriculture	25.1	0.8025	0.8877	0.1787	24.3
	Wage income	46.9				52.5
	- Agriculture (main job)	1.4	0.7875	0.9950	0.0110	1.5
	- Mining (main job)	0.8	0.8245	0.9974	0.0066	0.9
	- Manufacturing (main job)	1.7	0.8783	0.9960	0.0150	2.0
	- Elec, water, gas (main job)	5.8	0.7657	0.9738	0.0430	5.8
	- Construction (main job)	2.4	0.8540	0.9948	0.0207	2.8
	- Wholesale & retail (main job)	4.3	0.9361	0.9948	0.0403	5.5
	- Transp, stor, comm (main job)	0.5	0.8489	0.9985	0.0043	0.6
	- Financial services (main job)	18.6	0.8857	0.9499	0.1566	21.3
	- CSP services (main job)	1.6	0.7086	0.9891	0.0113	1.5
	- Private households (main job)	7.5	0.8190	0.9776	0.0604	8.2
	- Other/unspecified (main job)	0.5	0.8291	0.9986	0.0037	0.5
	- Secondary job	1.7	0.8451	0.9931	0.0141	1.9
	Remittances	5.9	0.6367	0.9311	0.0350	4.8
	Grants	0.2	0.7617	0.9981	0.0018	0.2
	Capital income	4.4	0.8606	0.9827	0.0371	5.0
	Other	10.7	0.7607	0.9169	0.0749	10.2
	TOTAL	100.0			0.7367	100.0
2015	Self-employment: agriculture	5.6	0.2877	0.8285	0.0134	1.8
	Self-employment: non-agriculture	33.3	0.8471	0.8015	0.2259	30.9
	Wage income	51.2				59.0
	- Agriculture (main job)	1.3	0.7614	0.9948	0.0096	1.3
	- Mining (main job)	1.1	0.8334	0.9964	0.0095	1.3
	- Manufacturing (main job)	2.0	0.8540	0.9947	0.0169	2.3
	- Elec, water, gas (main job)	8.9	0.8185	0.9645	0.0702	9.6
	- Construction (main job)	1.8	0.7716	0.9926	0.0134	1.8
	- Wholesale & retail (main job)	4.0	0.9088	0.9922	0.0359	4.9
	- Transp, stor, comm (main job)	0.4	0.9069	0.9991	0.0039	0.5
	- Financial services (main job)	22.0	0.9196	0.9509	0.1927	26.4
	- CSP services (main job)	1.4	0.7052	0.9893	0.0097	1.3
	- Private households (main job)	6.8	0.8473	0.9787	0.0566	7.7
	- Other/unspecified (main job)	0.0	0.0000	0.0000	0.0000	0.0
	- Secondary job	1.5	0.8607	0.9946	0.0129	1.8
	Remittances	3.0	0.5594	0.9360	0.0157	2.2
	Grants	0.4	0.7491	0.9945	0.0029	0.4
	Capital income	2.8	0.7856	0.9739	0.0217	3.0
	Other	3.7	0.6079	0.9097	0.0203	2.8
	TOTAL	100.0			0.7312	100.0

Source: *Authors' own calculations, based on Lerman and Yitzhaki (1985).*

Note: *Comparable figures for 1998 are not possible due to data problems.*

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