TANZANIA MAINLAND POVERTY ASSESSMENT

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Acronyms and Abbreviations

DHS	Demographic and Health Survey
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
HBS	Household Budget Survey
HIV	Human Immunodeficiency Virus
MDG	Millennium Development Goal
NBS	National Bureau of Statistics
NGO	Nongovernmental Organization
NPS	National Panel Survey
PPP	Purchasing Power Parity
SSA	Sub-Saharan Africa
T Sh	Tanzanian shilling
UN	United Nations
WDI	World Development Indicators
WHO	World Health Organization

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Executive Summary

Since the early 2000s, Tanzania has seen remarkable economic growth and strong resilience to external shocks. Yet these achievements were overshadowed by the slow response of poverty to the growing economy. Until 2007, the poverty rate in Tanzania remained stagnant at around 34 percent despite a robust growth at an annualized rate of approximately 7 percent. This apparent disconnect between growth and poverty reduction has raised concerns among policy makers and researchers, leading to a consensus that this mismatch needed to be addressed with a sense of urgency.

Over the past few years, the National Strategy for Growth and Reduction of Poverty (MKUKUTA) in Tanzania has given high priority to eradicating extreme poverty and promoting broad-based growth. Achieving pro-poor growth has also been widely recognized by the World Bank as a critical strategy for accelerating progress toward its twin goals of eliminating extreme poverty at the global level by 2030 and boosting shared prosperity by fostering income growth among the bottom 40 percent in every country.

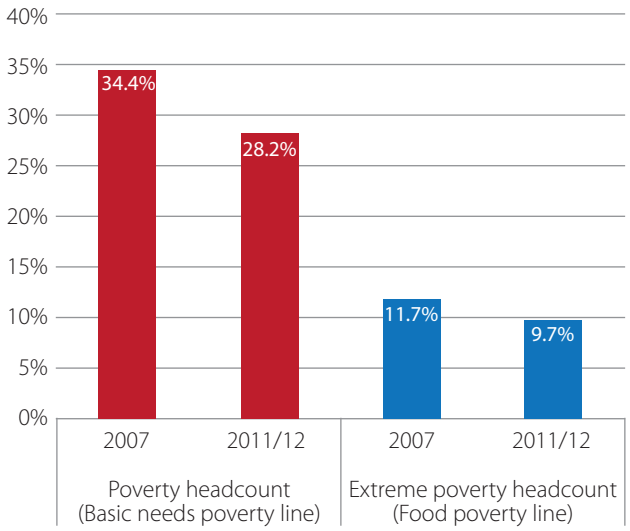
The official poverty figures announced by the government in November 2013 have revealed that the national strategy against poverty has begun to facilitate reductions. The *basic needs* poverty rate has declined from around 34 percent to 28.2 percent between 2007 and 2012—the first significant decline in the last 20 years. Identifying the policy mechanisms that have helped to increase the participation of the poor in the growth process and to speed pro-poor growth is therefore important for present and future decision-making in Tanzania on how best to eradicate poverty. Such task requires a rigorous analysis of the evolution of poverty and of the linkages between poverty, inequality, and economic growth. This report uses the availability of the new Tanzanian Household Budget Survey (HBS) for 2011/12, as well as the new rebased GDP figures released in December 2014, as an opportunity to address these issues. More specifically, the report examines the recent trends in poverty and inequality and their determinants and explores how responsive poverty reduction was to economic growth and the obstacles to achieving it.

Poverty and Extreme Poverty Have Declined since 2007

Basic needs poverty declined from 34.4 percent to 28.2 percent between 2007 and 2011/12 and extreme poverty declined from 11.7 percent to 9.7 percent. The figures come from the HBS's consumption-based headcount index, which measures the proportion of the population with a consumption level below the poverty line—28.2 percent of Tanzanians could not meet their basic consumption needs. The 9.7 percent of the population that is extremely poor cannot afford to buy basic foodstuffs to meet their minimum nutritional requirements of 2,200 kilocalories (Kcal) per adult per day.

These poverty figures are estimated using, respectively, the national basic needs poverty line of T Sh 36,482 per adult per month and the national food poverty line of T Sh 26,085 per adult per month.

Figure ES.1 Poverty and Extreme Poverty Incidence



Source: HBS 2007 and 2011/12.

The depth and severity of poverty declined even more strongly. *Depth* and *severity* capture the gaps between poor households' consumption level and the poverty line. They declined by 35 and 48 percent, respectively. In other words, in addition to a decline in the share of the population living in poverty, Tanzania also witnessed a reduction in the level of deprivation of those who remained in poverty. This suggests that poor households were able to reduce their consumption shortfall relative to the poverty line and that gains were larger amongst the poorest groups.

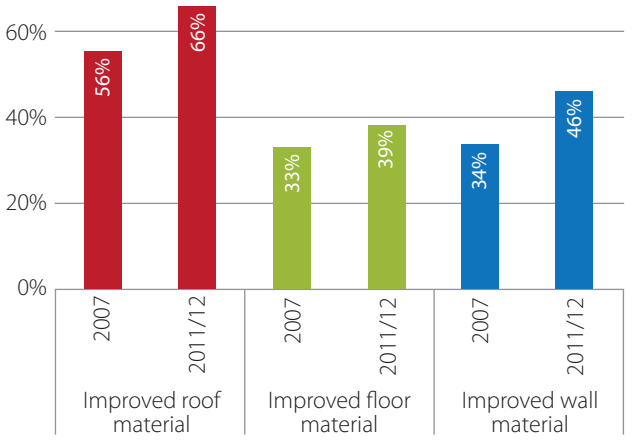
The analysis of the poverty trend is challenged by changes in the HBS design, but the adjustments made to counter the change in design support the decline of poverty. Assessing the changes in poverty levels over time is subject to issues of comparability stemming from changes in the survey design and methodological improvements implemented during the 2011/12 HBS. These issues were addressed using different methods, including the reevaluation of the consumption aggregates for HBS 2007 using the same approach as in 2011/12, as well as nonparametric and parametric imputation procedures. The different adjustment methods support the decline of poverty and extreme poverty and show that poverty has dropped by approximately 1 percentage point per year between 2007 and 2011/12.

Household Living Conditions and Human Development Outcomes Have Improved from Low Levels

The reduction in poverty was coupled with improvements in living conditions, though from low levels. All households saw large improvements, between 2007 and 2011/12 in their housing conditions and modern amenities such as television sets and mobile phones (Figure ES.2). Ownership of agricultural land improved as well, but possession of productive assets such as mechanized equipment and big livestock is still limited. While these improvements were experienced mainly by less well-off households, members of those households continue to suffer from different forms of deprivations. More than half of the poor and rural dwellers still live in pitiable housing conditions and lack important assets. Access to basic infrastructure (electricity, piped water) also remains limited.

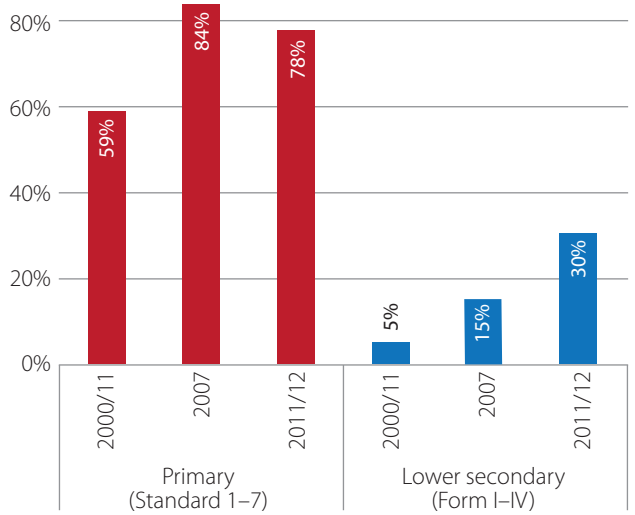
Human development outcomes such as education, health, and nutrition improved as well, but overall levels remain low. Enrolments in primary education increased markedly in 2001–7 but declined slightly in 2007–11/12 (Figure ES.3). However, there has been a remarkable expansion

Figure ES.2 Share of Households with Improved Housing Conditions



Source: HBS 2007 and 2011/12.

Figure ES.3 Net Education Enrolment Rates



Source: HBS 2001, 2007, and 2011/12.

in lower secondary education, albeit from very low levels. There are also growing quality concerns since education outcomes remain weak across all levels.

Infant mortality (per 1,000 live births) declined from 68 in 2004/05 to 51 in 2010, and mortality of children less than five years old declined from 112 to 81 during the same period. Improvements in maternal mortality have not been as significant, reflecting to some extent the lack of efficacy of the (public) health system and financial constraints of the poorest households.

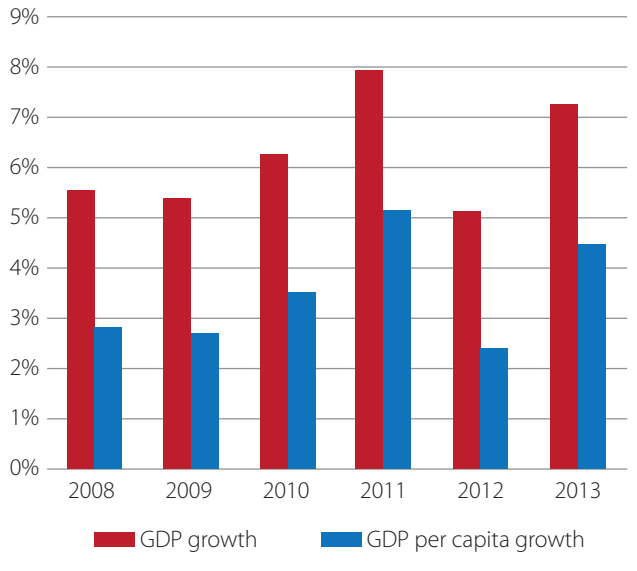
The welfare improvements did not hold across all household groups. Despite the decline of poverty and general improvements observed in households' living conditions, only 30 percent of the population has been able to significantly improve their economic status and move to higher welfare classes. Around 12 percent of those at the bottom of the consumption distribution remained trapped in chronic poverty. Around 13 percent of the population has moved down to the lowest quartile (bottom 25 percent) of the consumption distribution. The movement across the welfare classes occurred mainly among the households in the middle economic classes, with those lacking assets experiencing a worsening of their welfare and moving to lower economic status.

Poverty Has Become More Responsive to Growth

The poverty headcount appears to have declined just as economic growth has continued to expand since 2007. In December 2014, Tanzania released revised gross domestic product (GDP) figures with a base year of 2007 (Figure ES.4). GDP growth averaged 6.3 percent from 2008 to 2013, with a marked increase in volatility compared to the previous series of numbers. The new figures suggest a stronger impact of economic growth on poverty reduction than previously observed.

The magnitude of the poverty reduction response to economic growth, however, depends on how economic growth is defined. When growth is measured by changes in GDP per capita, the *growth elasticity* of poverty is –1.02 during 2007–2011/12—in other words, a 10 percent increase in GDP growth per capita can be expected to produce a 10.2 percent decrease in the proportion of the poor. When economic growth is defined using changes in mean household consumption calculated from HBS, however, the growth elasticity of poverty is –4.0 during the same period, indicating that an increase in household

Figure ES.4 Annual Growth in GDP and GDP per Capita (base year 2007)



Source: NBS, World Bank 2014.

mean consumption would have a higher impact on poverty reduction than would changes in GDP per capita. The Tanzania growth elasticity of poverty is higher than the available estimates of about –3.0 suggested by previous studies (using survey mean figures) on developing countries.

The difference between the estimates of the growth elasticity of poverty found with the different measures of economic growth is quite common in developing countries, but it seems to be larger in Tanzania. This is due to the discrepancy between the price deflators used to convert nominal GDP and household consumption values into real terms. The first measure uses the GDP deflator, which implies a much slower rate of inflation than price indices based on survey unit values and consequently a higher growth rate of real GDP per capita than of survey real mean household consumption. While there is no clear consensus on which of these measures of economic growth is more accurate, it seems that survey based data better reflect the spending behavior of the poor and regional differences in the cost of living.

There are emerging signs of pro-poor growth in Tanzania. The poor are found to have benefitted disproportionately from economic growth during the period 2007–2011/12, in sharp contrast to the period 2001–07, during which growth benefitted mainly the country's richer groups.

The relationship between growth and poverty involves changes both in mean consumption and in the distribution of consumption across households. The decline of poverty at the national level is due to an increase in mean household consumption as well as a reduction of inequality in the distribution of consumption between households, with the effect of inequality reduction being marginally more important than the effect of consumption growth. Household consumption growth contributes by 40 percent to poverty reduction, while the reduction of inequality contributes by 60 percent.

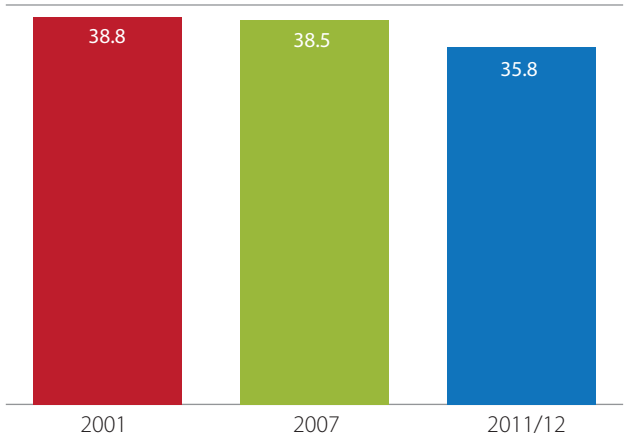
The emerging signs of pro-poor growth contrast with the nature of Tanzania's economic growth. The latter was driven mainly by fast-growing and relatively capital-intensive sectors (for example, finance, transport, and communications) that have limited capacity to create jobs. Agriculture, which represents the main source of livelihood for the vast majority of the poor, grew by only 4.2 percent per year in 2008–13, a lower rate than the overall economy of 6.3 percent. With growth mainly centered in national sectors where poorer Tanzanians are not particularly involved, the pro-poor growth would not be expected.

Pro-poor growth is actually the result of improvements in *endowments* and *returns* for poor households. Changes in peoples income and consumption over time can be broken down into changes in their personal characteristics or *endowments* (for example, increased education levels, ownership of land and other assets, and access to employment opportunities and basic services) and the *returns* that they get for those endowments (for example, the returns to education, land productivity, and so forth). Households in the 30 percent poorest groups experienced marked improvements in their endowments in assets, mainly transportation and communication means, and in education. The improvements in endowments were coupled with an increase of the returns to their economic activity—essentially nonagricultural businesses—as well as to community infrastructure, mainly local markets and roads, which have had a positive influence on needy households' living standards in recent years.

Consumption Inequality Remains Moderate and Fairly Stable

The Gini coefficient measures inequality in income or consumption expenditures across a nation's population; based on consumption per capita, it declined modestly in Tanzania during the last decade. The Gini coefficient of real per capita monthly consumption indicates that the level of inequality for Tanzania is approximately 36 in 2011/12, declining from around 39 in 2001–07 (Figure ES.5). The improvements in the distribution of consumption seem to be driven by an increase of the consumption share accruing to the 20 percent poorest segment of the population; this share grew by more than 16 percent between 2007 and 2011/12. The population groups in the second income quintile of the population

Figure ES.5 Income Inequity in Tanzania by Gini Coefficient, 2001–2011/12



Source: HBS 2001, 2007, and 2011/12.

experienced an increase in their consumption share by 5 percent, while those in top quintiles experienced a loss of around 4 percent.

Tanzania's inequality level compares favorably with Sub-Saharan Africa and less developed countries. Tanzania's Gini coefficient is below the Sub-Saharan Africa average of 45.1 (Figure ES.6) and the low-income countries average of 40. It is on par with levels of inequality in South and East Asia, which range around 38.4, and significantly lower than inequality levels in South America.

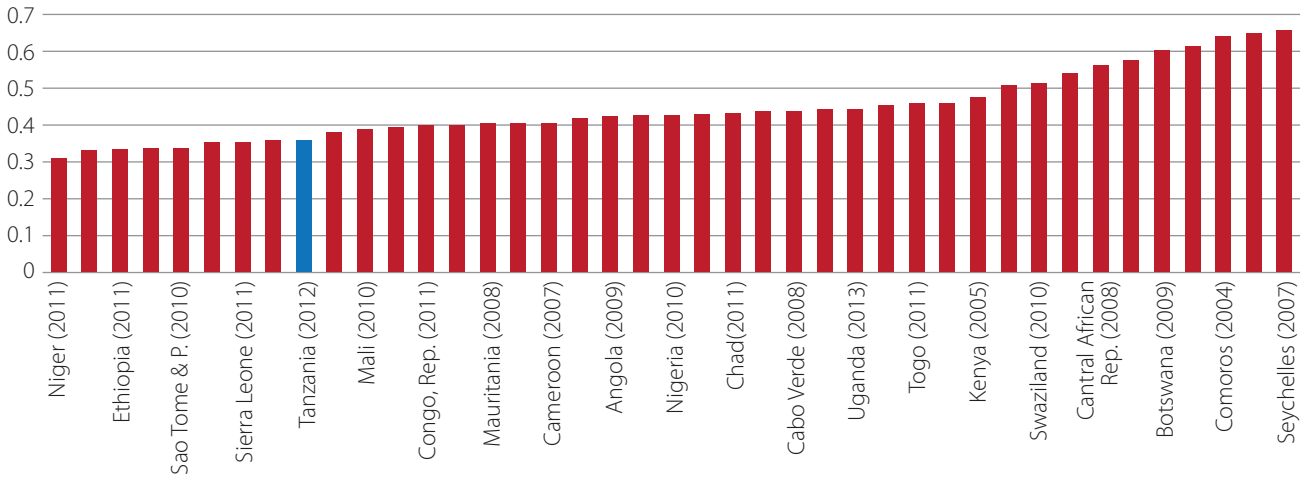
There Are Still Too Many Poor and Too Many People Clustered Around the Poverty Line

Around 12 million Tanzanian people are still below the poverty line. While the poverty headcount declined by around 18 percent, the absolute number of poor people only declined by 10 percent from 13.2 million to 11.9 million from 2007 to 2011/12, due to population growth. Likewise, the absolute number of extreme poor decreased by only 7 percent, declining from 4.5 million to 4.2 million.

Poverty is particularly pervasive in the rural areas, where around 70 percent of the Tanzanian population lives. About 10 million people in the rural population live in poverty, and 3.4 million live in extreme poverty, compared to less than 1.9 million living in poverty and 750,000 people in extreme poverty in the urban sector (Figure ES.7).

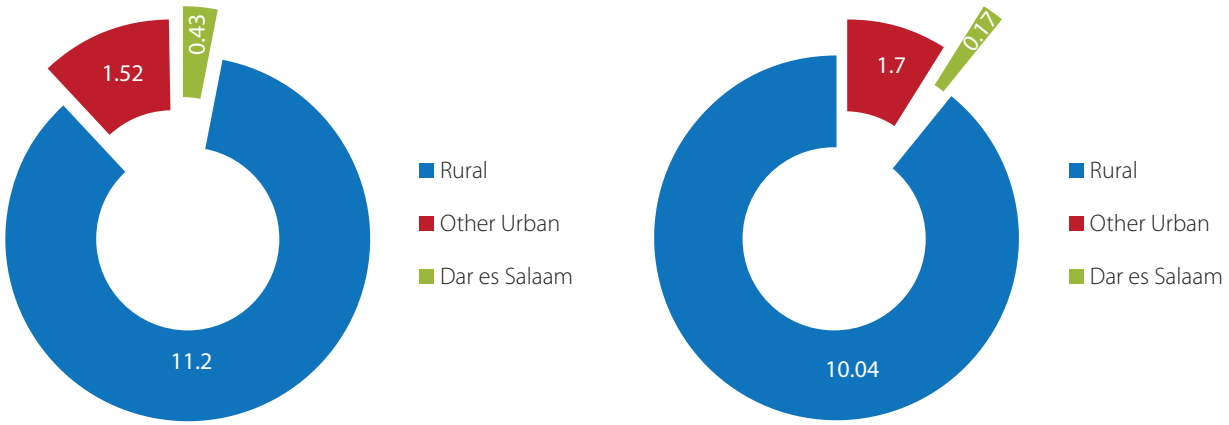
A large share of the population hovers around the poverty line, likely to escape poverty but also prone to fall into it. Small changes in the national poverty line yield significant differences in estimated poverty levels, indicating a high concentration of individuals around the basic needs threshold. For instance, a variation of the poverty line by 10 percent (T Sh 120 per adult per day) would lead to a change of poverty rate by more than 20 percent. The significant

Figure ES.6 Gini Coefficients in Sub-Saharan Africa



Source: HBS 2011/12 and WDI 2015.

Figure ES.7 Distribution of the Poor Population by Geographic Area (millions)



Source: HBS 2007 and 2011/12.

number of people clustering around the poverty line suggests that an important proportion of moderately poor people are positioned to move out of poverty, but also that an important proportion of nonpoor people are vulnerable to falling into poverty. This fact is quite common in SSA countries with poverty levels around 30 percent and requires a combination of policies to alleviate poverty and prevent people from falling into it.

The incidence of poverty in Tanzania is about 15 percentage points higher when using the international poverty line of $1.25 per person per day. The national poverty line reflects the country's specific costs of basic consumption needs but does not allow comparisons across countries. The international poverty line of $1.25 per person per day in 2005 purchasing power parity (PPP) exchange rates is often used to evaluate a country's poverty record vis-à-vis other low income countries or developing regions.

Tanzania's national poverty line is slightly lower than the international poverty line. Using the international poverty line shows that around 43.5 percent of the population lives in poverty in 2011/12. This increase of around 15 percentage points, compared to the national poverty rate of 28.2 percent, is explained by the clustering of the population around the poverty line—the international standard includes people considered just above the line using the national standard.

Poverty Is Associated with Rural Status, Larger Families, Lower Education, and Low Access to Infrastructure

Over 80 percent of the poor and the extreme poor in Tanzania live in the rural areas. More than half of the rural poor depend on subsistence agriculture for their livelihoods.

Poor households are larger in size and have more dependents than nonpoor households. Households with five children and more have the highest poverty rates, followed by elderly families whose head is 65 years old or older. The interaction between family size and poverty is bidirectional. On the one hand, the large number of children and dependents affects the ability of the poor to cover their basic food needs and to move out of poverty. On the other hand, poor households tend to have more children to compensate for their inability to rise from poverty by investing in the human capital of their children and having many as an insurance strategy against infant mortality, trapping them in a vicious circle of poverty.

Poverty is negatively correlated with higher levels of education of the household head. Higher education levels of the household's head, particularly secondary and upper education, seem to be associated with better income-generating

opportunities and significantly lower poverty levels. Education positively affects living standards and poverty reduction both directly and indirectly through its impact on health gains, productivity, social integration, and so forth.

Although primary education continues to be of crucial importance for fighting poverty, it alone seems no longer sufficient to increase poor people's opportunities for economic mobility and for moving out of poverty. Moreover, the returns to education that have increased meaningfully in conjunction with higher levels of the head's schooling appear to have declined in recent years. The expansion of education and the increase of the general population's education level might have induced changes in the requirements of the labor market and generated a decline of the rewards for years of schooling under a certain level.

Wage employment and nonfarm businesses are associated with lower poverty. Poverty rates are lowest among households headed by government employees or employees in the private sector and NGOs. Interestingly, households relying on nonagricultural businesses as a main source of income appear to be experiencing a remarkable decline in poverty, suggesting that the development of nonfarm employment can offer a pathway out of poverty. This effect remains strong and very statistically significant even after controlling for—or holding constant—various other factors related to household well-being.

There has been a movement out of agriculture during the recent years, as the proportion of Tanzanian households whose main source of income is agricultural activity declined from around 53 percent in 2007 to 39 percent in 2011/12. This seems to have reduced the negative influence of working in agriculture on living standards and poverty, probably due the fact that part of those who remained in the sector are more productive and engaged more in cash crop production.

Access to public infrastructure is also linked with lower poverty. Poor households tend to have much lower access to private piped water, electricity, and tarmac roads. Obstacles to infrastructure and services, particularly electricity and roads, seriously limit the possibilities of the poor to improve their living standards. Likewise, the presence in the household's community of a daily market and mobile phone signal have a positive impact on consumption levels and reduce the probability of poverty. Access to these services is still quite limited in rural areas, hampering local opportunities to reduce poverty.

Internal migration is related to lower poverty. Poverty levels appear to be much lower among migrant households. Migration is found to have a positive impact on welfare not only for migrants but also for their family left behind, improving their living standards as well as the school attendance of their children.

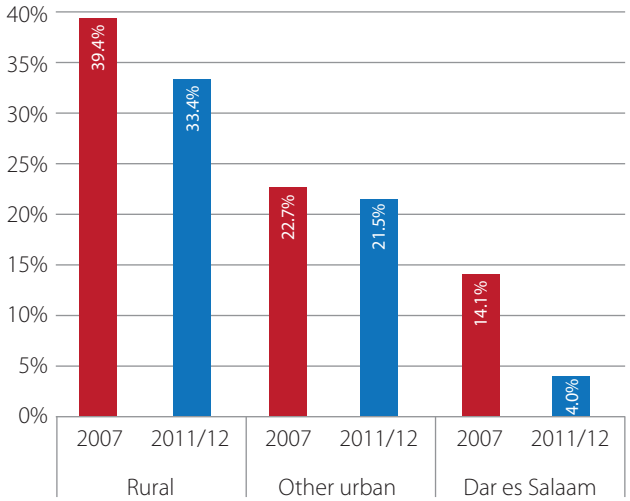
Migrants are generally more educated, younger, and more prosperous than others. They tend to move towards big urban cities such as Dar es Salaam, Mwanza, and Zanzibar to seek better employment opportunities and living conditions. The superiority of the characteristics of the migrants (for example, better education, higher living standards, and so forth) may partly explain the improvement of their economic situation, but the positive effects of migration can easily be generalized to less well-endowed people. While migration seems to be associated with lower poverty, it may prove to be less beneficial in the long run as excessive migration might cause a displacement of poverty to the destination areas.

The Decline in Poverty Is Uneven Geographically

Most of the improvements in the poverty indicators occurred in Dar es Salaam. Poverty declined by over 70 percent in Dar es Salaam but only by around 15 percent in the rural sector, while it remained almost unchanged in the secondary cities and towns, declining by only 5 percent (Figure ES.8). Although Dar es Salaam experienced the greatest proportionate decline in poverty, the absolute number of poor people declined more in the rural areas, as 1.2 million rural people moved out of poverty as opposed to fewer than 300,000 in the metropolitan city.

The uneven spatial decline of poverty is related to the pattern of economic growth, which was almost entirely centered in Dar es Salaam, where most of the expanding and flourishing sectors are concentrated. These include

Figure ES.8 Poverty Headcount by Geographic Domain



Source: HBS 2007 and 2011/12.

telecommunications, finance, and to a lesser extent construction and manufacturing.

Poorer households outside Dar es Salaam seem to have experienced an increase of their consumption, despite the limited growth in these regions. There were consumption gains among households in the poorest quintiles not only in Dar es Salaam but also in regions where there was almost no growth (rural areas and secondary cities).

Poverty reduction outside Dar es Salaam is driven mainly by a reduction in inequality. The decline of poverty in Dar es Salaam was driven by both an increase in mean consumption and an improvement in consumption distribution, while poverty reductions in rural and other urban areas are due entirely to improvements in consumption distribution (reduction of inequality). In these areas, the better-off experienced declines in their consumption levels whereas the poorest quintiles appear to have experienced an increase in their consumption levels, albeit from low levels.

The increase of the consumption of the poorest groups is driven essentially by the improvement of households' endowments in rural areas and secondary cities, while the increase in Dar es Salaam is explained mainly by the improvement of returns. Rural households in the 30 percent of poorest groups experienced an increase of their consumption by around 20 percent between 2007 and 2011/12. This increase was driven mainly by the improvement of their endowments in assets (for example, increased ownership of communication and transportation means and higher land ownership) as well as the improved access to community infrastructure (mainly roads). The returns to their endowments also increased, but to a lesser extent. In particular, there has been an expansion of returns to both nonfarm and household agricultural businesses followed by a slight increase of returns lo land. Poor households in the secondary cities also experienced an increase of their consumption levels, by about 15 percent. This increase was driven mainly by the increase of their endowments in assets and the improvement of the returns to nonfarm activities and wage employment. Likewise, consumption of poor households in Dar es Salaam increased by over 40 percent, due mainly to the expansion of the returns to employment in public and private sectors followed by a slight increase of the returns to nonfarm businesses.

Increasing Inequality between Geographic Domains

Inequality is increasing between urban and rural areas, as well as between Dar es Salaam and the other regions. Economic growth has benefitted most Tanzanians and started trickling down to the neediest, but the nature and composition of this growth induced an uneven increase of welfare at the regional level. Household consumption grew faster in the metropolitan and urban zones than in rural areas, inducing an increase of inequality between the geographic regions. The increase of interregional inequality was observed for all welfare groups but was much more pronounced among the richest groups.

Better off households in Dar es Salaam and urban zones have become richer due to expanding employment opportunities and improving returns. Interregional inequality among better-off households is much higher (approximately two times larger) and increasing faster than among poorer households. This is mainly driven by the expanding employment opportunities and the increase of returns to wage work in the public and private sectors in Dar es Salaam and some urban zones.

Despite the increasing disparities in returns, urban-rural inequality remains mostly due to large differences in households' endowments. Urban households have higher living standards essentially because they have superior endowments in terms of family size and composition, education, assets, and access to services and employment opportunities (Figure ES.9). Rural households have been able to catch up somewhat with their urban counterparts in education levels and asset ownership, but this has been partly offset by increasing differences in family structure and access to services and job opportunities.

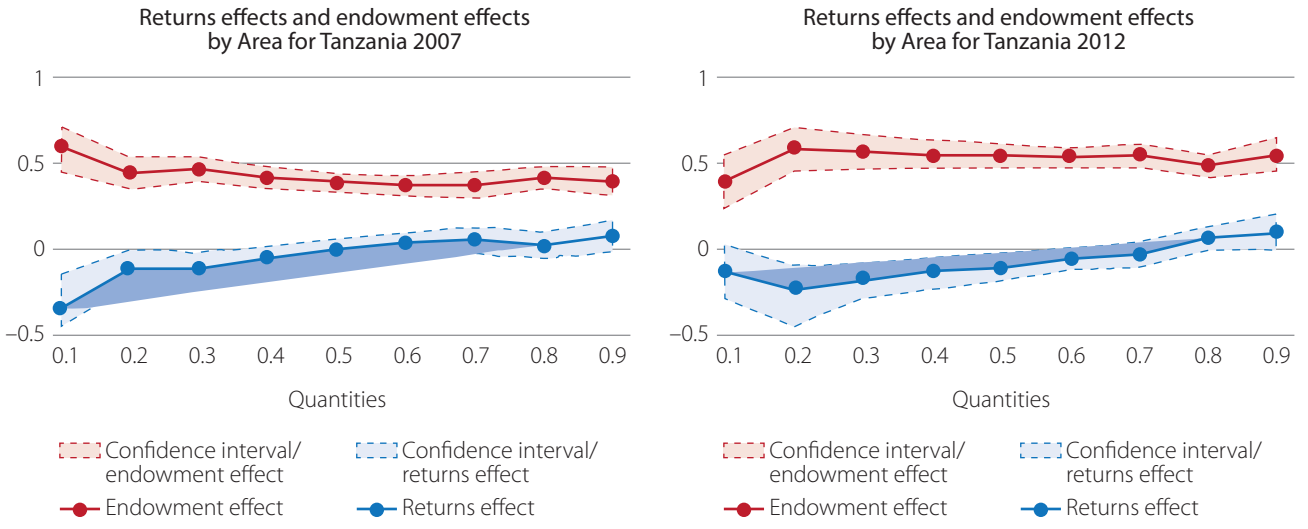
Inequality Can Be Explained Partly by Family Background

The disparities of households' endowments and living standards are, to a large extent, the results of intergenerational transmission of family background. Around one-fourth of total inequality in consumption in Tanzania is due to circumstances that are outside individuals' control, such as age, gender, parents' education, orphan status, and region of birth. This is a quite sizeable share compared to other SSA countries, where the contribution of an individual's circumstances to inequality is less than one-fifth. The most important circumstance variables in accounting for overall inequality is parental education, the partial effect of which is around 20 percent, indicating a quite high persistence between parents' and children's socioeconomic attainments.

Family background contributes more to inequality than community characteristics. Family background seems to have a greater influence on the disparity of living standards than the characteristics of the local community, such as access to basic services and infrastructure, connection to markets and population centers, and so forth (Figure ES.10). This indicates significant problems of intergenerational poverty and inequality persistence. Addressing the influence of parental education and background on children's opportunities is a long-term mission that is often complex. But without additional policy actions, there are limited chances for the generations disadvantaged by circumstances to spring out of the poverty and inequality also endured by their parents.

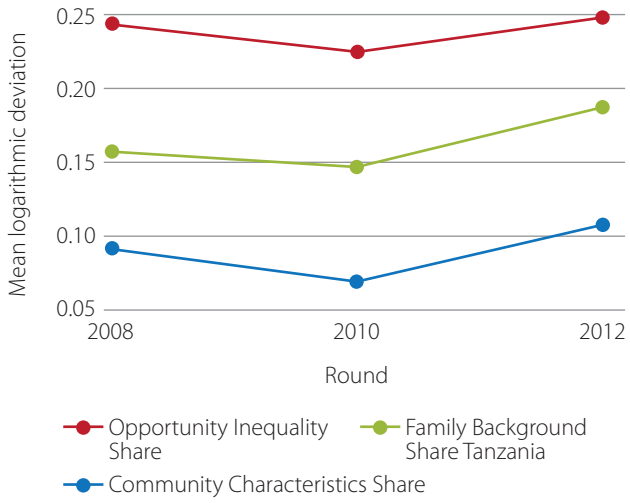
Policy actions need to focus on developing endowments, especially those inherited from parents or related to community characteristics. Strategies for promoting access to basic infrastructure and services need to be coupled with policy interventions to reduce disparities in the distribution of circumstances and equalize opportunities. Education and labor market policies as well as fiscal

Figure ES.9 Sources of Urban-Rural Inequality: The Contribution of the Differences in Endowments and Returns to the Consumption Gap



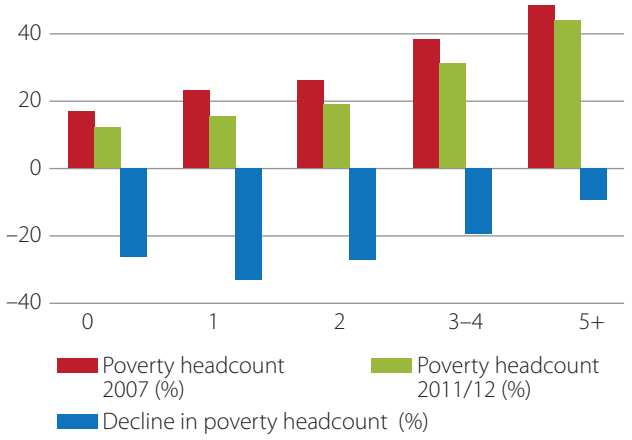
Source: HBS 2007 and 2011/12.

Figure ES.10 Contribution of Circumstance Variables to Consumption Inequality



Source: NPS 2008, 2010, and 2012.

Figure ES.11 Poverty Reduction by Number of Children (0–14 years), 2007–2011/12



Source: HBS 2007 and 2011/12.

system reforms could contribute to reducing inequality of opportunity. Also, better targeted policies to expand the access to basic goods and services for people in vulnerable circumstance groups may be instrumental for reducing the disparity of opportunities and breaking the cycle of intergenerational persistence of poverty.

Demographic Pressures Pose a Challenge to Poverty Reduction

Tanzania is in the early stages of the demographic transition. With high fertility of around five births per women and the decline of mortality, the momentum of high population growth is expected to continue in the coming years. The country could gain from a demographic dividend—meaning a large working-age population—starting in 2020–30, but the dependency ratio (the proportion of children below 14 years old and elderly above 65 years in the household) will remain much higher than the levels achieved in East Asia 30 years ago.

High fertility may slow poverty reduction and undermine pro-poor growth prospects. The rapid population growth will continue to weigh heavily on the country's future growth and its capacity to reduce poverty. At the household level, families with large number of children have limited capacity to reduce poverty (Figure ES.11).

At the national level, demographic pressures pose challenges for public service provision, labor markets, land and resources, and so forth and can put a break on growth in per capita incomes. The best way to reduce population growth and accelerate demographic change is by slowing down fertility. Empowering women through education and employment support, as well as with family planning services, would help to reduce fertility and stimulate per capita economic growth.

Implications for Research and Policy

The focus of this report has been on the two recent waves of HBS data and the information they provide on living standards and poverty in Tanzania. It reveals improvements in the poverty and inequality indicators and shows emerging signs of pro-poor economic growth since 2007. The report identifies significant changes in the way economic growth has been distributed across households in Tanzania and has found these to be associated with quite different experiences across the country. Urban households have experienced quite significant consumption gains, mainly in Dar es Salaam, where most of the growth has taken place. There have

also been gains among the rural poorer groups, essentially due to a reduction in inequality. Urban households in the three poorest deciles have benefitted from better access to employment opportunities, reflecting what has happened in Dar es Salaam. Those in rural areas, while also benefiting from an increase of the returns to their agricultural and nonfarm activities, have seen much higher improvements of their assets ownership. There seems to be a move away from agriculture, whilst at the same time those who remain in the sector are likely to have benefitted from an increase of their cultivation areas and improvements of their returns. There is also some evidence that farming households have a greater commercial orientation in 2011/12 then they did in 2007.

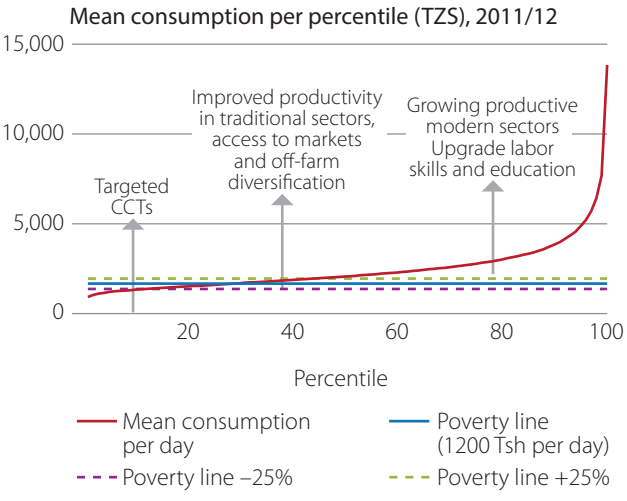
The report shows that despite the positive changes, the number of poor, particularly in rural areas, is still disconcertingly high and the welfare disparity between the geographic regions is widening. Households with a large number of children, whose heads have less education than counterparts, who are engaged in subsistence agriculture and living in communities lacking infrastructure are likely to be the most poor. Many of them will pass on their poverty to their offspring. Even though the results point to the positive effects of economic growth on the poorest segments of the population outside Dar es Salaam, an important proportion of the population has not been able to fully benefit from the economic prosperity of the country and remains vulnerable to poverty. Households that are located outside Dar es Salaam have not been able to reach the levels of access to basic services and employment opportunities prevailing in the city. The levels of endowment in education and assets remain lower outside Dar es Salaam and other urban zones. Even households who could improve their endowment base have not been able to find the returns in the local markets corresponding to those offered in the city.

The analysis in this report provides policy pointers for poverty reduction. While poverty cannot be effectively tackled through stand-alone policy approaches and requires a cohesive multisectorial strategy, the findings may help prioritize policy interventions tailored to enhance poverty reduction. The basic tenets of conventional poverty reduction strategies such as investment in human capital and infrastructure, income and employment generation, and control over fertility and family sizes largely remain, but the design of priority interventions should take into account the diverse nature of poverty.

For the extreme poor who lack basic necessities and assets, priority could be given to safety nets and cash transfer programs to help them enhance their livelihoods and productivity. Such programs increase the levels and quality of consumption of the poor, offer some security against unforeseen shocks, facilitate access to basic goods and services, and advance the inclusiveness of the most vulnerable population groups in the growth process.

Moderate poor and vulnerable nonpoor households should benefit from a combination of prevention and promotion strategies that enable them to diversify their activity into higher-return and more productive businesses. The following could be particularly beneficial in this effort:

- **The development of rural economy and agriculture will be instrumental for an effective poverty-reduction strategy.** The disadvantage of being engaged in agriculture seems to have diminished during recent years, but what seems to matter to farmers is access to cash crops and to markets, indicating the importance of encouraging a more commercial agriculture. Connectivity of farmers and rural poor people to infrastructure using modern communication and transport means is also vital for expanding their living standards. Although, there is little evidence of the increase of access to local markets in the rural communities, the increase of their



returns suggest that they play a positive role in influencing households' welfare.

- **There are significant returns to undertaking business activities in rural areas but also in some secondary urban towns, strongly supporting the case for diversification.** Nonfarm business seems more rewarding than agricultural activities, and households engaged in such businesses appear to have been more successful than others in reducing their poverty. While agriculture will remain the largest source of employment in Tanzania and there is no escaping the need to galvanize this sector, the role of nonfarm diversification in absorbing the underemployed workforce, improving poor households' living standards and reinvigorating the local economy needs to be recognized and promoted. Efforts by the government to accelerate the process of diversification could yield important returns in terms of reducing poverty and increased income mobility. But more work is needed to better understand how diversification to nonfarm activities can be enhanced in secondary cities and rural areas.

The road to inclusive growth is yet to be paved and the work is challenged by the widening urban-rural gap in living standards. Policy actions should focus on developing the endowments of rural households, with special attention to improving the opportunities of new generations. There have been commendable efforts to promote basic education and access to assets. These efforts need to spread more widely and more evenly and need to be oriented toward the provision of secondary and higher education, particularly in less favored regions. The report points to *secondary* schooling as being particularly important for escaping poverty, even among the rural, farming population. One way in which this effect could be channeled would be in enabling farmers to use improved inputs and technology. The promotion of education would help as well to equalize opportunities and contribute to breaking the cycle of intergenerational persistence of poverty. More efforts should be made to achieve broader coverage and better targeting of access to basic goods and services. Policies to reduce spatial disparities in endowments need to be coupled with strategies to enable households to find the appropriate returns to their improved attributes in the local markets by supporting increased labor and land productivity.

On the basis of the analysis in the report, the following key issues call for further investigation:

- The report reveals emerging signs of "pro-poor" growth with a changing structure of the economy and declining contribution of agriculture. In recent years this sector's growth has lagged other sectors in the economy, but agriculture continues to be the most important sector in rural areas and the main source of livelihoods for the poor. Stimulating agriculture through improving farmers' access to modern assets, enhancing their connectivity to infrastructure and markets and encouraging a more commercial agriculture will be instrumental for an effective poverty-reduction strategy. However, with the economic transformation, agriculture might not be able to absorb the expanding rural labor force and generate jobs commensurate with the aspirations and education of youthful workforce; and agricultural advances alone will not meet the rural poverty challenge. Higher diversification towards nonfarm activities can play an important role in boosting the local economy, promoting job creation and alleviating poverty. As it seems to be indicated by the results, efforts to accelerate the process of diversification could yield quite significant benefits in terms of increased employment opportunities and reduced poverty not only in the rural sector but also in secondary cities in urban areas. These effects can be further investigated using the upcoming Integrated Labor Force Survey (ILFS) and the National Panel Surveys (NPS) to examine the incentives for agricultural productivity and nonfarm diversification and to better understand their growth and poverty alleviation potentials in order to better inform the growth and poverty reduction strategy. The factors driving the changes in distribution pattern between 2007 and 2011/12 also call for further investigation in the subsequent studies.

- The relative decline of rural poverty appears to be driven by improvements of the endowments of poor households in assets and an expansion of their cultivation areas. These improvements seem to be coupled with a slight increase in the returns to land denoting potential increase of land productivity, particularly for the poor. As most poor farmers are smallholders with low productivity and yields, there is need to further investigate

the underlying causes of the observed improvements in land endowments and returns and whether these latter are resulting from increased yields, more productive use of resources, or higher diversification and complementarities between households' activities. There is also need to explore whether there are real increased efforts towards cash crops or food crops will remain the largest source of cash income to rural households. HBS and NPS with agricultural surveys provide an invaluable opportunity to examine these issues and to investigate the constraints poor farmers face in raising productivity, accessing markets, and diversifying (both within farming and into nonfarm activity). This would help a better understanding of the patterns of poverty dynamics and the underlying causes of poverty persistence.

- The exercise of linking observed poverty outcomes to data in economic growth identified the choice of price deflator as critical. This issue needs to be explored in more depth in future work.

- The 2011/12 HBS provides an excellent basis for small area poverty mapping, since it was concurrent with the 2012 Population and Housing Census. This would provide a significant data base for geographically disaggregated policy advice and development planning and for a better understanding of the characteristics of the poor.

Introduction

Poverty in Tanzania remains a persistent problem. In order for the government, development partners, and other key stakeholders to reduce poverty and boost shared prosperity in Tanzania, it is essential to understand poverty trends, inequality, and their dynamics. Specifically, it is necessary to determine whether growth has become more pro-poor. The last poverty assessment by the World Bank (2007b) for Tanzania, and more recent World Bank reports (World Bank 2011, 2012a, 2013d) flagged the sluggish response of poverty to growth as a concern.

This report is based primarily on the new Household Budget Survey (HBS) for 2011/12, which provides up-to-date information and an opportunity to explore the latest trends on economic growth at the household level. The availability of the 2011/12 HBS allows an updated and more detailed analysis of the poverty situation in Tanzania and provides opportunity to relate recent poverty trends to the performance of the economy at large. The quality of data is higher than in previous surveys, and this ensures more reliable and accurate estimates of poverty and the opportunity to explore inherent nuances.

The report starts by sketching the positive changes in welfare, poverty, and inequality. It then presents the challenges that remain to be addressed and the main obstacles to poverty reduction. Chapter 1 examines the trends in poverty and inequality in mainland Tanzania during recent years and explores the evolution of the nonmonetary dimensions of well-being. Chapter 2 reviews in detail the characteristics of the poor, including an analysis of the economic effects of migration. Chapter 3 examines the response of poverty to economic growth and investigates the distributional issues at the national level. Chapter 4 analyzes the pattern of poverty trend by geographic domain. Chapter 5 explores the sources of spatial inequalities. Chapter 6 analyses inequality of opportunity in consumption and income and explores the effects of family background on the persistence of poverty and inequality. Finally, chapter 7 examines the demographic transition and determinants of fertility.

Chapter 1

Poverty and Inequality Trends

Key Messages

- Poverty has declined by around 1 percentage point per year since 2007.
- Living conditions and human capital outcomes have improved over time, but the achievements are low compared to neighboring countries.
- Inequality is moderate and compares favorably with other SSA countries.

The poverty assessment for Tanzania (World Bank 2008) revealed a stagnant level of poverty at around 33–36 percent between 2001 and 2007, raising concerns that the country may be off-track in meeting the Millennium Development Goal (MDG) target of poverty reduction by 2015 as well as the Bank goal of ending extreme poverty by 2030.

The availability of the Household Budget Survey (HBS) for 2011/12 allows an updated and more detailed analysis of the poverty situation in Tanzania. These data are not only more timely but also of improved quality over previous household surveys, thereby permitting more reliable and accurate analysis of the latest trends in poverty and inequality as well as in other nonmonetary dimensions of welfare.

The first section of this chapter examines the poverty trend since 2007. Analyzing changes in poverty over time is challenged by the changes in HBS design between 2007 and 2011/12. In particular, changes that occurred in the length of the reference period and degree of commodity detail for nonfood items affect the welfare trends and complicate comparisons of poverty levels over time. The section uses different approaches to address the comparability issues and discusses their effects on the estimation of the poverty trend. Tanzanian poor people are identified as those facing consumption shortfalls, but poverty is not a single economic condition and it goes beyond consumption deficits. Thus, the second section examines the evolution of the nonmonetary dimensions of welfare and explores how these factors have evolved over time for both the whole population and the most disadvantaged groups. It also investigates the dynamics of well-being to identify the household groups facing chronic poverty and those switching between states of well-being and deprivation. The third section investigates the evolution and structure of inequality.

I. Decline in Poverty and Extreme Poverty Since 2007

The basic needs and extreme poverty headcount rates for Tanzania Mainland were, respectively, 28.2 percent and 9.7 percent in 2011/12. The headcount rates are based on the official National Bureau of Statistics (NBS) definition of *basic needs*

and *food* poverty lines, estimated at, respectively, T Sh 36,482 per adult per month and T Sh 26,085.5 per adult per month.

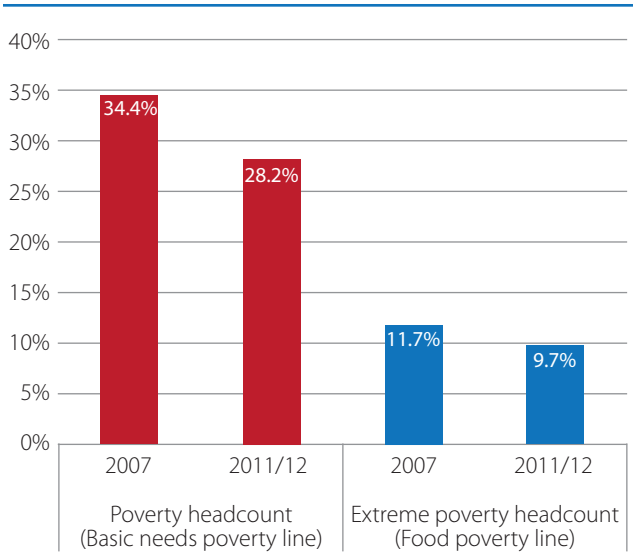
According to the 2011/12 Tanzania HBS, 28.2 percent of the population is poor, with monthly consumption per adult equivalent below the basic needs poverty line, and 9.7 percent lives in extreme poverty, below the food poverty line, and hence cannot afford to buy enough food to meet the minimum nutritional requirements of 2,200 kilocalories (Kcal) per adult equivalent per day (see Box 1.1 for details).

The poverty rate has declined by around 6 percentage points since 2007.[1] The official national (basic needs) poverty rate is estimated at 33.6 percent in 2007, but cannot be compared to the new headcount rate for 2011/12 due to significant changes in the survey design as well as improvements in the methodology for the measurement of consumption aggregate and poverty line. This poverty assessment tries to address these changes by reestimating the consumption aggregates for HBS 2007 using the same approach as in 2011/12 and by adjusting the current poverty line by the price changes between 2007 and 2011/12.[2] This yielded a poverty estimate of 34.4 percent for 2007, suggesting a poverty reduction at the national level by around 6 percentage points (or 18 percent).[3]

Extreme poverty also declined, but by a lower degree. The proportion of the population with consumption below the food poverty line declined from 11.7 percent in 2007 to 9.7 percent in 2011/12, falling by around 2 percentage points (or 16 percent) between 2007 and 2011/12 (Figure I.1). The food poverty line is updated using a food Fisher price deflator, calculated from unit values of the HBS 2007 and HBS 2011/12 data, which shows higher inflation than the combined food and nonfood price deflator used to update the basic needs poverty line. This leads to a stronger increase in the food poverty line than in the basic needs poverty line between 2007 and 2011/12 and thus to stronger variation of the basic needs poverty rates than in extreme poverty figures.

The depth and severity of poverty declined more strongly than the poverty headcount. The *depth of poverty* (or *poverty gap*) measures the average consumption expenditure shortfall of the poor as a share of the basic needs poverty line, while the *severity of poverty* (or *squared poverty gap*) reflects

Figure I.1 Poverty and Extreme Poverty Trends in Tanzania Mainland, 2007–2011/12



Source: HBS 2007 and 2011/12.

inequality among the poor. The estimate of the poverty gap for 2011/12 indicates that the average consumption level of a poor Tanzanian is around 93 percent of the national poverty line, suggesting that many of the poor are very close to the poverty line and that small income transfers would help a significant decline in poverty. Likewise, the severity of poverty is estimated at 2.3 percent, indicating a low level of inequality among the poor Tanzanian population groups.

[1] The rest of the text uses poverty rate for basic needs headcount poverty rate and extreme poverty for extreme headcount poverty rate.

[2] To estimate the poverty line for HBS 2007, we adjusted the poverty line of HBS 2011/12 by a food and nonfood Fisher price index, calculated from unit values of the HBS 2007 and HBS 2011/12 data.

[3] It should be noted that even though the 2007 poverty headcount ratio did not change much through the revision, both measured consumption and the poverty line were substantially increased. Consumption per adult rose by almost one-third. This is due partly to the fact that the revised aggregate includes education, health, and communication expenditures, which were previously excluded, and partly due to a different way of drawing on the diary and recall data for nonfood spending (see Appendix 1.A). The 2007 basic needs poverty line has also been revised upwards, from T Sh 13,998 (see URT 2009) to T Sh 19,201 (see URT 2014).

Box 1.1 Measuring Poverty in the HBS, 2011/12

As it is typically the case in SSA, the HBS 2011/12 uses consumption as the key welfare measure to analyze poverty. This consumption aggregate comprises food consumption, including food produced by households themselves, as well as expenditures on a range of nonfood goods and services (e.g., clothing, utilities, transportation, communication, health, education, etc.). However, the consumption aggregate does ***not*** include rent or other housing-related expenditures, nor does it include expenditures on larger consumer durable items (such as cars, TVs, computers, etc.). To the extent that better-off households devote a larger proportion of their total consumption to durable goods, this omission creates certain biases and underestimates "true" consumption among wealthier families. This matters less for poverty analysis, where the focus lies on the bottom-end of the distribution, but it can have a significant impact on estimated inequality.

The HBS 2011/12, as most household surveys, collects consumption data at the level of households. For the purpose of poverty and welfare analysis total household consumption needs to be adjusted for differences in household size and composition. This is to account for the fact that, for instance, a single-person household requires less consumption than a family of five. One possible approach is to compute consumption per capita, which implicitly assumes that all members of the household require the same level of consumption. Another approach, which is widespread in the context of Sub-Saharan Africa, where typically a large share of consumption is spent on food items, is to compute consumption per "adult equivalent." This requires equivalence scales to convert household members of different age and sex into a standardized adult based on assumptions about caloric requirements. The HBS 2011/12 poverty analysis follows in this tradition and uses consumption per adult equivalent as the key welfare measure. Price deflators are used to adjust consumption per adult equivalent for differences in prices across geographic domains and over the course of the HBS fieldwork.

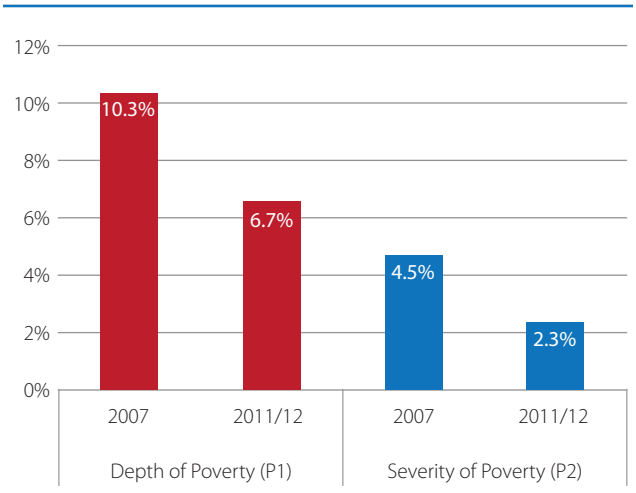
The *poverty lines* are based on the cost-of-basic-needs approach. The HBS 2011/12 *food poverty line* (T Sh 26,085.5 per adult per month) is based on the cost of a food basket that delivers 2,200 calories per adult per day (given consumption patterns in a reference population). The *basic needs poverty line* (T Sh 36,482 per adult per month) adds an allowance for basic nonfood necessities to the food poverty line. Further technical details on the construction of the HBS 2011/12 consumption aggregate, adult equivalence scale, price deflators, and poverty line can be found in Appendix 1.A.

The basic needs headcount poverty rate (or as used in the text, *poverty rate*) measures the proportion of the population whose monthly (price-adjusted) total household consumption per adult equivalent is below the basic needs poverty line, and the extreme headcount poverty rate (used in the text as *extreme poverty rate*) measures the proportion of the population whose monthly (price-adjusted) total household consumption per adult equivalent is below the food poverty line.

Figure I.2 shows a strong decline of the poverty gap and severity index by, respectively, 35 and 48 percent, suggesting that an important proportion of poor households have been able to reduce significantly their consumption shortfall relative to the poverty line and that the gains were particularly large among the poorest groups.

These poverty trends still face comparability issues emanating from the changes in the survey design, and these issues are further addressed using different prediction techniques. The reconstruction of the 2007 consumption aggregate and poverty line can account for changes in the methodology to estimate poverty, but they cannot correct for variations in the survey's design that occurred between 2007 and 2011/12, such as the changes in the reference period for which nonfood consumption are reported and the changes in the degree of commodity detail.

Figure I.2 Trends in Depth and Severity of Poverty in Tanzania Mainland, 2007–2011/12



Source: HBS 2007 and 2011/12.

We use a semiparametric method and two imputations methods, namely, the small area estimation poverty mapping application and multiple imputations chained equations to address the remaining comparability problems and analyze the poverty trend between 2007 and 011/12. The three methods proceed as follows (more details are in Appendix 1.B):

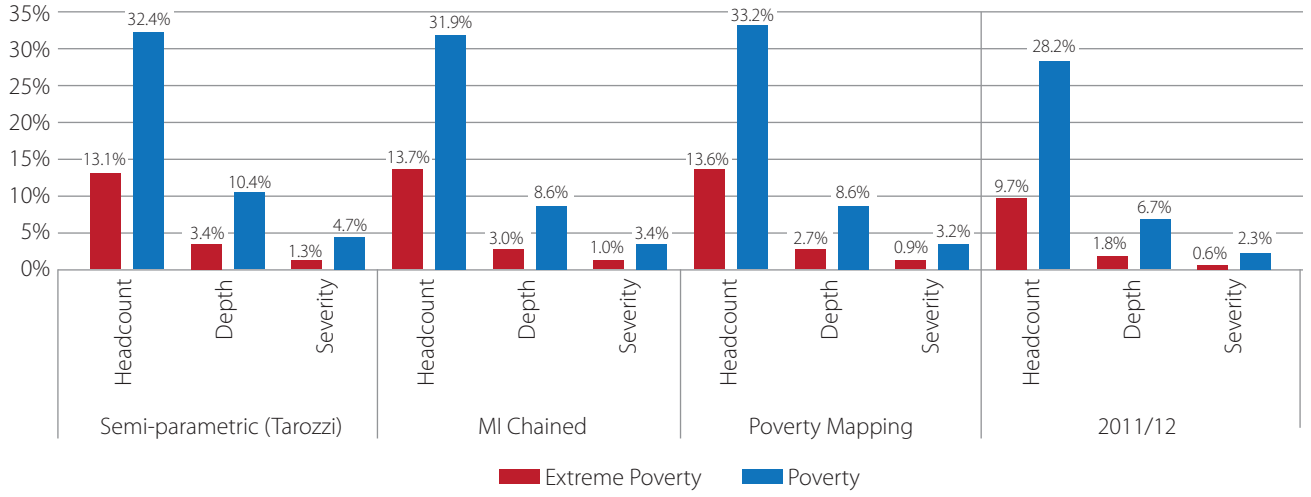
- *The semiparametric method.* This approach, proposed by Tarozzi (2002), is based on the assumption that HBS 2007 and 2011/12 share the same distribution of per-dult equivalent consumption conditional on a set of some variables that have not been affected by the changes in the questionnaire design. It is therefore possible to use observations on these variables from HBS 2007, together with information on the structure of the conditional distribution in HBS 2011/12, to recover the marginal distribution of consumption in HBS 2007. The approach then uses the reweighting procedure of Dinardo et al. (1996) to estimate the poverty counts for HBS 2007.

- *Small area estimation poverty mapping application.* This approach is based on Elbers et al. (2003) and Christiaensen et al. (2012). It replaces per-adult equivalent consumption data in HBS 2007 by predicted consumption using both available information on household characteristics (sociodemographic attributes and assets ownership) in 2007 as well as the parameter estimates obtained from a model of consumption estimated using 2011/12 survey data. The explanatory variables used in the model are restricted to those that are comparable across the two surveys, and the relationship between consumption and its correlates is assumed to be stable over time in order to ensure the perfect comparability of consumption across the two surveys. This approach circumvents the need for using price deflators and uses the poverty line for 2011/12 to measure the predicted poverty for 2007.

- *Multiple imputations chained equations (MI chained).* Implemented in STATA with the *mi impute chained* command, these are based on Rubin's (1987) work to deal with missing values generated by nonresponse in survey-based research. The method is close in spirit to the poverty mapping technique and consists in filling in missing values for multiple variables using iterative methods and chained equations. The approach accommodates arbitrary missing-value patterns and uses less restrictive assumptions than the poverty mapping method.

The different prediction approaches support the decline of poverty between 2007 and 2011/12, but reveal a slightly lower pace of poverty reduction. Depending on the method used, poverty appears to have declined by around 4–5 percentage points (or 12–15 percent), which is slightly lower that the decline of 6 percentage points (or 18 percent)

Figure I.3 Adjusted Poverty Rates for 2007 Using Prediction Methods



Source: HBS 2007 and 2011/12.

Table I.1 Adjusted Poverty Rates for 2007 Using Prediction Methods

	Semi-parametric (Tarozzi)		MI chained (with cell phone)		MI chained (without cell)		Poverty mapping (with cell phone)		Poverty mapping (without cell)	
	Extreme Poverty	Poverty	Extreme Poverty	Poverty	Extreme Poverty	Poverty	Extreme Poverty	Poverty	Extreme Poverty	Poverty
Headcount	13.1%	32.4%	13.7%	31.9%	11.9%	28.6%	13.6%	33.2%	10.6%	28.6%
Depth of poverty	3.4%	10.4%	3.0%	8.6%	2.6%	7.5%	2.7%	8.6%	2.2%	7.0%
Severity of poverty	1.3%	4.7%	1.0%	3.4%	0.9%	2.9%	0.9%	3.2%	0.7%	2.6%

Source: HBS 2007 and 2011/12.

reported above. Interestingly, the decline in extreme poverty appears to be quite higher using the prediction methods. It varies between 3 to 4 percentage points against a decline of only 2 percentage points observed above. This is due to the fact the prediction methods attenuate the effects of food prices inflation on extreme poverty (see Figure I.3).

One problem faced with the prediction methods is related to the difficultly of selecting the consumption correlates that are comparable across the HBS 2007 and 2011/12 surveys. These methods are quite sensitive to some household characteristics, especially demographic structure and ownership of assets. The ownership of certain assets, in particular cell phones, vary a great deal over time. Including cell phones in the prediction models violates the assumption of stability of the consumption correlates, while excluding them introduces an omission bias. The exclusion of the cell phones from the prediction models results in lower predicted poverty measures for HBS 2007, suggesting a very low decline of poverty over time (Table I.1). While the prediction models including cell phone may bias upward poverty estimates for 2007, excluding them would introduce an omission bias as these devices contribute significantly to households' welfare. Further research will be needed to explore alternative ways to address this problem.

II. Improvements in Households' Living Conditions and Human Development Outcomes

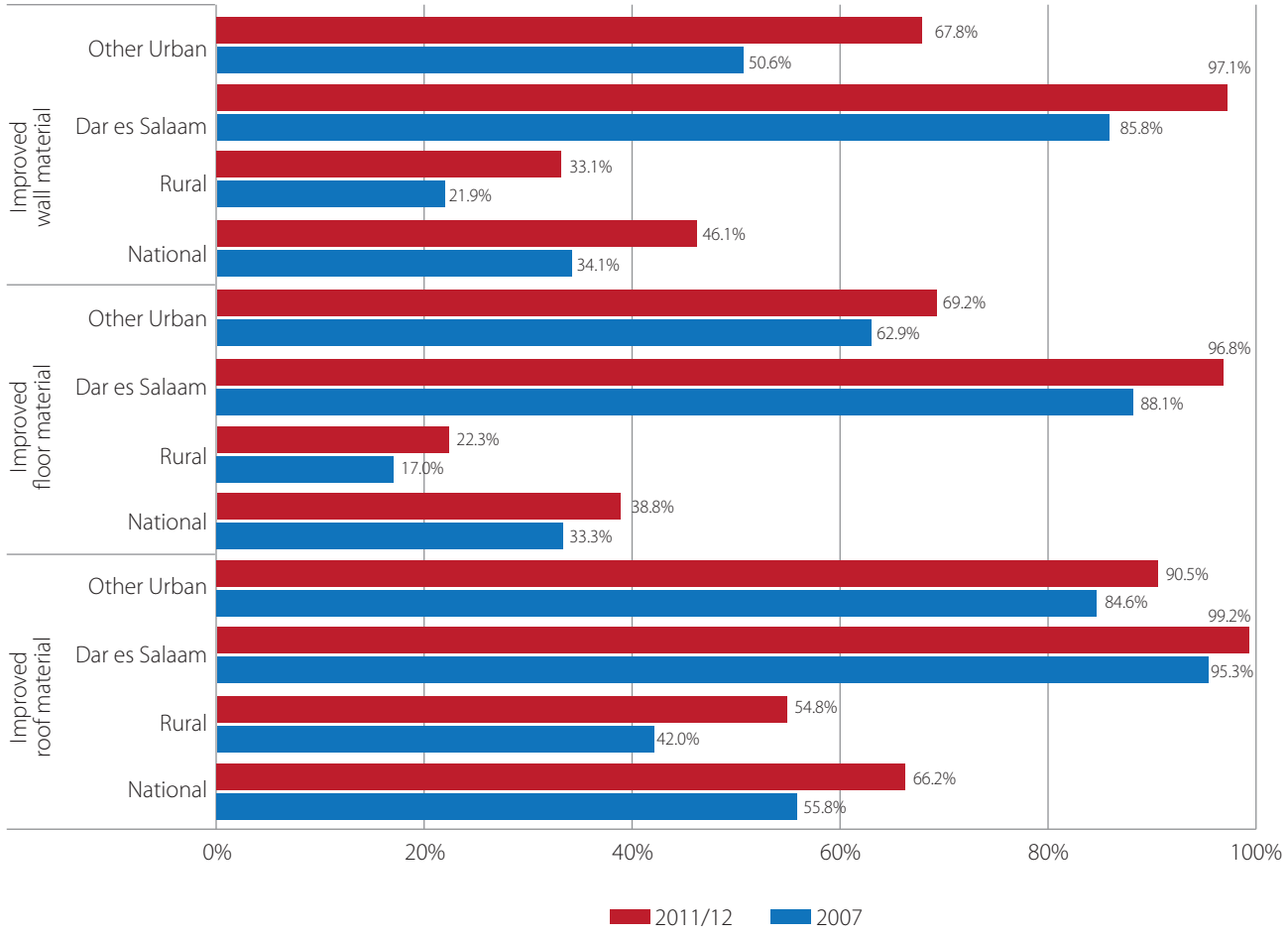
As poverty is not solely about consumption deficits, this section examines whether the observed improvements of living standards have been accompanied by improvements in other nonmonetary dimensions of well-being such as housing conditions, assets, and human capital. The section also examines the dynamics of well-being in Tanzania and investigates the population groups facing chronic lack of well-being and those "switching" between states of well-being and deprivation.

A. Housing Conditions and Assets

Housing conditions have improved considerably between 2007 and 2011/12, providing evidence for rising living standards, including for rural and the poorest households. At the national level, the share of households with improved wall material went up by 12 percentage points, from 34 percent in 2007 to 46 percent in 2011/12. Likewise, improved roof material went up by 10 percentage points at the national level and improved floor material by over 5 percentage points (Figure I.4). Interestingly, the rise in improved housing characteristics seems to have occurred mainly in the rural areas and for households in the poorest segments (Tables 1.C-1 and 1.C-2 in Appendix 1.C). Improved dwelling conditions increased by over 40 percent for households in the lowest quintiles, against less than 30 percent for the richest segments. Despite these improvements, more than half of poor households and rural dwellers continue to suffer from pitiable housing conditions.

Ownership of modern assets increased while ownership of traditional goods deteriorated. There have been some improvements in ownership of communication and transportation devices, mainly cell phones, TV and videos, motorcycles, and mopeds. Ownership of other selected household items, such as mosquito nets and cooking stoves, also

Figure I.4 Trends in Dwelling Materials, 2007–2011/12



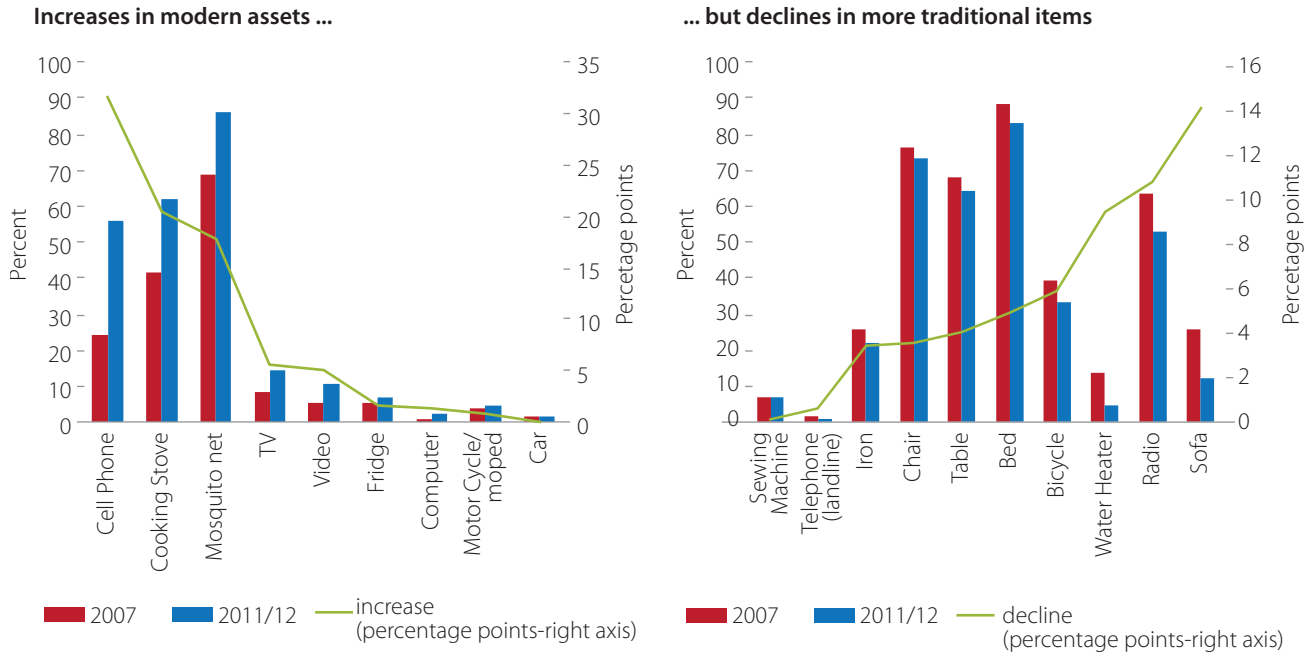
Source: HBS 2007 and 2011/12.

Note: Improved roof means iron sheets, tiles, concrete, or asbestos sheets. Improved floor means cement, ceramic tiles, vinyl, or wood/bamboo. Improved wall means stones, cement bricks, or baked bricks.

improved, related partly to public interventions for the former. The ownership of these assets appears to have improved more markedly among the less well off. The proportion of poor households having a mobile phone has multiplied by seven from 5 percent to around 39 percent and the proportion of poor families owning mosquito nets almost doubled (Tables 1.C-3 and 1.C-4). Conversely, ownership of more traditional assets such as basic furniture items, radios, and bicycles has declined. It seems that households have replaced these items by more modern ones, as can be seen from the decline of bicycles and increase of motorcycles and mopeds or the decline of radio and increase of TVs in Figure I.5 and Table 1.C-4. This is further confirmed by the analysis of Seff et al. (2014) who, using National Panel Survey (NPS) data, show that households tend to replace traditional devices such as radio and bicycle by more upgraded goods, such as TVs or motorbikes.

Ownership of agricultural land, particularly large plots, improved substantially for poor households. For the poor and nonpoor alike, there has been an improvement of ownership of agricultural land with areas over 5 acres, but the improvements are more marked for poor households (Figure I.6). The ownership of plots of marginal size also improved, while that of plots of small and medium sizes declined, particularly for the poor. The increase of land ownership seems to have resulted in a decline of plots provided for free. While this can be considered as a positive sign, the impact on small and

Figure I.5 Trends in Assets Ownership



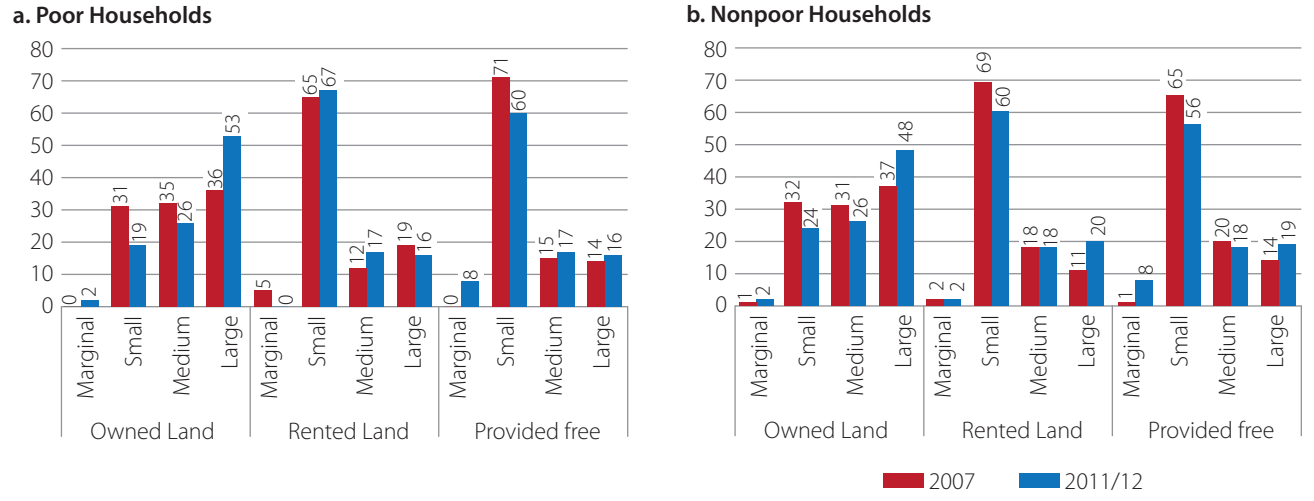
Source: HBS 2007 and 2011/12.

subsistence farmers who face liquidity constraints might be negative in the short term. The increase of large plots for the poor can contribute to the improvement of their productivity and living standards, but additional support will be necessary to help them better exploit these resources.

B. Human Development

Human development outcomes have improved since the early 2000s, but overall levels remain low, particularly in comparison to other neighboring countries as well as developing regions. This section examines education and health outcomes.

Figure I.6 Trends in Agricultural Land Ownership (%)



Source: HBS 2007 and 2011/12.

Note: Marginal is less than 0.5 acres; small is between 0.5 and 2.5 acres; medium is between 2.5 and 5 acres, and large is 5 acres and over.

Education

Gross enrollment rates at all levels of schooling are consistently lower than the average for SSA countries and much below achievements in other developing regions (Figure I.7).

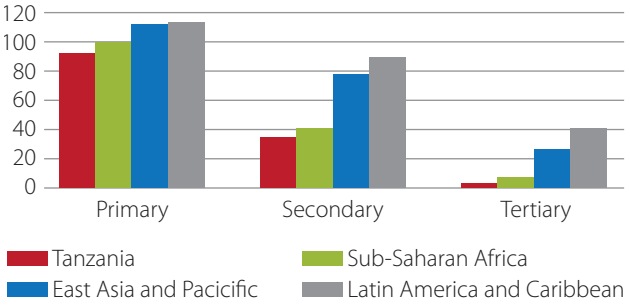
Primary school enrollments increased sharply after the inception of the Primary Education Development Program in 2001, but some of these gains appear to be eroding. According to HBS data the primary net enrolment rate increased from 59 percent in 2000/01 to 84 percent in 2007, but then fell back to 78 percent in 2011/12 (Figure I.8). Administrative data from the Education Management Information System generally show higher enrollment rates than the household surveys but confirm the recent decline in net and gross enrollment rates.[4] The recent declines are quite disconcerting given the approaching MDG target date for achieving universal primary education.

There has been a remarkable expansion in access to lower secondary education under the Secondary Education Development Program, although from very low levels. In 2000/01 only 5 percent of the population of lower secondary school age (14–17 years) was in school. This proportion rose to 17 percent in 2007 and 31 percent in 2011/12. The surge was particularly pronounced in rural areas, where the net enrollment rate at the lower secondary level increased from 2 to 22 percent from 2000/01 to 2011/12. However, upper secondary enrollments remain negligible, at below 2 percent of the population ages 17–22 years old in 2011/12.

Increased enrollments have gone in hand with a reduction in late enrollments, particularly between 2001 and 2007, and more recently a reduction in overage enrollments. Between 2001 and 2007 the share of children ages 7 years (the compulsory school age) enrolled in school increased from 23 to 60 percent, though it then fell slightly to 57 percent in 2011/12. In addition, the share of overage children (14 years and over) enrolled in primary school declined substantively between 2007 and 2011/12 (Figure I.9). While in 2007, 60 percent of 15-year-old children were still enrolled at the primary level, this share had declined to 26 percent in 2011/12, partly a reflection of the increased (and earlier) transition to the secondary level.

While primary education is not marked by significant gender inequality, girls continue to be less likely to attend upper

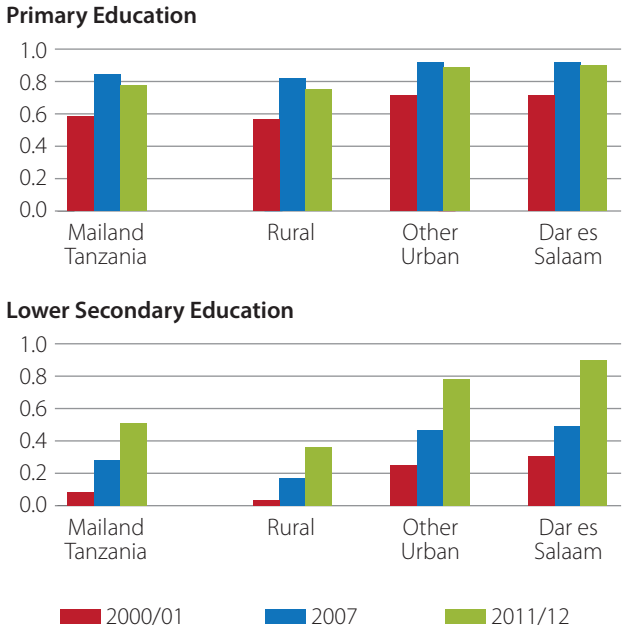
Figure I.7 Gross Enrollment Rates in Tanzania and International Comparison (%)



Source: World Development Indicators (WDI 2014).

Note: Regional aggregates for year 2011 and Tanzania estimates for 2012.

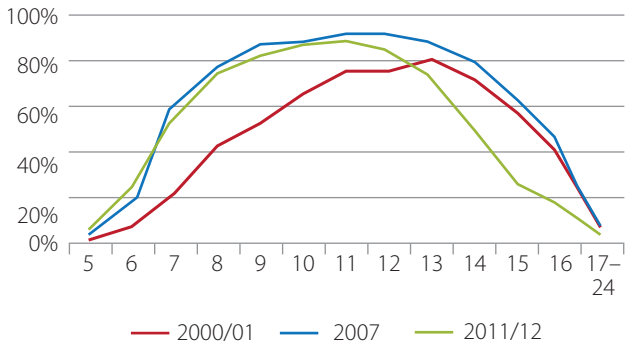
Figure I.8 Primary and Secondary Net Enrollment Rates, 2001–2011/12



Source: HBS 2000/1, 2007 and 2011/12.

[4] See Gaddis and Hoogeveen (2013) for a discussion of discrepancies between survey-based and administrative enrollment rates. Also note that enrollment rates are proxied by attendance rates in the HBS.

Figure I.9 Share of Children Enrolled in Primary School, by Age

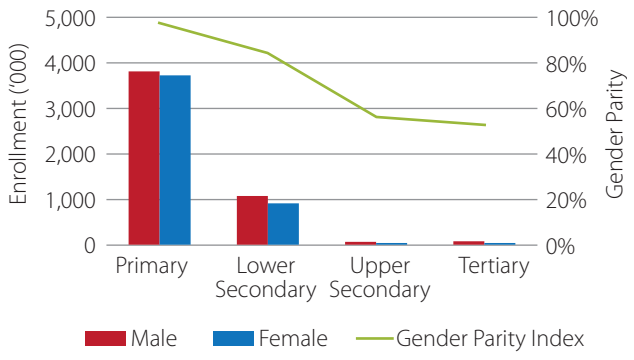


Source: HBS 2000/1, 2007 and 2011/12.

levels of education. The HBS 2011/12 shows that there were 3.8 million male and 3.7 million female students in primary school, which results in a gender parity index of 98 percent. Administrative enrollment data for 2011/12 even shows a slight advantage for girls. However, gender parity declines to 84 percent at the lower secondary level and 56 percent at the upper secondary level. Gender inequality is more pronounced for gross than for net enrollments, indicating that the gap in enrollment probabilities between boys and girls is larger for children outside the official school age.

Increased access to primary and secondary education is slowly transforming the educational structure of the labor force. As shown in Figure I.11, the share of the population ages 15-years-old and over, who have no education or less than completed primary education, has declined from 45 percent in 2001 to 33 percent in 2011/12, while the share of the population with some or completed lower secondary education has become more prevalent, increasing by about 10 percentage points.[5]

Figure I.10 Gross Enrollments by Gender and Gender Parity Index, 2011/12



Source: HBS 2000/1, 2007 and 2011/12.

While access to education has improved, education outcomes at the primary and secondary levels remain poor and uneven. Weak learning outcomes are documented, for instance, by the 2012 Uwezo Learning Assessment, which shows that only 26 percent of Standard 3 students can read a Standard 2 level Kiswahili story. Even in Standard 7, the final year of the primary education cycle, almost one-quarter of students do not meet Standard 2 level proficiency. Results are somewhat better for basic numeracy (where the results have improved since 2010), but even worse for English. The results, which are representative at the district level, also reveal large geographic inequalities—with pass rates of 79 percent in the highest performing regions and of 27 percent in the lowest performing districts (Uwezo, 2013).

Health and Nutrition

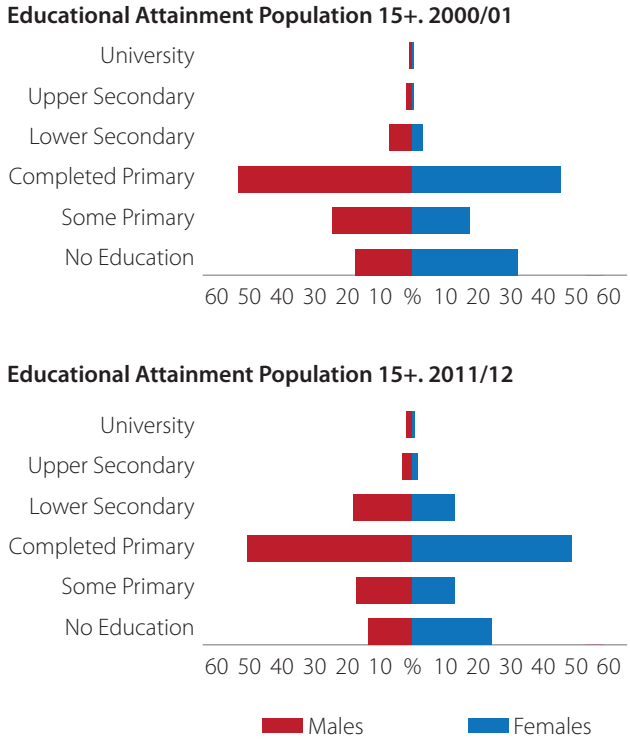
Infant mortality (which measures the probability of infants dying before their first birthday per 1,000 live birth) dropped from 68 in the 2004/05 to 51 in the 2010 (Figure I.12).[6] Under-five mortality, which measures the probability of children dying between birth and the fifth birthday, declined from 112 in the 2004/05 to 81 in the 2010. Since both indicators were already on a declining trend during the 1990s, Tanzania stands good chances of achieving the MDG target of reducing child mortality by two-thirds by 2015 (compared with 1990).

There is also cautious evidence of recent progress in maternal mortality. At 454 deaths per 100,000 live births—per the 2010 Demographic and Health Survey (DHS)—the maternal mortality ratio remains high, though it has come down from

[5] However, as discussed in World Bank (2014) the educational makeup and skill composition of the Tanzanian labor force today still resembles that of Thailand in 1975 and the country has a long way to go to catch up with the emerging economies in Asia and Latin America.

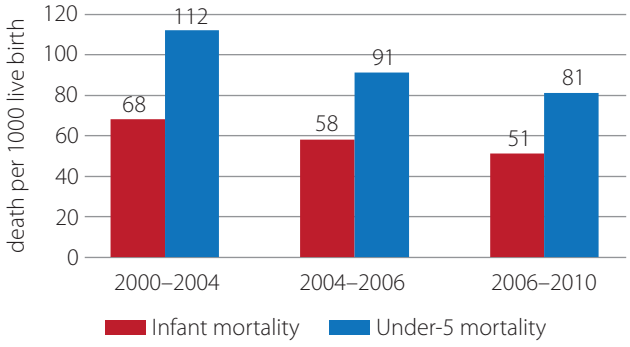
[6] Child mortality estimates in the 2004/05 DHS refers to the period 2000–04/05, and in the 2010 DHS to the period 2006–10.

Figure I.11 Educational Attainment is Improving Slowly



Source: HBS 2001 and 2011/12.

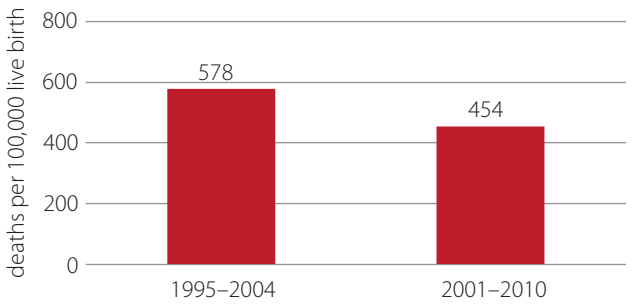
Figure I.12 Continued Reductions in Child Mortality, 2004/05–2010



Source: DHS data; NBS; and ICF Macro 2011.
Note: The figures include data for Zanzibar.

578 in the 2004/05 DHS (Figure I.13). While this change is not statistically significant, it suggests a departure from the increase in maternal mortality observed between the 1996 and 2004/05 DHS.[7] However, Tanzania will not achieve the MDG targets on maternal mortality.

Figure I.13 Recent Improvements in Maternal Mortality, 2004/05–2010



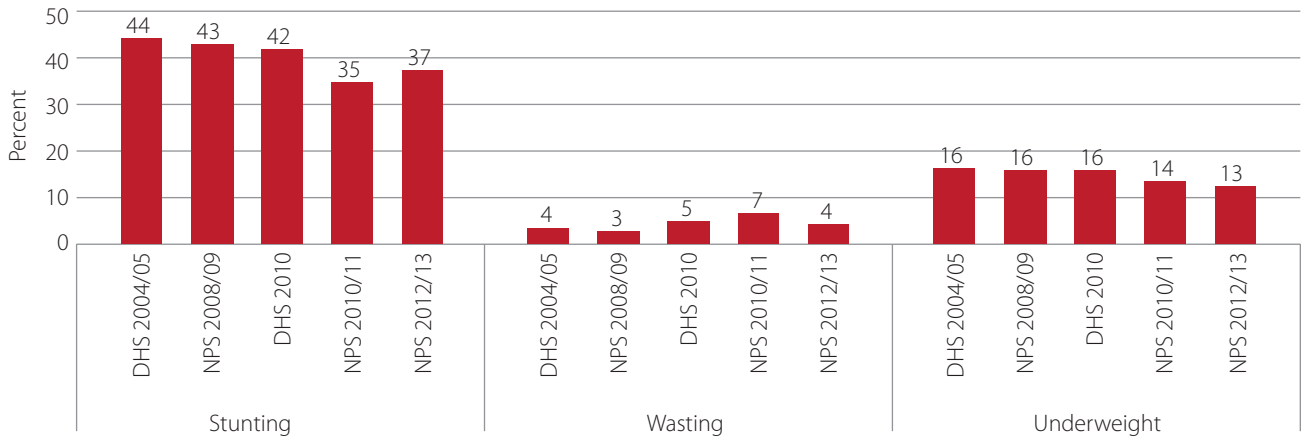
Source: DHS data; NBS; and ICF Macro 2011.
Note: The figures include data for Zanzibar.

Anthropometric indicators for young children show some improvement since 2004/05, but the trends are uneven and malnutrition continues to be widespread. Stunting, defined as reduced height for age and an indicator of chronic malnutrition, was consistently high between the 2004/05 and 2010 DHS (at 42–44 percent). It came down to 35 percent in the NPS 2010/11 but rebounded to 37 percent in the NPS 2012. Underweight (low weight for age) fell slightly from 16 to 13 percent. Wasting, measured as low weight for height and an indicator of acute food shortage or infectious disease (such as diarrhea), increased from 2.6 percent in 2004/05 to 6.6 percent in 2010, but declined to 4.2 percent in 2012 (Figure I.14).

Malnutrition appears even more widespread if one considers the risk a child faces of suffering undernourishment at some point in time. Fifty-five percent of children less than 3 years old at the time of NPS 2008 fieldwork were stunted, and 22 percent were underweight, at least once before reaching age five (based on at least two independent observations at different points in time). This risk falls slightly for children of the same age at the time of NPS 2010. Fifty-two

[7] The lack of statistical significance partly mirrors that maternal death is a rare event in the surveys, so that mortality ratios tend to come with large standard errors (NBS and ICF Macro 2011). In addition, maternal mortality rates are measured for the 10-year period preceding the survey, which also implies that the indicator does not react immediately to changes in the socioeconomic environment.

Figure I.14 Uneven Progress in Child Nutrition, 2004/05–2010/11



Source: DHS Statcompiler (2014); URT (2011); and Seff et al. (2014).

Notes: Figures include data on Zanzibar. Children are below 5 years of age. Z-score below – 2 SDs. Based on the 2006 WHO child growth standards.

percent of those children were at risk for ever being stunted and 19 percent for being ever underweight.

Infections such as Malaria and HIV continue to account for a substantial burden of disease. With an estimated 10 million malaria cases in 2010, Tanzania continues to be one of the most affected country by the disease in the World.[8] HIV/Aids prevalence in 2012 was estimated at 5.1 percent of the population ages 15–49 years, slightly above the SSA average (4.7 percent) but somewhat below prevalence rates in other East African countries (for example, Uganda 7.2 percent and Kenya 6.1 percent).

C. Dynamics of Well-being

Living conditions and human capital appear to have improved over time, despite the persistence of important deprivations and gaps in many dimensions of human well-being. But these improvements are not homogenous for all household groups and may hide significant fluctuations in the well-being. Some households may have experienced improvements in their economic status, while others may have fallen into a state of poverty. These dynamics cannot be tracked by cross-sectional HBS data but require panel data series. This study uses the three waves of the NPS—fielded in 2008/09, 2010/11, and 2012/13—to explore more in depth the dynamics of well-being in Tanzania during the past five years.[9] The analysis examines the movement in and out of economic status quartiles, where economic status is measured by consumption and each quartile represents one-fourth of the population. It examines the main characteristics of the households who experienced a decrease in their economic status or remained trapped in the poorest quartile.

There are substantial variations in households' economic status, both positive and negative. Around 60 percent of the population changed economic status, in the distribution of consumption, between 2008 and 2013.[10] About half of them moved up in economic status, while the other half experienced a deterioration of their economic status. The poorest and richest population groups were less likely to change their economic status than those in the middle classes.

Table I.2 shows movement between economic status quartiles for the first and last round of the NPS. Economic status

[8] The World Health Organization considers Tanzania to be one of the four countries with the highest malaria burden in Africa, along with Nigeria, DRC, and Uganda (WHO 2012). The other data cited in this section are based on the World Development Indicators (WDI 2014).

[9] The analysis is based on the paper by Seff et al. (2014). The three waves of NPS are for 2008/09; 2010/11, and 2012/13.

[10] The change of economic status is related to the change of quartile in the distribution of per adult equivalent consumption, where each quartile represents 25 percent of the population.

quartiles are created for each wave of the NPS using real consumption expenditure per adult equivalent, where the first quartile reflects those at the bottom 25 percent of annual expenditure and the fourth quartile represents consumers at the 75th percentile of expenditure and above. The results are presented through transition matrices, where the diagonal moving from the top left to the bottom right reflects those individuals who have maintained their level of consumption expenditure between rounds, those in the bottom left triangle have fallen to a lower welfare quartile, and individuals in the upper right triangle have improved their welfare quartile.

Many Tanzanians are trapped in poor well-being status.[11] Of those who were in the poorest quartile in 2008, about half (12 percent) were still in the poorest quartile in 2013. Such individuals are likely trapped in chronic poverty.

Many Tanzanians have experienced a deterioration in their living standards. Around 30 percent of the population has moved to lower economic status during the past five years. Among them 13 percent have moved to the lowest quartile, falling into poverty. This reveals that many Tanzanians are vulnerable to poverty, even among those that are not currently poor. Those who became poor are generally those who lack assets, mainly agricultural land and livestock, while those better endowed with assets have been more able to improve or at least maintain their economic status.

The urban residents were more likely than the rural ones to maintain their economic status, but the difference between the two areas, in the likelihood of maintaining the economic status quartile, significantly declined over time. Between the first two waves of NPS data, the percentage of individuals who maintained their economic status was 48 percent in urban areas against 37 percent in rural sectors. These percentages dropped, respectively, to 43 percent and 39 percent between the last two waves.

Table I.2 Changes in Economic Status across Quartiles, Wave 1 (2008/09) to Wave 3 (2012/13)

Wave 1 quartiles	Wave 3 quartiles				Total
	1st (poorest)	2nd	3rd	4th (top)	
1st (poorest)	12% (1.0)	7% (0.7)	4% (0.5)	2% (0.3)	25%
2nd	8% (0.7)	7% (0.6)	7% (0.7)	3% (0.4)	25%
3rd	4% (0.4)	7% (0.6)	7% (0.6)	7% (0.7)	25%
4th (top)	1% (0.2)	4% (0.4)	7% (0.6)	13% (0.9)	25%
Total	**25%**	**25%**	**25%**	**25%**	

Source: Seff et al. 2014.

Notes: Point estimates are weighted to population of individuals in wave 1; Standard errors in parentheses are corrected for stratification and clustering. Total observations are: 3,082.

III. Moderate and Fairly Stable Inequality

This section examines the extent and structure of inequality in the distribution of household consumption expenditures, using data from three rounds of HBS for 2001, 2007, and 2011/12. It is now widely admitted that above a certain threshold, inequality undermines growth and poverty-alleviation efforts and affects the length of growth spells.[12] Reaching a better understanding of how pervasive and deep are inequalities in Tanzania, would help the design of policies to accelerate the reduction of poverty.

A. The Level and Trend of Consumption Inequality

Tanzania shows moderate levels of inequality in 2012. With the Gini coefficient estimated at less than 40, inequality in Tanzania is moderately high by international standards but lower than Sub-Saharan average inequality. The Gini coefficient of real per capita monthly consumption indicates that the level of inequality for Tanzania is approximately 36, below the SSA average of 45.1 and the low income countries average of 40.[13] Among East African countries, Tanzania's Gini coefficient is below that of Burundi, Kenya, Uganda, and

11 Here we use a relative concept of "poverty," which basically implies that the household falls into the poorest consumption quartile.

12 See UNDP 2013; Chambers and Krause 2010; and Berg and Ostry 2011, among others.

13 Africa's Pulse (2013) and WDI Gini indicators.

Rwanda and is only slightly higher than Ethiopia.[14] It is on par with levels of inequality in South and East Asia, which range around 38.4, and significantly lower when compared to parts of South America, such as Mexico, Bolivia, and Brazil, where levels of inequality range from 47 to 55.[15]

It is worth mentioning that the levels of inequality in Tanzania are likely higher than the figures reported here, as the available surveys fail to sample the richest households and to capture the rising concentration of wealth among people at the top end of the distribution. Also, the consumption aggregate used to measure inequality excludes expenditures on housing and durable goods. Expanding the food and nonfood expenditure aggregates to include these expenses would probably increase inequality. Finally, expenditure-based measures of inequality tend to underestimate income inequality because expenditure is closer to permanent income and is likely to be less dispersed than current income.

Inequality in Tanzania shows a slightly decreasing trend over time. The Gini coefficient decreased from 38.8 to 35.8 between 2001 and 2012 (see Figure I.15). The HBS and NPS datasets show slightly different levels and trends for inequality. This is possibly due to differences in measurement methods of consumption expenditures between the two datasets. The first uses the diary method and the second a seven-days-recall method for collection of food consumption data.[16] Also, NPS data do not collect information on clothing expenditures, and there have been no changes in the survey design similar to those introduced in HBS. But although the inequality estimates from NPS did not confirm the declining trend of inequality, it still provides evidence of moderate and fairly stable inequality at a level below 40-as estimated by Gini index.

For the rest of the analysis in this section, the study uses the HBS, as it is the nationally representative survey that is specifically designed for national measures of poverty and inequality.

Dar es Salaam and secondary cities display more unequal distributions of consumption than rural areas. The Gini coefficients are respectively of 36, 38, and 30 for the capital city, rest of urban, and rural areas in 2011/12. The distribution of consumption is equalizing over time in all the regions, with the most substantial improvement occurring in the rural areas, as can be seen from the changing shape of the Lorenz curves in Figure I.15. Much of the reduction in inequality seems to be driven by an increase in the welfare share accruing to the poorest segment of the population, as the consumption share of the poorest quintile grew by more than 16 percent between 2001 and 2011/12 and by over 20 percent during the past five years, except in the secondary cities, where it grew by only 11 percent over the past decade (bottom part of Figure I.15). Even though part of the increase in the share of consumption going to the bottom quintile can be attributed to improvements in the survey design, the adjusted inequality estimates using the reweighting procedure, as well as the small area estimation techniques, reveals also positive changes over the past decade in the consumption shares of the lowest quintile groups.

B. The Structure of Consumption Inequality

The positive picture of equalization of consumption distribution patterns in Tanzania may hide persisting inequalities between groups. It is important, thus, to examine the structure of inequality and to investigate the extent to which consumption inequality is attributable to variations between population subgroups. This investigation can be carried out by the decomposition (or breakdown) of inequality by population subgroups, which consists of separating overall inequality in the distribution of consumption into inequality within population subgroups and inequality between them. (For more see Box 1.2.)

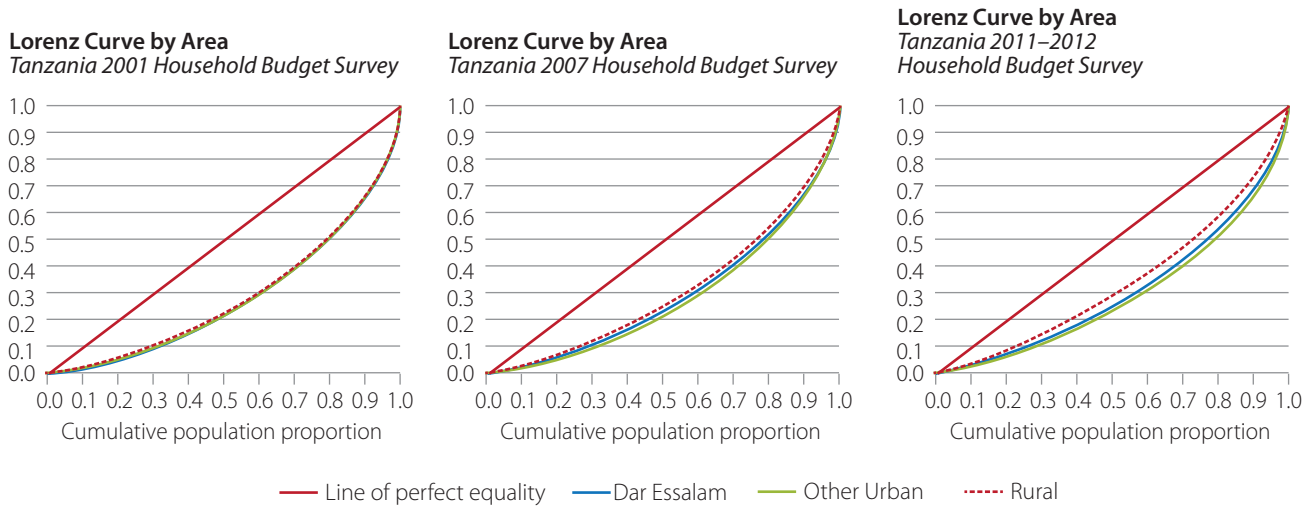
Table I.3 provides summary results of the shares of inequality explained by the differences between population subgroups partitioned according to eight household attributes (the gender, age, educational level, activity status, and sector of employment of the household head and the regional

[14] The Gini coefficients in some East African countries are 46 for Burundi in 2012; 47.7 in Kenya in 2005; 44.3 in Uganda in 2009; 50.8 in Rwanda in 2011; and 33.6 in Ethiopia in 2011.

[15] World Development Indicators database (WDI 2014). The GINI coefficient for Latin American countries is based on income which generally shows higher variability than consumption.

[16] A study by Beegle et al. (2012) revealed that diary-based collection of food consumption data leads to lower inequality estimates than recall-based collection.

Figure I.15 Lorenz Curve and Inequality Coefficients



	2001				2007				2011/12			
			Income shares				Income shares				Income shares	
	Gini	p90/p10	Low quintile	Top quintile	Gini	p90/ p10	Low quintile	Top quintile	Gini	p90/p10	Low quintile	Top quintile
National	38.78	5.42	6.52	45.88	38.50	5.18	6.62	45.72	35.84	4.39	7.73	44.07
Rural	37.23	5.08	6.83	44.55	35.54	4.66	7.26	43.33	29.86	3.53	8.98	39.06
Other urban	38.80	5.69	6.27	45.49	39.96	5.96	5.98	46.58	38.14	4.92	6.96	45.65
Dar es Salaam	39.77	5.60	6.44	46.55	40.12	5.60	6.44	47.26	36.04	4.36	7.74	44.40

Source: HBS 2001, 2007, and 2011/12.

location, the urban/rural status, and the demographic composition of the household).[17]

Over 20 percent of total real per capita consumption inequality in 2011/12 can be explained by inequality between six groups of households sorted by the educational attainment of the head. As expected, mean consumption levels of the different educational groups increase with the education of household head, and more than double when the education of the head is above completed primary. There are also substantial differences in average consumption levels between household groups headed by university graduates and those headed by secondary graduates.

Differences between education groups seems to be increasing over time—the share of inequality attributable to the household head's education, in both Theil_L and Teil_T, is around 6 percentage points higher in 2011/12 than in 2007 and more than doubled since 2001. This increase is mainly driven by the widening disparities between household groups whose head has not completed the primary education level and whose head is illiterate as well as by the more than proportionate expansion of the mean consumption level of tertiary educated groups relative to the other groups. Families headed by university graduates seem to have been able to benefit from economic growth more than the other households.

Inequality between geographic regions is increasing as well. Even though consumption inequality remained relatively stable or slightly decreased over time, the welfare gaps between urban and rural areas and between

[17] For details on the different household characteristics used in the decomposition, see appendix 1.D.

Box 1.2 Inequality Decomposition

The static decomposition of inequality enables one to explore how the differences in households' characteristics affect the level of inequality and provide important clues for understanding the underlying and changing structure of real per capita consumption distribution in Tanzania.

The decomposition follows the approach of Cowell and Jenkins (1995) and consists of separating total inequality in the distribution of consumption into inequality between the different household groups in each partition, I_{Betw}, and the remaining within-group inequality, I_{Within}. As the most commonly decomposed measures in the inequality literature come from the General Entropy class, mean log deviation (Theil_L) and the Theil_T indices in real per capita monthly consumption expenditure are used to identify the contribution of between-group differentials to total inequality. The General Entropy inequality measures allow total inequality to be equal to $I_{Betw} + I_{Within}$ and the amount of inequality explained by households attributes (or group of attributes) is measured by I_{Betw}/I_{total} , where between and within group inequalities are defined, respectively, for Theil_L and Theil_T indices as

$$I_{Betw} = \left[\sum_{j=1}^{k} f_j \log\left(\frac{\mu}{\mu_j}\right)\right] \quad I_{Within} = \sum_{j=1}^{k} f_j GE_0^j$$

$$I_{Betw} = \left[\sum_{j=1}^{k} f_j \left(\frac{\mu_j}{\mu}\right) \log\left(\frac{\mu_j}{\mu}\right)\right] \quad I_{Within} = \sum_{j=1}^{k} v_j GE_1^j$$

with f_j the population share, $\mathbf{v}_j$ the consumption share, and $\boldsymbol{\mu}_j$ the mean consumption of subgroup j; $\boldsymbol{\mu}$ total mean consumption, GE_0^k Theil_L index, and GE_1^k Theil_T index of subgroup j.

with: $Theil\_L = 1/n \sum_{i=1}^{n} \log\left(\frac{\bar{y}}{y_i}\right)$ and $Theil\_T = 1/n \sum_{i=1}^{n} \left(\frac{y_i}{\bar{y}}\right) \log\left(\frac{y_i}{\bar{y}}\right)$

y_i: is real monthly per capita consumption expenditure for household i and $\bar{y}$ is mean real monthly per capita consumption expenditure.

geographic regions increased substantially. Differences between urban and rural areas as well as disparities between geographic locations account for more than 17 percent of overall inequality in the most recent survey. The differences in average consumption levels between household groups living in urban zones and those located in rural areas are quite substantial. The welfare gap between these groups has widened over time, increasing by over 9 percentage points between 2007 and 2011/12 and more than tripling since 2001. This increase is driven by the considerable expansion of the average consumption level of households in Dar es Salaam, which grew proportionately much more than average consumptions of household groups in the other locations.

Interregional inequalities, already important in the beginning of the decade, are gaining importance over time, increasing by more than 10 percentage points since 2001. These widening disparities can be explained mainly by the uneven growth of the average consumptions of household groups across the different geographic locations, as consumption levels for households in the coastal and central zones have increased proportionately more than for households in the other regions.

There are quite important welfare disparities between sectors of employment groups. The share of total inequality attributable to the differences in the mean consumptions of these sectors is around 13 percent. Household groups headed by government employees and private sector employees are much better off than groups with heads employed in the other sectors. Inequality between these groups slightly increased in 2011/12 due to a more than proportionate increase of the average consumption level of household groups headed by private sector employees relative to the other groups.

Table I.3 Decomposition of Inequality by Household Attributes

	2001 Share of inequality explained by (%)		2007 Share of inequality explained by (%)		2011/12 Share of inequality explained by (%)	
	Theil-L	Theil-T	Theil-L	Theil-T	Theil-L	Theil-T
Education of head	9.94***	10.20***	14.70***	15.40***	20.80***	21.10***
	(0.021)	(0.028)	(0.010)	(0.012)	(0.015)	(0.014)
Gender of head	0.000	0.000	0.000	0.000	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Age of head	1.99***	1.73***	1.19***	1.04***	1.32***	1.08***
	(0.006)	(0.005)	(0.003)	(0.003)	(0.003)	(0.003)
Activity stat. of head	0.751	0.700	0.48**	0.39**	0.32*	0.25*
	(0.014)	(0.016)	(0.002)	(0.001)	(0.001)	(0.001)
Empl. sector of head	9.87***	9.13***	12.60***	12.10***	13.70***	12.60***
	(0.013)	(0.011)	(0.010)	(0.010)	(0.010)	(0.009)
Family type	12.10***	13.00***	10.50***	11.20***	10.60***	10.30***
	(0.018)	(0.021)	(0.008)	(0.009)	(0.008)	(0.009)
Urban/rural status	5.76***	5.39***	8.69***	8.27***	19.10***	17.40***
	(0.009)	(0.010)	(0.007)	(0.007)	(0.012)	(0.012)
Regional location	6.79***	6.03***	11.50***	10.50***	18.40***	16.60***
	(0.012)	(0.010)	(0.010)	(0.009)	(0.011)	(0.011)

Source: HBS for 2001, 2007, and 2011/12.

* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

Differences in households' demographic composition accounts for a quite significant share of total inequality, amounting to around 11 percent. Households comprised of only adults all over 14 years old, whether single or in couples, are much better off than the rest of household groups, while elderly households whose head is 65 years old or over seem to face severe hardships and have the lowest mean per capita consumption levels. The contribution of family composition to inequality seems to slightly decline over time.

The gender, age, and activity status of the household head have marginal explanatory powers barely exceeding 1 percent. Total consumption inequality is overwhelmingly a matter of inequality within these various household groups. The low share of gender in these decompositions can be explained by the low proportion of woman-headed households in the sample, amounting to less than 20 percent, and the particular status of women who head their own households, as most are widowed, running their own agricultural business, or benefitting from remittances from family abroad.

Chapter 2

Poverty Profile

Key Messages

- Despite the improvements in the poverty level, there are still nearly 12 million Tanzanians living in poverty.
- Poverty is associated with larger families, lower education, and low access to infrastructure.
- Nonfarm diversification and internal migration can make an impact on poverty alleviation
- Migration contributes to raising the welfare of migrant households as well as that of their families left behind.

The previous chapter shows that poverty has started to decline and that improvements of households' living standards have been coupled with improvements in the other dimensions of well-being. However, despite these positive changes, around one-third of the Tanzanian population continues to live in poverty, and an important proportion of the population in the poorest groups is likely to be trapped in persistent poverty.

The "Tanzanian poor" are not a homogeneous group and poverty is not a single problem that can be solved with a stand-alone or uniform package of policy measures. In order for the government and other stakeholders to instigate appropriate pro-poor measures, it is necessary to understand in detail the characteristics and profiles of the most disadvantaged groups and the different constraints they face.

This explores the correlates of poverty in Tanzania and who is most affected. As recent literature on Tanzania highlights the positive impact of migration on economic mobility and poverty, the analysis will focus on the welfare payoffs of internal migration and examine the potential for geographic mobility to improve poor households' living standards.[18]

I. Still Too Many Poor and People Clustered Around the Poverty Line

Around 12 million Tanzanians continue to live below the poverty line. The improvements of poverty over time have not resulted in a significant decline of total number of poor people. The rapidly growing population in Tanzania—which increased from around 38 million in 2007 to 42 million in 2011/12—slowed the reduction of the absolute size of poor population.[19] As a result, the total number of poor people declined by only 10 percent, falling from 13.2 million in 2007 to 11.9 million in 2011/12. The absolute number of extreme poor declined even more slowly, by 7 percent, falling from 4.5 million to 4.2 million.

[18] See Beegle et al. (2011) and Christiaensen et al. (2013).

[19] The total population for mainland Tanzania in HBS 2011/12 (42.3 million) is slightly lower than the total population captured in the 2012 population and housing census (43.6 million).

A large share of the Tanzania population is clustered around the poverty line, vulnerable to fall into poverty but also likely to escape from it. The poverty depth indicator shows that many of the poor are close to the poverty line, likely to escape poverty through small improvements of their living standards. Likewise, slight increases in the value of the poverty line can lead to significant increases in the estimated poverty levels. For instance a rise of the poverty line by 25 percent—a mere additional T Sh 300 per adult per day—increases the poverty headcount by more than 50 percent (Table II.1).[20]

The international poverty rate is 43.5 percent, around 15 percentage points higher than the national poverty rate. Tanzania's national poverty line reflects the country's specific costs of basic consumption needs, but is difficult to compare with other countries poverty thresholds. To overcome this issue the international poverty line of US$1.25 per capita per day (in 2005 PPP exchange rate) is often used to evaluate a country's poverty record vis-à-vis other developing countries or regions.[21]

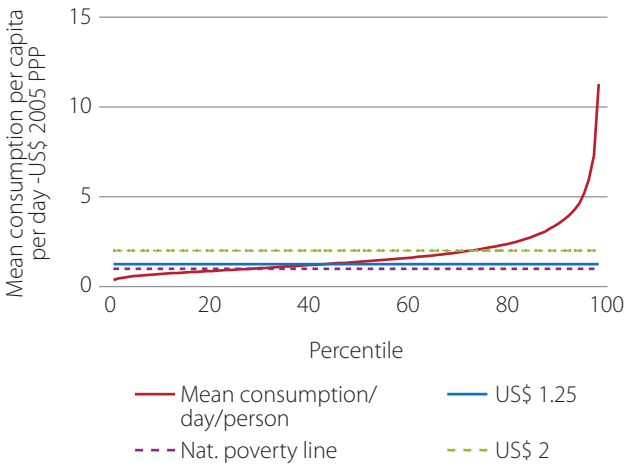
The US$1.25 international poverty line is slightly higher than the 2011/12 basic needs poverty line but yields a significantly greater poverty rate of 43.5 percent compared to the national poverty rate of 28.2 percent.[22] This is due to the clustering of people around the poverty line, as can be seen also in Figure II.1, which plots average consumption (per capita per day) for each percentile of the consumption distribution. At the bottom end of the distribution, the curve appears relatively flat, showing that many people are in close vicinity of the basic needs poverty line (sienna solid line). The solid green line, which represents the international poverty line, crosses the consumption distribution close to the 44th percentile, indicating a quite significant increase of the poverty rate due to relatively small changes in the poverty line.

Table II.1 Poverty Headcount for Alternative Poverty Lines, 2011/12

Change	Poverty line (T Sh)	Δ (T Sh)	National poverty headcount (%)
+0%	36,482		28.2
+5%	38,306	1,824	30.8
+10%	40,130	3,648	34.7
+15%	41,954	5,472	37.9
+20%	43,778	7,296	41.2
+25%	45,603	9,121	43.8

Source: HBS 2011/12.

Figure II.1 Mean Consumption by Percentile (US$ at 2005 PPP)



Source: HBS 2011/12.

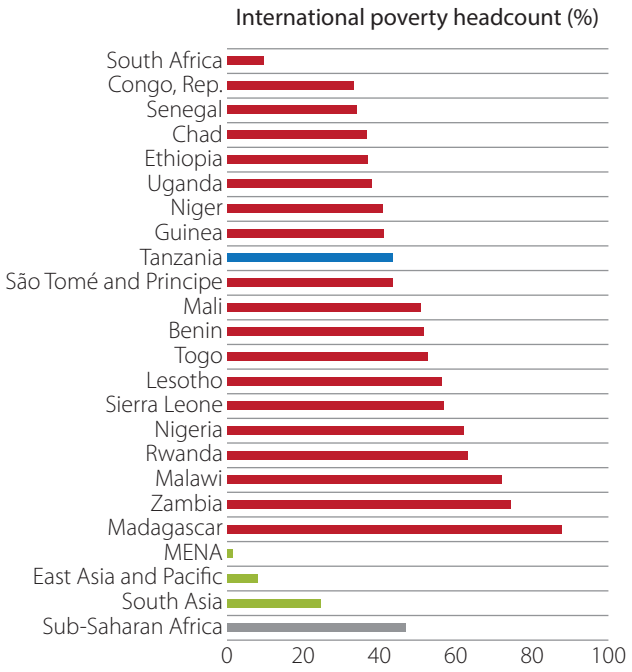
Tanzania's international poverty rate compares favorably with other SSA countries with similar income levels. Poverty is slightly lower than the SSA average of 46.8 percent. As can be seen in Figure II.2, poverty is relatively less pervasive in Tanzania than in the neighboring countries that have similar

20 T Sh 120 corresponds to US$0.17 at current official exchange rates.

21 Global poverty estimates are based on an international poverty line of US$1.25 per person per day, converted into local currency using purchasing power parity estimates (PPPs) rather than currency exchange rates. Official World Bank estimates of global poverty use PPPs from 2005 (from the International Comparison Program of 2005). In 2014, a new set of PPPs was released (International Comparison Program of 2011). At this time, the World Bank has not updated its global poverty estimates to be based on the 2011 PPPs; the World Bank is currently examining the 2011 PPPs in the context of global poverty monitoring. In this report we also use the 2005 PPPs to be consistent with official World Bank global poverty estimates.

22 The national poverty line is equivalent to about US$1 per capita per day in 2005 PPP. We should highlight that each of these national and international approaches for the measurement of the poverty line has its strengths and limitations. While international poverty lines allow comparability between countries and over time, they remain inevitably arbitrary. The national poverty lines, despite their limits, are more closely tailored to the actual costs of livings in the country.

Figure II.2 Poverty Estimates in Tanzania and Other Developing Countries by Percentage



Source: PovcalNet estimates for the period 2010–2012.

Note: Poverty estimates based on the US$1.25 per person per day international poverty line. Country level poverty estimates are for the period between 2010 and 2012. Region averages are estimated using PovcalNet for the year 2011. These figures are provisional and subject to be updated.

income levels. Nevertheless, it remains relatively higher than in Uganda, Chad, Senegal, Democratic Republic of Congo, and Ethiopia. When compared to other developing regions, poverty seems much more prevalent in Tanzania. It is around 4 percentage points higher than average poverty levels in South Asia and over 20 percentage points higher than in East Asia, the Middle East, and North Africa region, where average international poverty rates are estimated, respectively, at 24.5, 7.9, and 1.7 percent.[23] However, most countries in these regions also have much higher average per capita GDP levels.

II. The Characteristics of the Poor

Geographic location matters—poverty is overwhelmingly rural, with more than 80 percent of the poor and extreme poor Tanzanians living in rural areas (Figure II.3). Despite urbanization, over 70 percent of the Tanzanian population continued to live in the rural zones in 2011/12, relying on subsistence agriculture and low productivity jobs. Around 10 million of this population is in poverty and 3.4 million is in extreme poverty, compared to respectively less than 1.9 million and 750,000 people who live in poverty and extreme poverty in the urban sector.

The specific geographic location also matters for poverty. As apparent from Tables 2.B-1 and 2.B-2 in Appendix 2.B, households living in coastal regions have a higher standard of living and are less likely to be poor than those located in the south and to a lesser extent the southern highlands.

The demographic structure of the household is closely associated with poverty. Figure II.4 illustrates some of the key links with family type, number of children and the age of the household head. Households with children, followed by elderly families, have the highest poverty rates. In contrast, those without children appear to be less poor.

Households with a large number of dependents and more children under the age of 14 are poorer (tables 2.B-1 and 2.B-2). Poverty is particularly high among households with five or more children. The interaction between family size and poverty is bidirectional. On one hand, the large number of children and dependents affects the ability of the poor to cover basic food needs and move out of poverty. On the other, poor households tend to have more children to compensate their inability to invest in the human capital of their kids and as an insurance strategy against infant mortality, trapping them in a vicious circle of poverty.

Household size dynamics are in part reflected in the rural-urban poverty split. Table II.2 shows that the average number of children in rural poor households is greater than in families located in Dar es Salaam and to a lesser extent secondary cities. The number of children is also increasing in the rural sectors and among the poor, while it is constant for other urban households and declining in Dar.

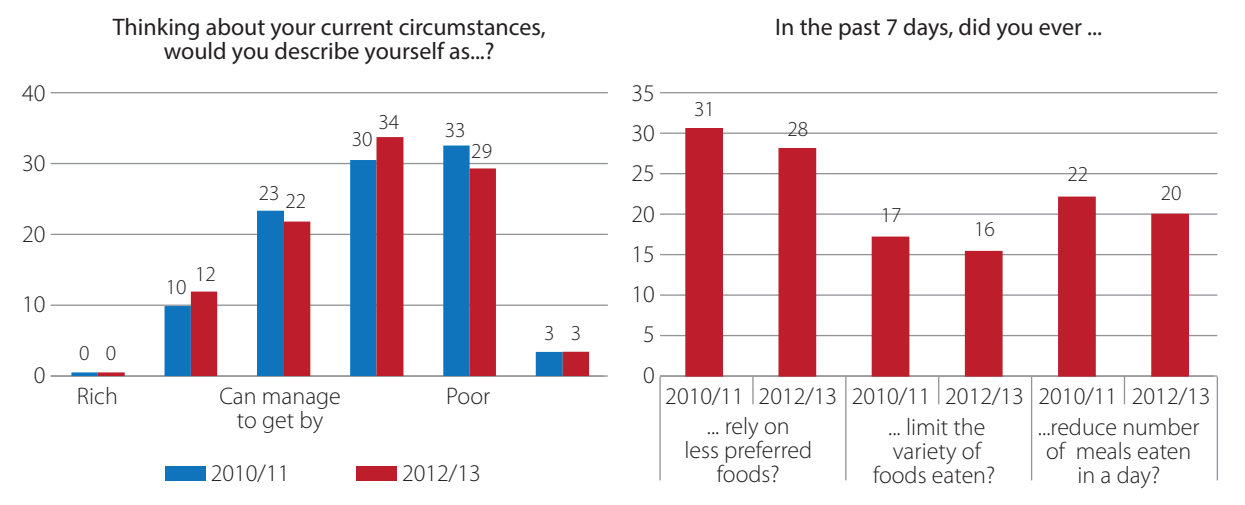
As in many parts of SSA, fertility is very high among poor families. The average Tanzanian woman is expected to give birth to five to six children by the end of her lifetime, and

[23] Based on PovcalNet estimates for 2011.

Box 2.1 Subjective Indicators of Deprivation

While Tanzania's poverty line appears relatively low by international standards, the level of basic needs poverty (28.2 percent) corresponds reasonably well to subjective indicators of deprivation. For instance, 35–32 percent of the population aged 15+ years in 2010/11 and 2012/13 classified themselves as poor or destitute. Furthermore, around 28–31 percent of the Tanzanian population reported having to rely on lower preference food during the preceding seven days in 2010/11 and 2012/13. Other indicators of food insecurity are somewhat lower. Of course, these subjective indicators measure something different than consumption-based poverty. Nonetheless the indicators suggest that the 2011/12 HBS poverty levels are somewhat in line with common perceptions about material deprivation, at least at the aggregate level.

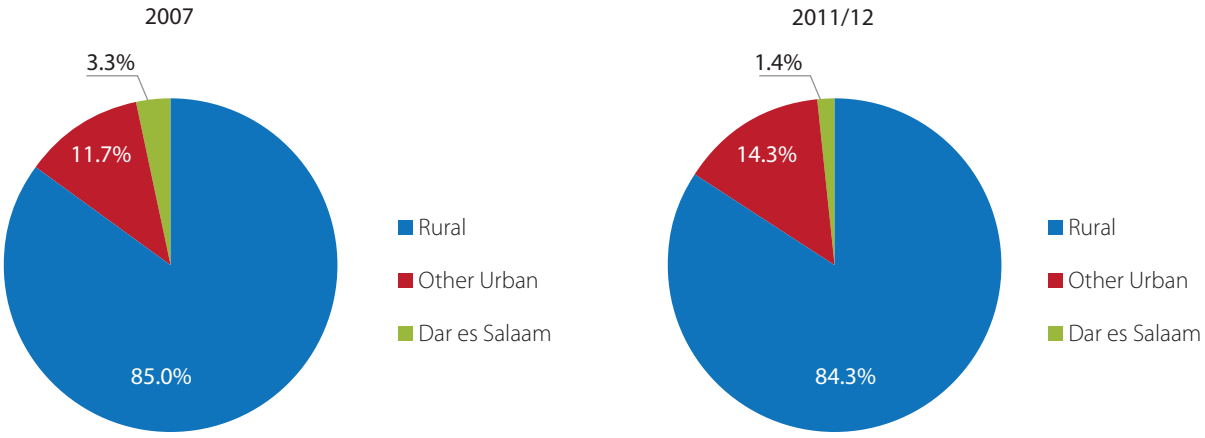
Figure B.2.1 Subjective Indicators of Deprivation



Source: National Panel Survey (NPS)

Notes: Food insecurity is population weighted. Subjective well-being is representative of the population 15+ years.

Figure II.3 Proportion of the Poor by Geographic Domain



Source: HBS 2007 and 2011/12.

Table II.2 Households' Demographic Structure

	Rural		Other urban		Dar es Salaam		Extreme poor		Poor households	
	2007	2011/12	2007	2011/12	2007	2011/12	2007	2011/12	2007	2011/12
HH size	6.76	7.33	5.96	6.29	5.13	5.47	8.10	8.18	7.40	8.31
Depend. ratio	0.51	0.51	0.44	0.42	0.36	0.33	0.54	0.54	0.53	0.53
No child. <14 yrs	3.30	3.67	2.59	2.60	1.88	1.86	3.72	4.24	3.13	4.28
No adult wom.	3.45	3.64	3.07	3.27	2.61	2.74	4.23	4.09	3.85	4.19
No adult men	3.29	3.67	2.80	2.94	2.41	2.57	3.85	4.08	3.53	4.11
Head women	18.67	18.67	26.20	23.62	22.51	21.16	23.11	21.16	21.16	19.09
Age of head yrs	46.26	47.01	44.20	45.59	43.51	43.99	49.05	48.01	47.94	48.42

Source: HBS 2007 and 2011/12.

Note: The dependency ratio is measured by the proportion of children below 14 years old and elderly above 65 years in the household.

this number increases to over seven for women in the poorest segments of the population.

Families with many children have been less successful in reducing poverty over time. From 2007 to 2011/12, the poverty headcount of families with 0–2 dependent children fell by 26 to 33 percent. Families with 3–4 children experienced a reduction in poverty by 19 percent, and families with 5 children or more had the lowest (relative) reduction in the poverty headcount, of just 5 percent.

On the surface, households with younger heads seem to fare much better than those with older heads. Poverty is lower and decreasing faster among households with a head 30 years old or younger (Figure II.4). However, this is largely due to the fact that young heads are generally better educated and have only just started their family lives and so have few children. When one controls for other sociodemographic characteristics of the household in a multivariate model, the effect of head age on poverty vanishes. This indicates that the age of the head does not significantly matter of living standards and poverty. (See figures II.5 and II.6 for more.)

Also, there is no significant relationship between the gender of household head and economic welfare of the household. The proportion of households headed by women seems to be larger among the poor and extreme poor, though this appears to be declining over time. While one can think that women-headed households fare worse than male headed ones, this effect could not be detected in a multiple regression analysis of the determinants of poverty. This may be explained by the fact that there are two main categories of women-headed households: (i) widows running their own household business and mainly located in the rural areas and (ii) single women working in the private sector in the urban areas and capital city. The former suffer from much higher levels of poverty as compared to the other groups.

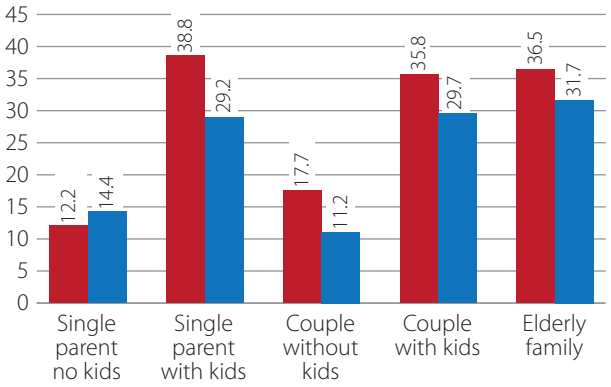
Poverty is associated with lower levels of education of the household head. The head's level of schooling is closely related to poverty incidence, suggesting that education is strongly linked to income-generating opportunities. The incidence of poverty declines considerably among households whose head has lower secondary education or above (Figure II.7). When one controls for the various sociodemographic effects in the regression model, education appears to be significantly positively associated with consumption, and the returns to education increase meaningfully with higher levels of the head's schooling.

Education positively affects living standards and poverty reduction directly, and also indirectly through its impact on health gains, productivity, social integration, and so forth.

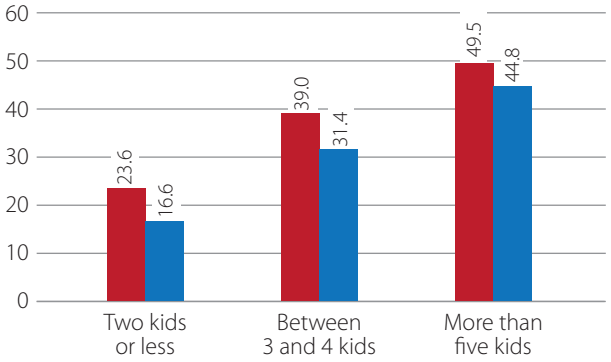
In particular, *secondary* education appears to be the most closely associated with higher living standards in both rural and urban areas, while primary education seems less important and is not significant in urban sectors (see tables 2.B-1 and 2.B-2). Although primary education continues to be of

Figure II.4 Poverty by Demographic Structure (%)

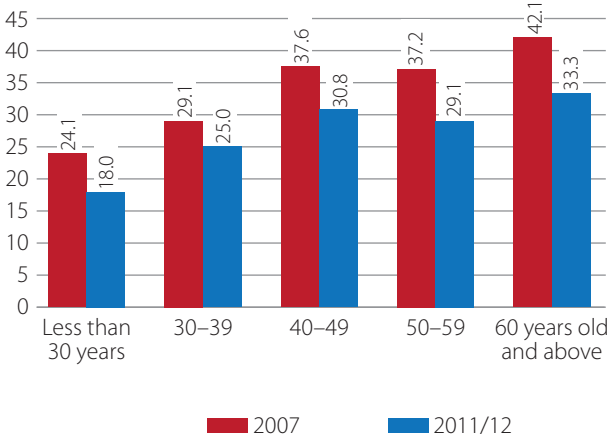
a. Family type



b. Number of children



c. Age of household head

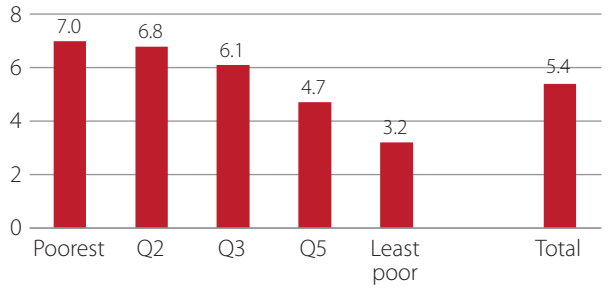


Source: HBS 2007 and 2011/12.

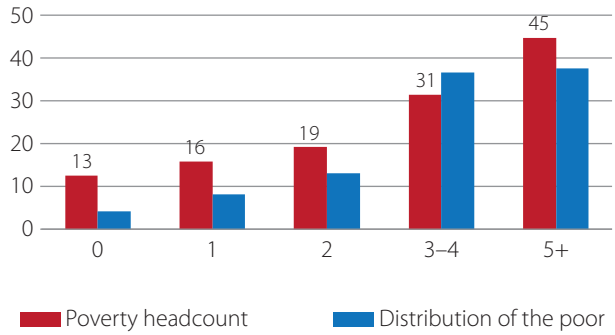
Note: Single parents with no kids are households composed of only adults over 14 years old, where the head is less than 65 years old and is either never married, divorced, separated, or widowed. Elderly families are households whose head is aged 65 years old and above.

Figure II.5 Poverty Goes in Hand with Large Family Sizes

a. Total fertility rate by wealth quintile, 2010

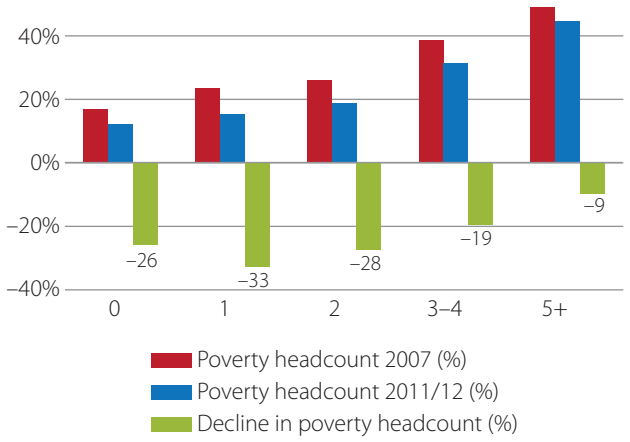


b. Poverty by number of children (0–14 years), 2011/12



Source: HBS 2011/12; and DHS 2010.

Figure II.6 Poverty Reduction by Number of Children (0–14 years), 2007–2011/12



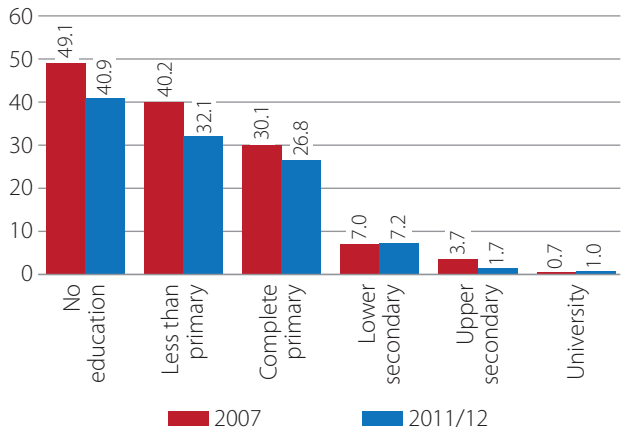
Source: HBS 2007 and 2011/12.

crucial importance for fighting against poverty, completing primary school seems not enough anymore to move out of poverty.

A surprising result in Figure II.7 is the decline of poverty over time for households with no education. This might be explained by two facts. On a one hand, there is an increase of ownership of large land plots, as the proportion of households with no education owning land of more than 5 acres increased from 37 to 47 percent between 2007 and 2011/12. Given that over 70 percent of these households are engaged in agriculture, this increase helps them to improve their living standards. On the other hand, the expansion of aid and assistance to these household groups, as the proportion of families with no education who receive pensions, remittances, and other transfers, went up from 5 to 20 percent during the past five years.

Wage employment in the private and public sectors is clearly associated with lower poverty for urban households. Poverty rates are lowest among households headed by government employees or employees in the private sector and NGOs (Figure II.8). The results in figure II.8a are in line with those in figure II.8b, showing that families with cash and in-kind revenues from employment, as their main source of income, are better off. Less than 20 percent of these families live in poverty.

Figure II.7 Poverty by Education Level of the Household Head (%)



Source: HBS 2007 and 2011/12.

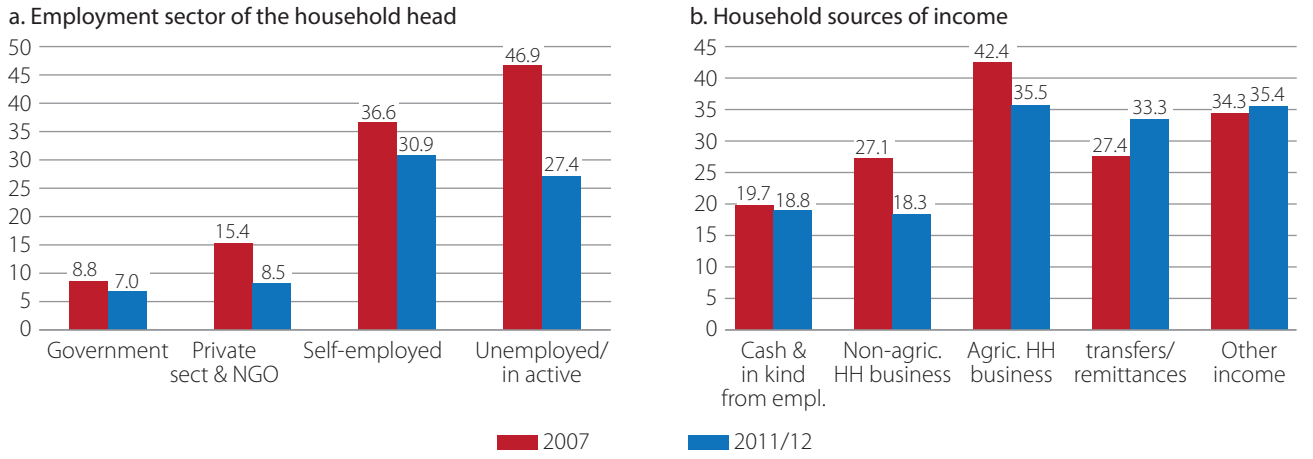
Interestingly, households that derive their income from non-agricultural businesses appear to be experiencing a remarkable decline in poverty. The poverty rate for these household groups dropped by around 9 percentage points (over 30 percent) during the past few years. This suggests that the development of nonfarm employment can offer a pathway out of poverty. This effect remains strong and highly significant even after controlling for various other factors related to household well-being. The regression analysis shows that employment in household nonfarm business is positively associated with greater levels of consumption and therefore negatively linked to poverty. This effect is much higher in the rural areas than in the urban zones (tables 2.B-1 and 2.B-2).

The regression results also indicate that agricultural employment is positively correlated with the probability of being poor. However, households who own larger land plots and who are able to commercialize their outputs are less likely to be poor. These beneficial effects can be large enough to offset the disadvantages of being engaged in agriculture. Thus, only households engaged in subsistence farming with low land holdings suffer from high levels of poverty.

There has been a movement out of agriculture between 2007 and 2011/12, as the proportion of households whose main source of income is agricultural activity declined from around 53 percent in 2007 to 39 percent in 2011/12. Even poor households seem less likely to work in agriculture in 2011/12 than they were in 2007, as their proportion declined from 64 percent to 47 percent between the two periods. This seems to have contributed to reducing the negative influence of working in agriculture on living standards and poverty, probably due the fact that part of those who remained in the sector are more productive and engaged more in cash crop production.

Households relying on transfers, remittances, and other incomes as main sources of revenues are experiencing a deterioration of their living standards (Figure II.8b). The poverty rate increased by about 6 percentage points (over 20 percent) for these households. A rather surprising result is related to the marked decline of poverty for households with an inactive and unemployed head. This result is probably due to the fact that many of those classified as unemployed work in the informal sector, but further analysis will be needed to better understand this finding.

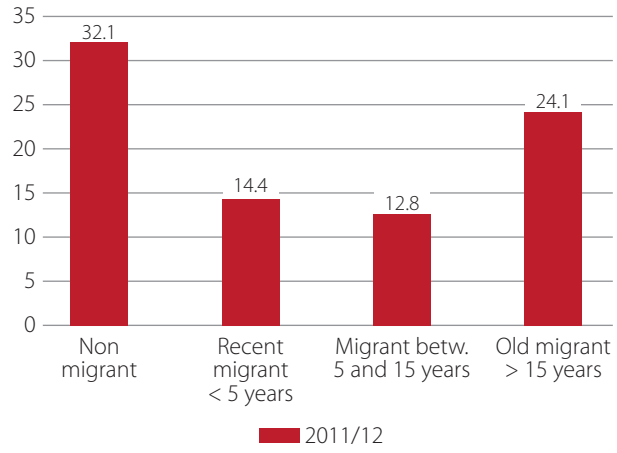
Figure II.8 Poverty by Sector of Work of Head and Sources of Income of the Household (%)



Source: HBS 2007 and 2011/12.

Recent internal migrants, who moved less than 15 years ago, are significantly less likely to be poor than nonmigrants. Unfortunately data on the place of birth and migration status are not available in HBS 2007, so the analysis is limited to the 2011/12 survey. It appears from Figure II.9 that poverty is much more prevalent among nonmigrant households. Households whose head migrated less than 15 years but more than five years ago fare the best followed by the very recent migrants. This is in line with most of the literature on migration, including that on Tanzania, which reveals strong positive linkages between geographic and economic mobility. The next section will explore these linkages more in detail.

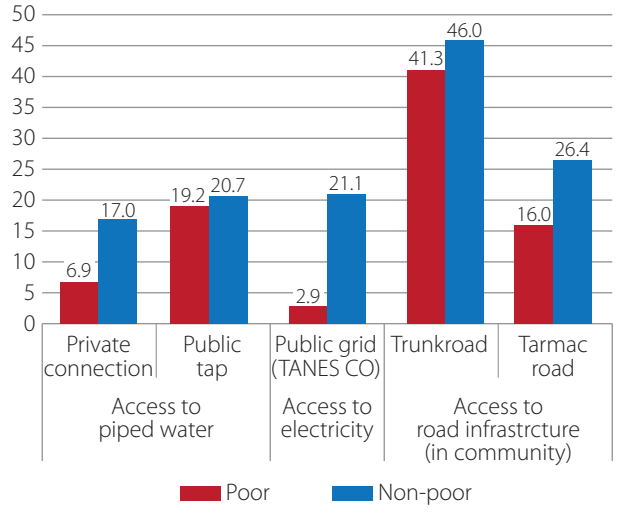
Figure II.9 Poverty by Migration Status (%)



Source: HBS 2011/12.

Poor households tend to have much lower access to infrastructure than nonpoor ones. Here again data availability is limited to HBS 2011/12, and it reveals that poor households tend to have much lower access to private piped water, electricity and tarmac roads (Figure II.10). The obstacles to infrastructure and services, particularly electricity and roads, seriously limit the possibilities of the poor to improve their living standards. Table 2.A-2 in appendix 2.A shows that electricity access has a very strong income gradient—varying

Figure II.10 Access to Public Infrastructure (%)



Source: HBS 2011/12.

Note: Connection to piped water is measured for dry season and private connection stands for connection inside and outside house.

from below 3 percent for the poorest quintile to 42 percent among the least poor quintile.

Connectivity to other soft infrastructure is also found to significantly increase consumption and reduce the risk of poverty. Tables 2.B-1 and 2.B-2 show that the presence in the household's community of a daily market and mobile phone signal impact positively on the consumption levels and reduce the probability of poverty. Access to these services is still quite limited in rural areas, hampering local opportunities to reduce poverty.

III. Migration and Poverty

The previous section shows that poverty is less prevalent among migrant households, suggesting a potential positive association between internal migration on poverty reduction. This evidence is supported by previous studies on internal migration and poverty in Tanzania. However, the available literature has mainly focused on the Kagera region and might not be conclusive about the benefits of migration for poverty reduction at the national level.[24]

This section explores internal migration in depth in all of Tanzania and its economic effects. The analysis relies on the three available waves of the National Panel Surveys—NPS1, NPS2, and NPS3—and proceeds in two parts.[25] The first investigates the features of migrants and examines the determinants of migration. The second explores the impact of migration on the living standards of migrants and their families left behind and analyses the relationship between migration, poverty, and remittance flows.

A. Migrant Features and Determinants of Migration

Over the past 20 years, Tanzania has experienced great internal migration, with half of its population migrating over the last two decades.[26] According to the latest available migration data from the 2002 census, 6.2 percent of the population in Dar es Salaam consists of recent migrants who moved between regions in 2001 and 2002 (NBS 2006). The regions of Pwani, Manyara, and Mwanza are the other main destinations of recent migrants, while Dodoma is the greatest sending region, with an out-migration rate of 12.6 percent.[27]

Table II.3 Migration by Gender and Period

	Total (%)	Men (%)	Women (%)
Lifetime migrant	40.72	43.06	38.94
Long-run migrant	25.44	22.52	28.12
Recent migrant	8.44	8.31	8.56
— Intraregional	4.45	4.29	4.60
— Interregional	3.99	4.02	3.96

Source: National Panel Survey, (NPS3 2012/13).

Note: *Recent migrants* are individuals that live in a different district in NPS2012 than in NPS2008. *Long-run migrants* are individuals that have migrated to the current district in the past 10 years. *Lifetime migrants* are individuals that live in a different district than their district of birth.

Migration Flows

Lifetime migrants represent about 40 percent of the population, and around 25 percent have migrated to their current district during the past 10 years. Table II.3 reports the distribution of migrants by gender and according to the duration of residence in the current location. It shows a higher proportion of lifetime male migrants compared to lifetime female migrants (see the note below table II.3 for definitions). However, women appear more likely to be

[24] See McKenzie et al. (2010), Lokshin et al. (2010), and Gibson et al. (2011), among others. For the studies on Tanzania, see Beegle et al. (2011), who investigated the relation between migration and economic mobility. DeWeerdt and Hirvonen (2013) analyzed the insurance mechanism in place between migrants and their households of origin, and Dimova et al. (2011) explored the relationship between emigration and child labor. These three studies focused on the Kagera region.

[25] NPS1, NPS2, and NPS3 stand for National Panel Surveys for 2008/09; 2010/11, and 2012/13, respectively. Appendix 2.C provides details on the surveys main characteristics.

[26] See de Weerdt and Hirvonen (2013).

[27] According to the 2002 census, stayers, i.e., individuals who reside in their region of birth, account for 83 percent of the population in Tanzania, with substantial differences between the geographic regions. The proportion of individuals born in Zanzibar and still resident at the time of the 2002 census is around 72 percent. Dar es Salaam is the focal point of attraction for lifetime migrants, as about 49 percent of the population residing in Dar es Salaam in 2002 was born in another region, while about 1.4 percent was born in another country (NBS 2006). A study by Muzzini and Lindeboom (2008) also shows that migrants' turnover is very high.

long-run migrants than men. This difference might be related to the variation of the reasons of migration between men and women, which will be explored later in the chapter. The recent migrants, who moved between the two waves of the survey, represent only 8 percent of the population, suggesting that people migrate over a longer period of time. They seem more willing to migrate within the same region.

Dar es Salaam is a popular destination for migrants from Pwani, Lindi, Mtwara, and Morogoro. Tables 2.C-2 and 2.C-3 in Appendix 2.C represent the interregional migration movements. Dar es Salaam is the most attractive migration destination, and Mwanza also receives an important flow of migrants, particularly from Kagera, Shinyanga, and Mara. There is also a high degree of migration within the regions in Zanzibar. These patterns are broadly consistent with the patterns noted in the 2002 census and indicate migration movements mainly toward the major urban areas

Characteristics of Migrants

Long-run migrants tend to be significantly younger than non-long-run migrants, they are usually married, and about 84 percent are literate. Table II.4 presents the characteristics of migrants by length of the migration experience. Lifetime migrants are slightly younger than nonlifetime migrants and are more likely single. Other differences between lifetime migrants and nonlifetime migrants emerge when looking at the type of activity. Lifetime migrants are more likely to work for pay and to work as self-employed.

There is no significant difference between long run and non-long-run migrants in terms of labor activity, however, differences emerge when considering the type of activity. In line with previous results, a larger percentage of long run migrants works for pay or is self-employed.

Finally, panel c of Table II.4 presents the results for recent migrants and shows the difference between recent migrants and nonrecent migrants only in school attendance and labor activity. The percentage of recent migrants attending school is lower than nonrecent migrants, while the fraction of recent migrants who are labor active and who work for pay is larger than nonrecent migrants.

Table II.4 Characteristics of the Migrants

a.	Nonlifetime migrants	Lifetime migrants	Difference
Age	37.94	36.76	**
Female	56.33%	47.32%	***
Married/living together	67.11%	60.29%	*
Literate	72.61%	84.00%	***
Attending school	3.78%	4.76%	
Labor active	95.04%	95.03%	
Work for pay	67.34%	78.16%	***
Self-employed	15.98%	27.26%	***
b.	**Non-long-run migrants**	**Long-run migrants**	**Difference**
Age	35.99%	30.46%	***
Female	47.66%	51.99%	***
Married/living together	56.04%	58.39%	***
Literate	74.41%	82.39%	***
Attending school	8.71%	5.79%	***
Labor active	89.22%	93.85%	***
Work for pay	59.20%	70.17%	***
Self-employed	12.24%	22.92%	***
c.	**Nonrecent migrants**	**Recent migrants**	**Difference**
Age	35.94%	32.44%	
Female	49.59%	44.94%	
Married/living together	57.82%	47.53%	
Literate	75.90%	81.60%	
Attending school	8.43%	5.52%	***
Labor active	89.77%	93.75%	***
Work for pay	62.01%	72.03%	***
Self-employed	14.65%	15.94%	

Source: National Panel Survey (NPS3 2012/13).
***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Lifetime and long-run migrants are mainly motivated by better housing and services conditions as well as marriage and family, while recent migrants are motivated by work related reasons**.** Table II.5 explores the reasons for moving for each migration group and shows different motivations across the migrants' categories. Stark differences appear between men and women migrants. Men seem more likely to migrate for work reasons and better housing and services

Table II.5 Reasons for Migrating

	Total (%)	Men (%)	Women (%)
Lifetime migration			
Work related	10.53	14.83	6.92
Studies related	2.49	2.39	2.58
Marriage	14.65	0.82	26.27
Other family reasons	33.76	34.50	33.14
Better housing/services	31.76	37.92	26.59
Land/plot	3.80	5.59	2.30
Other	3.00	3.95	2.21
Long-run migration			
Work related	8.67	12,82	5.62
Studies related	2.68	2.83	2.58
Marriage	18.54	1.11	31.33
Other family reasons	32.21	32.52	31.98
Better housing/services	30.99	40.96	23.68
Land/plot	3.47	5.60	1.90
Other	3.44	4.16	2.91
Recent migration			
Work related	14.03	19.65	8.89
Studies related	2.15	1.62	2.64
Marriage	11.64	0.31	22.01
Other family reasons	28.76	27.33	30.06
Better housing/services	35.08	40.82	29.82
Land/plot	4.43	5.23	3.71
Other	3.90	5.04	2.86

Source: National Panel Survey (NPS3 2012/13).

conditions, while women seem to be more motivated by marriage and family reasons. Less than 10 percent of women seem to migrate for work-related motives.

Lifetime and long-run migrants are mainly heads of households or spouses of the head of household, while recent migrants are predominantly their sons or daughters.[28] Table II.6 shows different patterns in the length of migration experience according to the nature of the relationship to the head. Households heads and spouses who are looking for better living conditions are those who migrate over long periods of time, while the sons and daughters who are looking for better job opportunities are those who migrate for shorter periods of time.

Table II.6 Relationship to the Head of the Household

	Lifetime migrants	Long run migrants	Recent migrants
Head of household	41.81	32.79	32.44
Spouse	26.27	26.3	17.51
Son/Daughter	12.9	15.83	34.84
Step Son/Daughter	0.86	1.28	1.38
Grandchild	2.52	3.21	4.37
Parent	0.88	0.80	0.95
Other relative	11.2	5.01	6.95
Domestic servant	2.17	2.60	0.42
Other nonrelative	1.40	2.19	1.14

Source: National Panel Survey (NPS3 2012/13).

Determinants of Migration

The analysis of the determinants of migration is based on a multinomial logit model. The decision of individuals to migrate between NPS1 and NPS3 is categorized into three types: (i) those stay in the same district in both waves, (ii) those who move to a different district within the same region, and (iii) those who move to a different region within the country. The migration decisions are examined against the individual's characteristics, the household's characteristics, and the distance between the household's residence and the district headquarters.

Individuals who are less than 30 years old and have higher education are much more likely to migrate to a different region than others. The head, or the spouse of the household head, appears much less likely to migrate compared to the other household members (Table 2.C-4). The level of household assets, measured using Principal Component Analysis of all household assets, is strongly correlated with interregional migration. This suggests that the availability of resources to finance migration strongly affects the migration decision. Larger households are associated with a lower probability of migration, possibly because of social networks

[28] The sons and daughters of all household heads (either migrant or not migrants) are predominantly the recent migrants, indicating that recent migration is happening essentially among younger cohorts.

Table II.7 Differences between Migrants and Nonmigrants before and after Migration

	Prior to migration (in NPS1)			After migration (in NPS3)		
	Nonmigrants	Migrants	Difference	Nonmigrants	Migrants	Difference
Asset index	–0.76	–0.03	0.74***	–0.63	0.30	0.93***
Per capita consumption *(log)*	3.56	3.38	–0.18	3.89	4.49	0.60***
Per capita income *(log)*[a]	3.24	3.14	–0.10			
HH size	5.73	6.42	0.70***	5.41	5.55	0.14
HH members <14 years	2.56	2.72	0.16	2.40	2.30	–0.09***
HH head male	0.76	0.76	0.00	0.75	0.76	0.01
HH head literate	0.76	0.81	0.05***	0.75	0.82	0.07***

Sources: NPS1 2008/09; and NPS3 2012/13.
* p < .10, ** p < .05, *** p < .01.
[a] The income data was taken from the RIGA database, http://www.fao.org/economic/riga.

that tie individuals to the local community. The remoteness of the household location also appears to affect the household decision to migrate. Individuals who live further away from the district headquarters are more likely to migrate to a different region instead of moving to another district in the same region or not moving at all.

The household consumption level seems to increase significantly after migration. Table II.7 compares the characteristics of households before and after they migrate and shows that migrants tend to have slightly lower consumption and income levels than nonmigrants before migration. However, migrants appear to have significantly higher consumption levels than nonmigrants after migration, suggesting a positive impact of migration on living standards. The asset ownership seems also to increase significantly after migration (Table II.8).[29]

The tabulation of the probability of migration by asset quintiles indicates individuals from households in higher quintiles are more likely to migrate outside their initial region.

B. Economic Impact of Migration

There is a movement outside agriculture for migrants. Table II.9 provides an overview of the occupational choices of recent migrants with respect to nonrecent migrants and compares their characteristics before and after migration. The analysis focuses on recent migrants, ages 18 years and above, and examines their occupational choices before and after migration. It appears that only 40 percent of recent migrants work in the agricultural sector, against 62 percent of the nonmigrant population. Migrants were less likely to work in the agricultural sector even before the migration episode. Indeed, about 54 percent of individuals who migrated between NPS1 and NPS3 report that they worked in agriculture before migrating, while more than 70 percent

Table II.8 Asset Differences between Migrants and Nonmigrants before and after Migration

Asset quintile	Nonmigrant	Intraregional migrant	Interregional migrant	Total
1	85.75	7.24	7.00	100.00
2	86.33	5.15	8.52	100.00
3	87.32	5.25	7.43	100.00
4	79.01	9.13	11.86	100.00
5	72.04	11.18	16.78	100.00
Total	83.34	7.17	9.49	100.00

Sources: NPS1 2008/09; and NPS3 2012/13.

[29] Prior to migration, migrants seem more likely to live in larger households than nonmigrants. However, the multinomial regression model shows a negative effect of family size on migration decision. This might be explained by the correlation between household size, the age structure, or assets ownership of the household. When we control for these factors, living in a large households does not seem anymore to encourage migration.

Table II.9 Migrant Occupations

	Prior to migration (in NPS1)			After migration (in NPS3)		
	Nonmigrants	Migrants	Difference	Nonmigrants	Migrants	Difference
Agriculture/livestock	71.06%	53.73%	***	62.52%	40.83%	***
Family work	4.40%	8.85%	***	5.76%	7.84%	**
Private enterprise	3.65%	6.20%	**	6.51%	18.72%	***
Self-employed	9.93%	11.67%		11.09%	13.75%	
Government/parastatal	2.23%	2.52%		2.33%	6.22%	***
Student	3.65%	12.52%	***	5.07%	6.87%	
No job/job seeker	2.16%	2.33%		3.33%	3.18%	
Other	2.91%	2.19%		3.38%	2.60%	

Source: NPS3 2012/13.

of nonmigrants were involved in the agricultural sector according to the NPS1 data. Working in a private enterprise appears to be more prevalent among migrants, especially after migration. Interestingly, migrants are more likely than nonmigrants to be classified as students before the migration experience. Finally, migrants are more likely to be working for the government after migrating.

Migration contributes to a significant increase of the consumption level. The (weighted) descriptive statistics in Table II.7 reveal that while the average Tanzanian experienced 39.7 percent growth in real consumption between NPS1 and NPS3, a typical migrant experienced a 57.3 percent real consumption growth over the same period. However, this result might be due to the difference of unobservable characteristics between migrants and nonmigrants, as better connections to social networks may help them to find good jobs or raise motivations and abilities. The effect of migration on consumption growth is thus further explored using the regression model presented in Appendix 2.C. The results indicate that migrants observe a 21.2 percentage point higher consumption growth in their consumption levels than nonmigrants, suggesting that moving to a different district could lead to a significant increase in consumption growth even during a relatively short time-period of about four years (see Table 2.C-5). This result holds for different estimation models. Even after controlling for the endogeneity resulting from unobservable individual characteristics, there is significant evidence of the positive impact of migration on the improvement of consumption.

The role of migration in improving living standards in Tanzania should, not, however be overestimated, as only 8.4 percent of the total population migrated between NPS1 and NPS3.

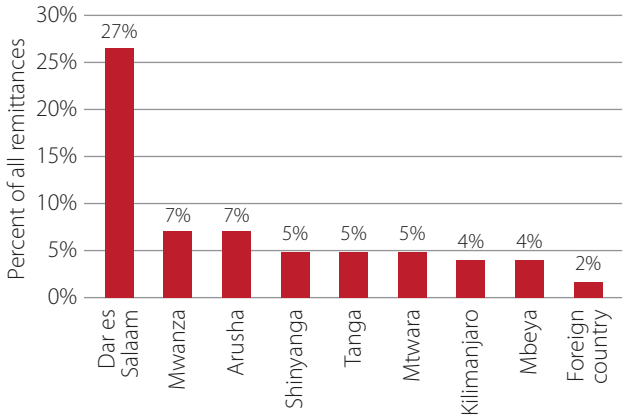
Remittances

Migrants may improve not only their own welfare but also that of their former households through remittances-in the form of cash and in-kind transfers. The magnitude of domestic remittances in Tanzania is neither well known nor easy to trace, as most remittances flow through semiformal and informal channels. Approximately 23 percent of Tanzanian households report the receipt of remittances in the 12 months prior to the NPS3.[30] Most of these remittances originate from major urban areas in Tanzania such as Dar-es-Salaam, Mwanza, and Arusha (Figure II.11), and only two percent of households report to have received remittances from outside of Tanzania.[31]

[30] The addition of several questions on remittances in the third wave of NPS greatly contributes to our understanding of the nature and magnitude of remittances in Tanzania.

[31] According to official statistics, Tanzania received $67.3 million in international remittances from Tanzanians living abroad. See http://data.worldbank.org/indicator/BX.TRF.PWKR.CD.DT. International remittances are mainly received from Rwanda, Uganda, Kenya, UK, Canada, and the United States. See 2013 information on destinations and the migrant stock in http://esa.un.org/unmigration/TIMSO2013/migrantstocks2013.htm.

Figure II.11 Major Sources of Remittances Received by Households



Source: NPS3 2012/13.

Domestic remittances usually come in small amounts. In contrast, households who receive large amounts of remittances in cash often receive them from a foreign country. Around 50 percent of the households received on average $67 of domestic remittances during the previous 12 months, and 41 percent received less than $50 (see Table II.10). The amounts, in cash and in-kind, are evaluated on average to around $207, which represent about nine percent of the value of total annual consumption for a typical Tanzanian household.

Table II.10 Amount of Domestic Remittances Received by Households (previous 12 months)

Amount	Share of households
$0–$50	41.3%
$51–$100	19.6%
$101–$500	30.3%
$501–$1000	4.7%
$1001+	4.2%
Total	100%

Source: NPS3 1012/13.

Note: The estimates are for the 22.87% of households that reported to have received remittances during the previous 12 months. The amounts are converted from Tanzanian shillings to U.S. dollars using the official exchange rate for 2013 of 1600.44 shillings per dollar.
See: *http://data.worldbank.org/indicator/PA.NUS.FCRF.*

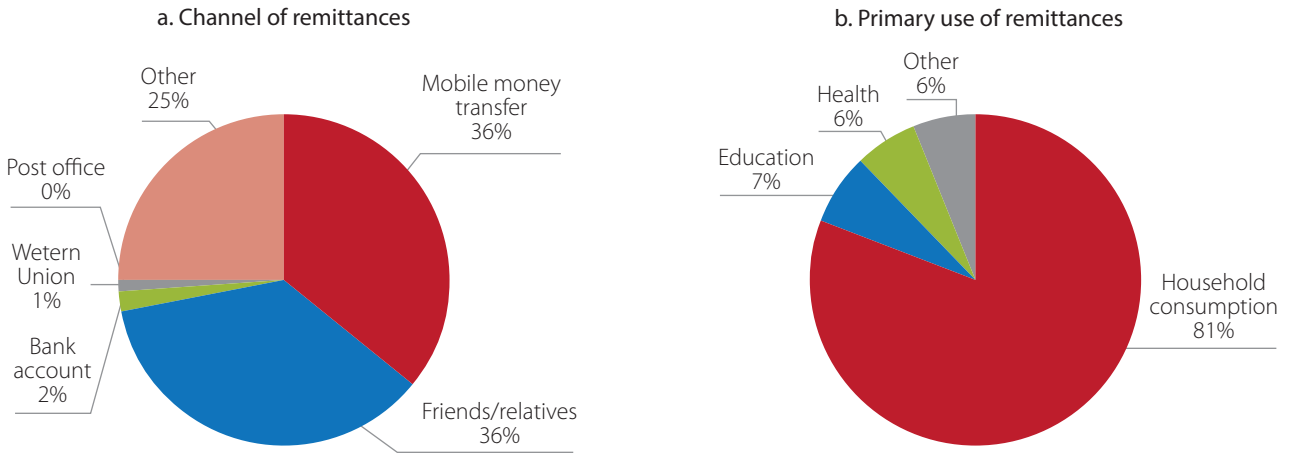
Money transfers are increasingly made through mobile channels. Approximately 36 percent of all transfers are made through mobile money transfer services such as M-Pesa, Tigo Pesa, EZY Pesa, or Airtel Money (Figure II.12a). That said, transfers through more traditional channels such as friends and relatives are just as prevalent as mobile money transfers, while formal channels through the banks, Western Union, or post office services account for a much smaller share of all transfers.

The primary use of remittances is for household consumption, followed by spending on education and health. As apparent from Figure II.12b, only few households use remittances to invest in business or agriculture, although the reason behind this may be the fact that the average amount of remittances received represents a fairly small share of the annual household consumption—they make up only 9 percent of the annual consumption expenditures for the 23 percent of all households that received remittances.

Remittances are strongly correlated with school attendance for households, suggesting a potentially important channel through which the benefits of migration accrue to recipient households. Children living in households that received remittances are 20 to 23 percentage points more likely to attend school.[32] Moreover, it appears that a 1 percent increase in remittances is associated with a greater probability of school attendance by up to 1.7 percentage points (see Table 2.C-6 in appendix 2.C). While remittances have a positive effect on the probability of school attendance, an inverse relationship is observed with the impact of migration on school attendance. This may be due to the financial costs of migration or the disruption imposed by migration. These results remain consistent after addressing the potential selection bias using the Propensity Score Matching approach (Table 2.C-7).

[32] The impact of remittances on poverty and human capital has been the subject of a large number of studies, although most of these focused on international remittances. See Adams and Cuecuecha (2013), McKenzie (2005), Yang (2008), de Brauw et al. (2013), and Lokhshin et al. (2010), among others. Amuedo-Dorantes and Pozo (2010) explored the effects of remittance receipt on children's school attendance and found a strong positive effect particularly on the attendance of girls, secondary school-age children, and younger siblings. Following these authors, we examine the impact of remittances on the school attendance of Tanzanian children.

Figure II.12 Channel and Primary Use of Remittances



Source: NPS3 2012/13.

Sustainability of Migration

Migration to larger cities may not necessarily be sustainable due to the pressure on receiving households. In a study of internal migration in Tanzania, Muzzini and Lindeboom (2008) highlight the issue of overcrowding for migrant-receiving households. Using the 2002 census data, they show that around 47 percent of migrant receiving households have more than two people per room compared to 39 percent in households without migrants. However, this analysis did not capture any overcrowding effect, as the percentage of households with more than two people per room is around 37 percent for *both* migrant and nonmigrant receiving households.

Migrants do not seem to face great obstacles in access to health care services or higher health care costs. The process of rapid urbanization might reduce the possibility for migrants to access health care facilities or might impose higher health care costs to migrants compared to nonmigrants. However, the analysis does not show significant differences between the two groups, except the fact that lifetime migrants and recent migrants seem more likely to consult a health care provider relative to nonmigrants (see Table 2.C-8 in Appendix 2.C). Also, lifetime migrants seem to spend, on average, a slightly larger amount on illnesses and injuries than the other groups, which might be due to the fact that they are older.

The positive effects of migration need, however, to be balanced against the consequences of excessive migration. While it appears from this analysis that migration contributes to improving the living standards of migrant households and their families left behind, these results need to be interpreted in light of the fact that internal migration remains relatively low in Tanzania and is limited to individuals from households with higher education and better living standards. Even though self-selection effects have been ruled out in the present analysis, the expansion of migration to include people from less educated and prosperous households as well as the increase of migration flow in urban centers may significantly reduce the beneficial effects found here. Migration can be among the solutions to address poverty, but excessive migration may worsen the problems of city congestion and unemployment, causing a displacement of poverty to the urban zones. Besides migration, other solutions such as rural diversification and nonfarm development remain needed.[33]

[33] See Christiaensen *et al. (2013)* for a good discussion of these alternative solutions in Tanzania.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Chapter 3

Economic Growth and Poverty

Key Messages

- During the second half of last the decade, poverty has become more responsive to economic growth
- The increase of poor households' living standards is driven mainly by improvements of their endowments in assets and education. Given the returns to these endowments, this has raised the earnings of the poorest..

Poverty is falling and living conditions rising in Tanzania. However, given Tanzania's strong economic performance in recent years, the pace of poverty reduction is not as fast as might be expected.

To understand this dynamic, this chapter examines the interaction between growth and poverty in Tanzania. It first provides a brief overview of recent economic growth in the country. Second it examines the response of poverty reduction to economic growth and investigates to extent to which the poor have benefited from growth.

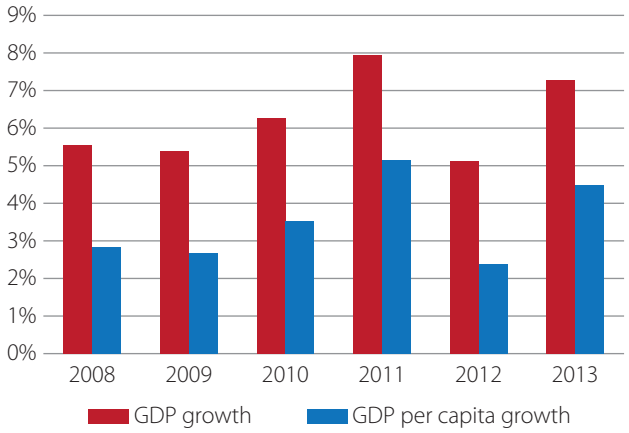
I. A Brief Review of Recent Economic Growth

At the theoretical level, the relationship between macroeconomic growth and the elimination of poverty is key. A sound macroeconomic foundation is necessary, but not sufficient, to achieve a higher level of per capita income. This section therefore looks at recent economic growth trends.

In December 2014, Tanzania released a new GDP series with a base year of 2007, rather than 2001. The revised numbers use new and improved data sources to update the national accounts series and make it a more accurate reflection of the economy. The new series sees an upward revision of 27.8 percent in the base year 2007.

The revised GDP figures suggest that Tanzania's growth has been robust over the past decade. From 2008 to 2013, growth averaged 6.3 percent, but when adjusted by the size of the population this rate drops modestly to 3.5 percent. The new figures show a degree of volatility not seen in the previous series (Figure III.1). The increased volatility for the most part captures the variations in performance of the agricultural sector, due in part to variable climatic conditions, and possibly selling prices influenced by regional and global markets. The increased volatility also reflects improved data collection across sectors, including industries and services. Extrapolation methods and assumptions were frequently used in the old series.

Figure III.1 Tanzanian GDP Growth Rate (base year 2007)

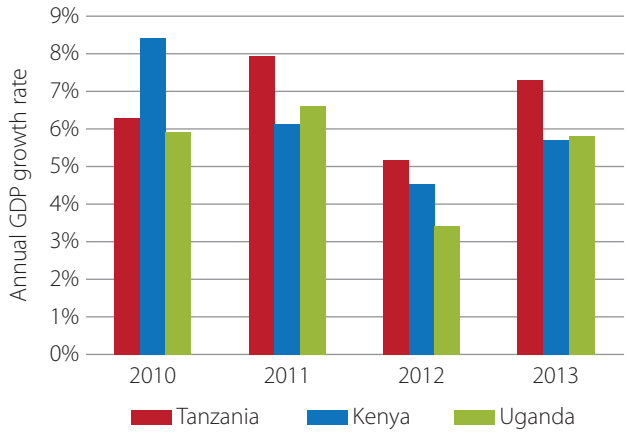


Source: National Bureau of Statistics, 2014; World Bank, 2014.

The level of growth achieved in the past three years is significantly higher in Tanzania than that achieved by neighboring Uganda and Kenya (Figure III.2).

The main drivers of Tanzania's rapid economic growth are a small number of fast growing, relatively capital intensive sectors. Over the period 2008–13, construction, communications, and financial services all saw a growth rate of over 10 percent (see figures III.3 and III.4 and Table III.1).

Figure III.2 Comparison of Growth Rates across Countries

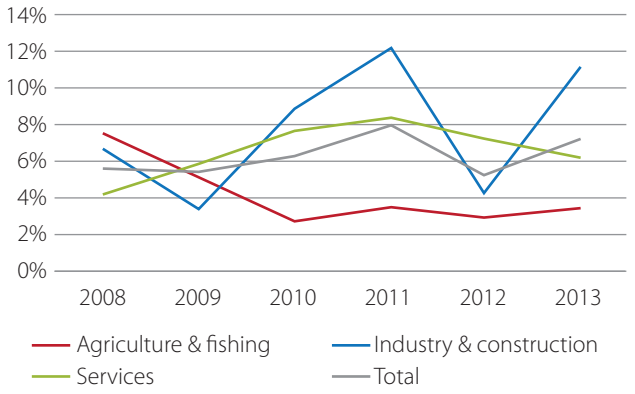


Source: World Bank, 2014.

Note: Kenya and Tanzania are rebased figures. Uganda figures are not rebased.

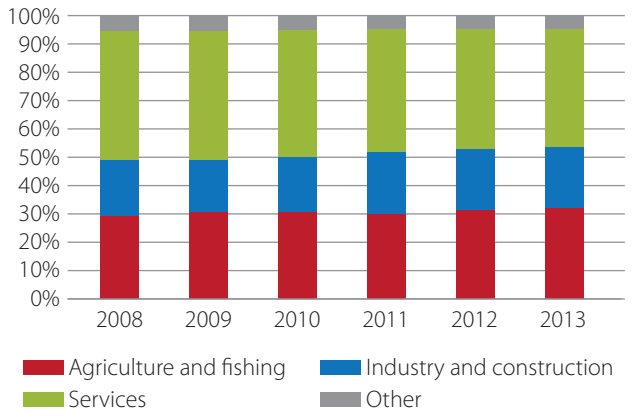
With the exception of construction, these capital intensive sectors create limited jobs. In contrast, the rate of growth of the labor-intensive agriculture sector, which employs three-quarters of the workforce, remained far lower than average growth at only 4.2 percent from 2008–13. The agriculture sector has continued to underperform compared to the rest of the economy. That said, cash crops, including coffee, tea, cotton, cashews, sisal, and cloves account for a significant proportion of export earnings, and agriculture's share of current GDP has increased from 27 percent in 2007 to 32 percent in 2013. However, while the volume of major crops has increased in recent years, large amounts of

Figure III.3 Sectoral Real Growth Rates in Tanzania



Source: National Bureau of Statistics, 2014.

Figure III.4 Sectoral Composition of Growth in Tanzania (current market share of GDP)



Source: National Bureau of Statistics, 2014.

Table III.1 Real GDP Growth in Tanzania by Sector, 2008–2013

Economic Activity	2008	2009	2010	2011	2012	2013
Agriculture and Fishing	**7.5%**	**5.1%**	**2.7%**	**3.5%**	**3.0%**	**3.4%**
Crops	7.8%	5.5%	3.7%	4.8%	3.6%	3.9%
Livestock	8.0%	5.3%	1.4%	1.7%	1.9%	2.0%
Forestry and Hunting	3.8%	5.0%	3.4%	3.4%	3.5%	4.7%
Fishing	7.1%	0.6%	1.0%	3.5%	2.9%	5.3%
Industry and construction	**6.6%**	**3.4%**	**9.0%**	**12.2%**	**4.1%**	**11.2%**
Mining and quarrying	–9.5%	18.6%	7.2%	6.4%	6.7%	3.8%
Manufacturing	11.0%	4.7%	8.8%	6.9%	4.1%	6.6%
Electricity and water	5.1%	4.4%	7.7%	–2.7%	3.1%	8.0%
Electricity	8.0%	4.2%	13.2%	–4.0%	3.4%	12.9%
Water	2.3%	4.5%	2.2%	–1.1%	2.8%	2.7%
Construction	10.1%	–3.5%	10.2%	23.1%	3.4%	18.4%
Services	**4.2%**	**5.8%**	**7.7%**	**8.4%**	**7.2%**	**6.2%**
Trade, hotels and restaurants	5.6%	2.4%	8.7%	10.4%	3.9%	5.1%
Trade and repairs	6.3%	2.7%	9.6%	11.3%	3.6%	5.3%
Hotels and restaurants	2.1%	1.0%	3.5%	5.6%	6.0%	3.6%
Transport and communication	4.8%	12.6%	15.4%	6.1%	11.0%	8.6%
Transport	1.8%	7.1%	10.8%	4.6%	4.4%	5.7%
Communications	12.7%	25.4%	24.4%	8.7%	22.0%	12.7%
Financial intermediation	17.5%	18.6%	12.7%	14.6%	5.2%	2.9%
Real estate and business services	4.1%	3.5%	8.2%	3.4%	6.4%	5.9%
Public administration	–5.5%	0.1%	–4.8%	15.2%	9.2%	7.7%
Education	9.4%	9.0%	6.3%	5.6%	7.3%	4.2%
Health	5.4%	7.3%	3.3%	5.3%	11.2%	8.7%
Other social and personal services	5.1%	4.6%	5.6%	5.9%	6.5%	5.7%
FISIM	6.8%	20.1%	8.0%	22.4%	1.3%	0.3%
Net taxes	4.5%	12.8%	3.7%	12.1%	1.5%	15.0%
Total GDP	**5.5%**	**5.4%**	**6.3%**	**8.0%**	**5.1%**	**7.3%**

Source: National Bureau of Statistics, 2014; World Bank National Accounts data, 2014.

produce never reach the market. Poor pricing and unreliable cash flow to farmers continue to inhibit growth in the agricultural sector.

The nature of growth in Tanzania has not created sufficient productive employment for the rapidly growing population. The capital intensive bias of growth has meant it has absorbed only a handful of the 700,000 additional workers who enter the domestic labor market every year. The shift in labor toward more productive sectors has not been fast enough. Productivity growth and increased diversification of the economy will be central to enhancing the expansion of private firms and their capacity to create productive jobs to improve incomes and reduce poverty.

The new GDP data also highlights some weaknesses in the Tanzanian economy. Although the revised GDP figures suggest that Tanzania is drawing closer to the $1,045 income per capita threshold for middle income countries, reaching $970 in 2013, the level of trade openness at 47.7 percent in

2013 is well below the regional average of 65.9 percent, and Tanzania's tax revenue to GDP ratio is alarmingly low at 11.5 percent in 2013.

However, albeit from a low base, Tanzania's economy has become more open, with increasing diversification toward new products and markets during the past five years. Since 2005, the value of exports of goods and services has nearly doubled. Although the export structure remains largely dependent on volatile primary commodities such as minerals (gold), coffee, tea, cashew, and cotton, the recent surge in manufactured exports to the East African Countries (EAC) and the Southern African Development Community has been a notable and welcome development. During the same period, imports tripled, leading to a growing trade deficit over time. The current account deficit has been financed by official aid and growing foreign direct investment (FDI) inflows into the natural resources sector.

Inflation has moderated as the Central Bank has followed a tight monetary policy over the past two years. As a result, together with falling domestic food prices, inflation reached 6 percent in 2014—a significant achievement, compared to the 19 percent of December 2011. This is good news for consumers and nonindexed wage workers. The decline has also helped to moderate the appreciation of the real exchange rate, which is positive for exporters, particularly given the recent fall in commodity prices. However, the measures implemented to achieve lower inflation have resulted in the cost of credit stabilizing at a higher level, imposing increased burdens on borrowers.

Fiscal policy provides greater cause for alarm. On the surface, the government has demonstrated a strong fiscal commitment, reducing the overall fiscal deficit from 4.2 percent of GDP in 2012/13 to 3.2 percent in 2013/14, below the initial target set in the approved budget. This is a significant improvement after the unexpected slippage in 2012/13. However, this figure fails to account for a rapidly accelerating increase in arrears estimated to be about 1 percent of GDP from 2012/13 to 2013/14. Not only is the fiscal deficit arguably larger than reported, but fiscal management was not smooth in 2013/14 and substantial mid-year fiscal adjustments were required. Deterioration in fiscal management is a cause for concern.

Despite its apparent stability, there are a number of risks to Tanzania's sound macroeconomic position that need to be considered and carefully managed when developing strategies for poverty reduction. These include the fiscal position, including spending pressures from the ongoing Big Results Now initiative and the upcoming general elections, the level of government debt, the need for higher tax revenues, continued financial risks in the energy sector in part due to exogenous factors, the rising level of arrears, and fluctuations in commodity prices which will affect the trade balance.

The magnitude and timing of anticipated FDI inflows to the natural gas sectors will also impact the local economy, especially in the geographical areas where those investments will take place. The new investments are expected to be in the range of US$4 billion to US$5 billion per year. Even if the majority of these funds are used to purchase imported goods, as is likely, their magnitude will modify the current equilibrium in the domestic financial markets and possibly have an impact on exchange rates. These potential impacts will have to be carefully managed by the authorities. If managed well, they have the potential to transform Tanzania's economic future and increase the opportunity for poverty reduction. However, the large scale exploitation of these resources is unlikely to begin for at least 7–10 years. It is only after this point that significant revenues will be generated from this source.

To summarize, Tanzania has made significant economic progress, and the macroeconomic position is largely sound. That said, many poor households have not benefitted from the recent growth, which has largely been driven by non-labor-intensive sectors. The task of broadening the growth base is key to translate exceptional growth into poverty reduction. There are also a number of risks on the horizon. With this in mind, the government must closely monitor its fiscal stance, keep debt service at a reasonable level, and determine how best to clear and manage arrears. This is essential to ensure continuation of a sound macroeconomic base on which to build poverty reduction. The government should prepare for the influx of gas revenues and determine clear structures to manage these and maximize their impact for service provision and the poorest.

II. The Growth Elasticity of Poverty

The previous section reviewed recent macroeconomic trends; this section proceeds to analyze the poverty-growth relationship over the period 2007–2111/12. It starts by estimating the growth elasticity of poverty reduction. This elasticity measures the percent change in poverty with respect to a 1 percent change in GDP (or consumption) per capita and is a well-known concept for exploring the responsiveness of poverty to economic growth.

The response of poverty to economic growth has dominated the recent literature on Tanzania's economic performance, with the general conclusion that growth and poverty are in many respects "delinked".[34]

There are two broad approaches to measure economic growth and estimate the growth elasticity of poverty in this context: one based on national accounts or one based on household survey data. The first measures growth as changes in GDP per capita in the national accounts. The second approach is to measure growth directly from the household surveys on which the poverty estimates are based, that is, as growth in average household consumption per capita. Growth rates estimated from these two sources can differ significantly, which has implications for the estimated elasticities.

Economic growth measured by changes in HBS consumption per capita appears much lower than growth in GDP**.** Real GDP per capita grew at an average annual rate of 3.6 percent over the period 2007 to 2012. Conversely, household consumption per capita in the HBS increased at only an average annual rate of 0.9 percent between 2007 and 2011/12.

Economic growth does reduce poverty in Tanzania, but the rate of poverty reduction depends on how economic growth is defined. Measures of poverty reduction appear much more responsive to survey-based household consumption growth. When growth is measured by changes in HBS real per capita consumption, the growth elasticity of poverty of –4, that is, a 1 percent increase in the survey mean will reduce poverty headcount by 4 percent. But when growth is measured by changes in real GDP per capita the growth elasticity of poverty is –1.02, indicating that a 1 percent increase in economic growth will reduce poverty headcount by only 1 percent.

The difference between the estimates of the growth elasticity of poverty with respect to the measures of economic growth is quite common in developing countries, though the discrepancy appears larger in Tanzania. A large literature has discussed inconsistencies between national accounts and household surveys data, for developing countries in general (Ravallion 2001; Adams 2004) and for SSA in particular (Deaton 2005; Christiaensen and Devarajan 2013), and show strengths and weaknesses to both. The discrepancies can be related to variations in the definition of consumption in national accounts versus household survey data, inflation adjustment, omission and measurement errors, and so forth. While there is no clear consensus on which of these measures of economic growth is more accurate, it seems that growth measured from survey data is more closely related with changes in households' consumption and income and better reflect the spending behavior of the poor.

In Tanzania, the variation of the relationship between poverty and growth for different measures of growth is partly related to the price deflators of the two series. Growth in nominal GDP per capita is approximately 20 percent per annum for 2007–12, which corresponds reasonably well to the growth of nominal household consumption per capita from HBS, estimated at around 19.7 percent per annum. It is only in real terms that the two sources diverge, which mirrors differences in the underlying deflators. In particular, the GDP deflator shows inflation of 70 percent over the period 2007–12, a lower rate than the HBS internal deflator calculated using unit values, which suggests an increase of prices by approximately 90 percent during the same period. These discrepancies in inflation trends between the two series induce a quite significant difference in trends of real household consumption.

[34] For example, see Atkinson and Lugo (2010), Demombynes and Hoogeveen (2007), Hoogeveen and Ruhinduka (2009), Kessy et al. (2013), Mashindano et al. (2011), Mkenda et al. (2010), Osberg and Bandara (2012), Pauw and Thurlow (2011), and World Bank (2007, 2013b).

Survey-based price indices probably better reflect price variations across regions and over time, but the discrepancy between the deflators would need further investigation and is beyond the scope of this report.

III. The Distributional Pattern of Growth

Leaving aside the national accounts data, this study focuses on the evidence from the 2007 and 2011/12 HBS, using changes in household consumption as the measure of growth to explore whether the poor have benefitted from growth.

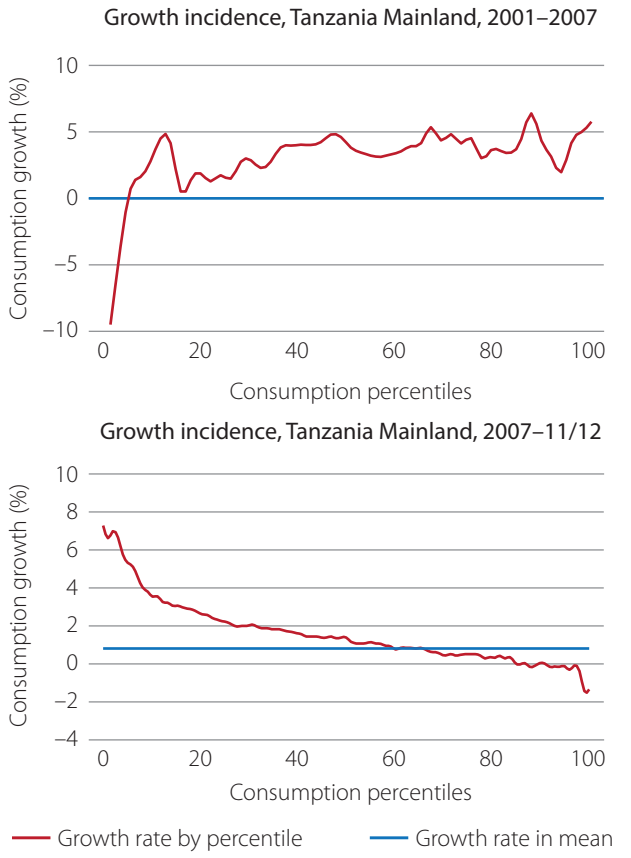
There are emerging signs of "pro-poor" growth since 2007. The growth incidence curve for 2007–2011/12, which shows the percent change in average consumption for each percentile of the distribution, are downwardly sloped, indicating higher growth amongst the poorest (Figure III.5). Poor households seem to have benefitted disproportionately from growth, despite the modest increase of real household consumption, which grew by only 0.9 percent per annum. The recent pattern of real consumption growth differs from the period 2001–07, which shows that growth benefitted mainly the richer groups.[35]

These results hold even after addressing the data comparability problem. The imputed data from the different prediction models show downward sloping growth incidence curves in 2007–2011/12, confirming that consumption growth of poorer households was faster than that of better-off groups.[36]

These positive results are tempered by the limited absolute gains accruing to the poor. People in the 30 percent poorest groups experienced an increase of their consumption of around 20 percent between 2007 and 2011/12. But this increase is from a low base and translates to an additional consumption amount of only T Sh 4,300 per adult per month (in 2011/12 prices), which is equivalent to approximately 10 percent of the cost of basic consumption needs.

The relationship between growth and poverty involves changes both in mean consumption and changes in the distribution of consumption across households. This report applies the decomposition method proposed by Datt and Ravallion (1992) to determine the growth and redistribution components of the decline of poverty. As is apparent from Figure III.6, the reduction in the poverty headcount at the national level was driven by both the increase in mean household consumption (growth effect) and reduction of inequality in the distribution of consumption (redistribution effect), with the effect of inequality reduction being

Figure III.5 Growth Incidence Curves, 2001–2007 and 2007–2011/12

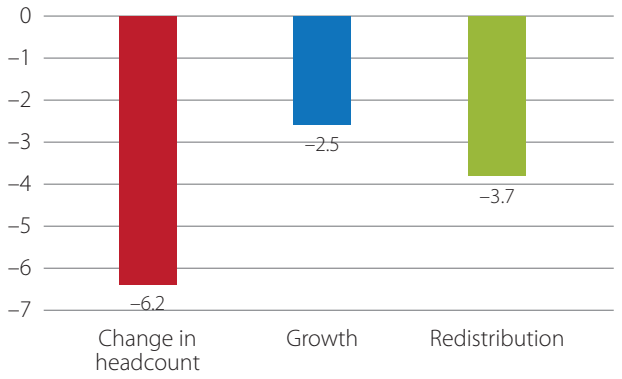


Source: Hoogeveen and Ruhinduka (2009). HBS 2007 and 2011/12.

[35] See Hoogeveen and Ruhinduka (2009) and Osberg and Bandara (2012).

[36] The National Panel Survey Data show however a different poverty trend to that observed in HBS data and do not support the disproportionate consumption growth for poorer households, see more details in Box 3.1 in Appendix 3.

Figure III.6 Growth and Redistribution Effects on Poverty Reduction (in percentage points)



Source: HBS 2007 and 2011/12.

marginally more important. The growth effect contributes by 40 percent (2.5 percentage points) to poverty reduction, while the redistribution effect contributes by 60 percent (3.7 percentage points).

The emerging signs of pro-poor growth contrast with the nature of Tanzania's economic growth. As shown in the first section of this chapter, economic growth in Tanzania was driven mainly by fast growing and relatively capital-intensive sectors with limited job creation capacity. Agriculture, which represents the main source of livelihood for the vast majority of the poor, grew at a much lower rate than the overall economy. With growth centered mainly in national accounts sectors where poorer Tanzanians are not so involved, the observed signs of pro-poor growth are not to be expected.

In order to explore the basic factors behind the observed variations in household consumption, this study performed a decomposition of the changes in consumption over time into two components: one component that is due to improvements in personal characteristics or *endowments* (better education, increased ownership of land and other assets, access to employment opportunities, local infrastructure, and so forth) and one component attributable to changes in the *returns* to those characteristics (returns to education, land productivity, returns to business, and so forth). These components are then further decomposed to identify the specific attributes that contribute to the changes of consumption. The decomposition is applied at each decile group of the consumption distribution to understand the patterns of the changes for the different welfare groups.[37]

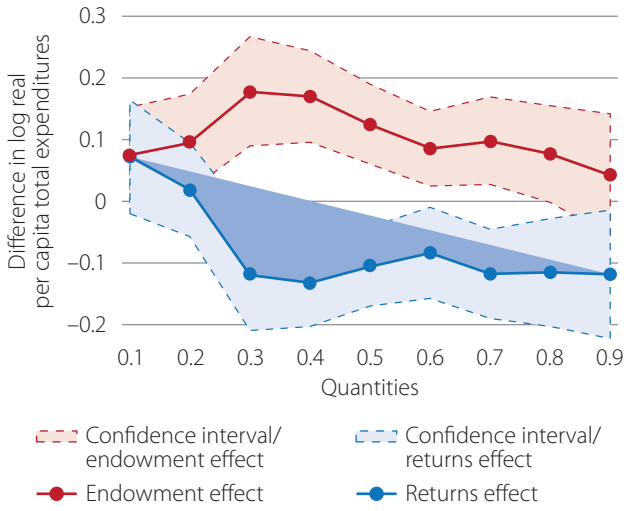
The increase of poor households' consumption is the result of improvements in both endowments and returns. One can observe from Figure III.7 an improvement of households' endowments for all the population groups, but the improvements are more marked for the 30 percent poorest segments.

The increase of the endowments is driven by a significant expansion of assets ownership, mainly transportation and communication means, and to a lesser extent agricultural land. Educational attainment of household's heads has improved as well but less significantly. The access to local infrastructure has deteriorated in general, but access to local roads seems to have slightly improved for the poor. The decomposition indicates also a decline of households' engagements in business activities, particularly among the poorest groups.

The improvements of households' endowments were coupled with an increase of the returns to those endowments, but only for the poorest decile group. Except for the first two deciles, returns appear to have declined over time. But this decline masks divergent trends across the different attributes. As observed from the table in figure III.7, the gains from household businesses, essentially nonfarm activity, increased quite significantly between 2007 and 2011/12 particularly for the three bottom deciles. Returns to land seem also to have improved over time, though less significantly for the poor. The returns to community infrastructure also improved, indicating a higher positive influence of access to local markets and roads on needy households' living standards.

[37] The decomposition approach is based on the Recentered Influence Function and unconditional quantile regression method proposed by Firpo, Fortin and Lemieux (2009). See Appendix 4 for more technical details on the approach.

Figure III.7 Returns Effect and Endowments Effects over Time, Tanzania 2007–2011



	Extreme poor	Poor	Middle class	Richest
Total	0.147***	0.058***	0.019*	–0.076***
Endowments	0.075**	0.178***	0.125***	0.043
Demographic Structure	–0.019***	–0.026***	–0.022***	–0.013***
Education	–0.001	0.003*	0.003**	0.011***
Wage work	0.001	0.002*	0	0
HH business	–0.024***	–0.022***	–0.009***	–0.005
Assets	0.124***	0.114***	0.103***	0.054***
Land	0.006*	0.005*	0.007**	0.011***
Access local markets	–0.005**	–0.004**	–0.002**	–0.002
Access local roads	0.037***	0.052***	0.028***	0.005
Returns	0.072**	–0.120***	–0.106***	–0.119***
Demographic Structure	0.255***	0.064	0.025	0.216***
Education	–0.186***	–0.017	–0.003	0.066*
Wage work	–0.003	0.010	0.001	0.012
HH business	0.123**	0.162***	0.056	0.077
Assets	–0.266***	–0.169***	–0.156***	–0.244***
Land	0.016	0.022**	0.019**	0.035**
Access local markets	0.055***	0.049***	0.021**	0.030*
Access local roads	0.011	0.045***	0.011	–0.022

Source: HBS 2007 and 2011/12.

Note: *Extreme poor* are population groups in the bottom 10 percent of the distribution; the *poor* are in the third decile; *middle class* are in the fifth decile, and the *richest* are in the top decile.

Large household size and numbers of children seem to be a continuing constraint on household well-being, although their negative impact appears to have diminished somewhat, as apparent from the positive change in the returns to demographic structure.

However, the observed improvements in the returns to some households' attributes have been offset by a significant decline of the returns to assets followed by a decline of returns to education, inducing a loss of returns for the moderate poor and better-off households.

Chapter 4

Uneven Geographic Decline in Poverty

Key Messages

- Most of the improvements in the poverty indicators occurred in Dar es Salaam, but the absolute number of poor declined more in rural areas.
- The reduction of poverty outside Dar es Salaam is driven mainly by a decline of inequality.
- Besides improvements in assets endowments, the growth of poor households' consumption levels is due to the increase of returns to nonfarm businesses and wage employment in urban zones and improvements of the returns to agricultural businesses and cash crops in rural areas.

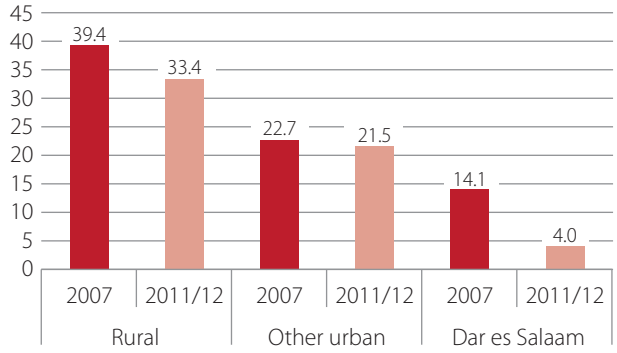
The previous chapters focused on the analysis of poverty trends and the relationship between poverty and growth at the national level. The report turns here to the analysis of poverty trends and the links between growth and poverty in the different geographic domains, namely rural areas, Dar es Salaam, and the other urban zones. The first section examines the evolution of poverty headcounts and poverty depth and severity in the different geographic areas. The second section investigates the distributional patterns of growth in these areas and explores the factors contributing to poverty reduction.

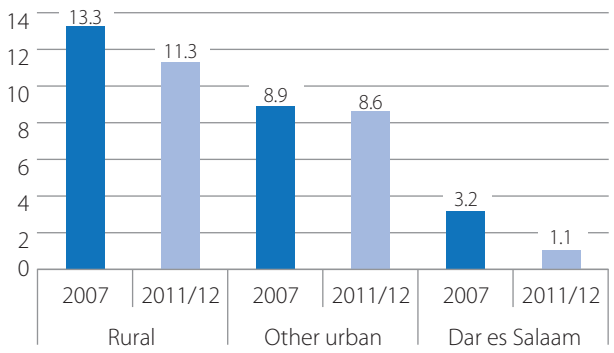
I. Poverty Trends by Geographic Domains

Most of the improvements in the poverty indicators occurred in Dar es Salaam (Figure IV.1). The basic needs poverty headcount declined by over 10 percentage points (70 percent) in Dar es Salaam and by around 6 percentage points (15 percent) in the rural sector, while it declined only marginally, by 1.2 percentage points (5 percent), in the secondary cities and towns. This trend is repeated with extreme poverty, as the highest decline was observed in Dar es Salaam followed by rural areas, while there was almost no change in the other urban zones. Clearly, the city and the surrounding administrative area have pulled ahead of other parts of the country, despite the fact that Dar es Salaam already had significantly lower poverty than other areas in 2007.

Although most of the reduction of the level of poverty occurred in Dar es Salaam, the absolute number of poor people declined more in the rural areas (Figure IV.2). The absolute number of poor people declined by around 1.2 million in rural areas against nearly 260,000 in Dar es Salaam, while it slightly increased by approximately 160,000 in the secondary cities. Likewise, the number of extreme poor, who are not able to meet their food basic needs, declined by around 400,000 in

Figure IV.1 Basic Needs and Extreme Poverty Headcounts by Geographic Domain (%)





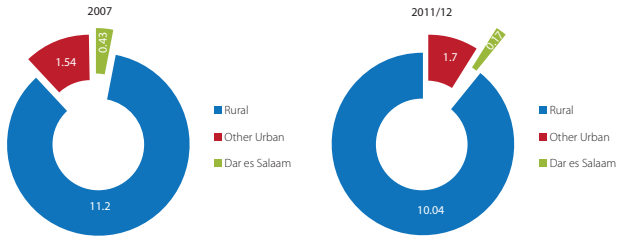
Source: HBS 2007 and 2011/12.

the rural zones against nearly 54,000 in Dar es Salaam, while it increased by about 81,000 in the other urban zones.

But basic needs and extreme poverty remain more pervasive in rural areas. HBS 2011/12 indicates that rural areas continue to account for, respectively, 84 and 82 percent of the total poor and extreme poor populations in Tanzania, against, respectively, 14 and 17 percent in the other urban areas and less than 1 percent in Dar es Salaam.

The comparison of the rural-urban dynamics over time in Figure IV.3 shows that over 84 percent of the population in the bottom quintile (20 percent poorest group) lives in rural areas and that this proportion remained fairly stable between 2007 and 2011/12. The proportion of population in the poorest quintile living in Dar es Salaam declined by over 50 percent, while that living in the secondary cities increased by over 14 percent. In contrast, the proportion of the population in the 20 percent richest group living in Dar es Salaam expanded considerably between 2007 and 2011/12, increasing by approximately 60 percent, indicating that the benefits of Tanzanian economic growth have largely been reaped by well-off households located in Dar es Salaam.

Figure IV.2 Distribution of Poor Population by Geographic Area

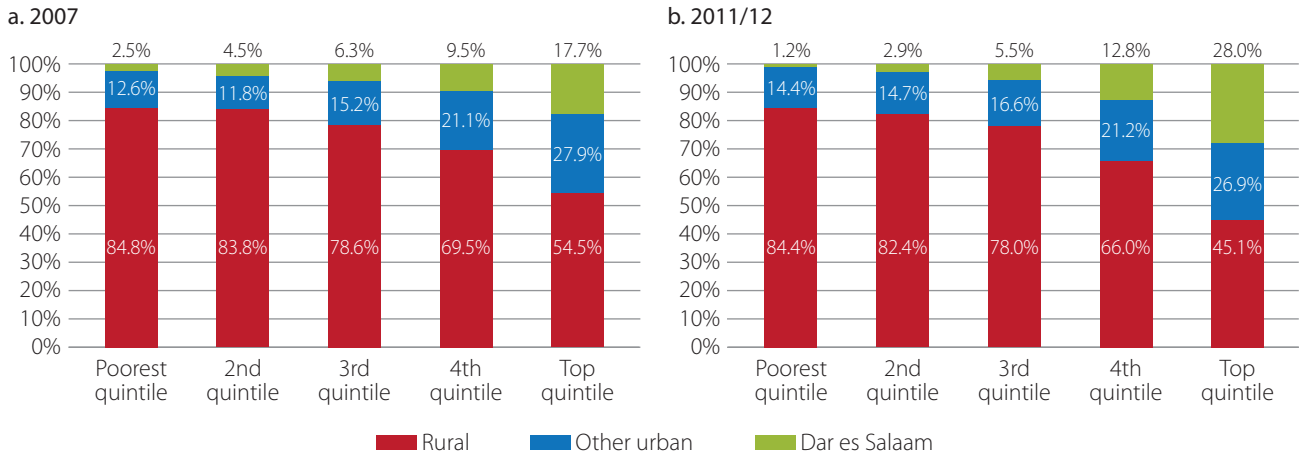


Source: HBS 2007 and 2011/12.

The depth and severity of poverty declined faster than the poverty headcount (Figure IV.4). The decline in the poverty gap and poverty severity is more pronounced than the reduction in the poverty headcount in all the geographic domains, indicating a significant improvement in the status of those who remain poor in the different regions. Even in the secondary cities where the poverty headcount has declined only marginally, one observes a reduction in poverty depth by nearly 2 percentage points, indicating the improvement in consumption by the poor and that the gap between their average consumption and the basic needs threshold has narrowed by 2 percentage points (or around 25 percent). In the rural areas, the average consumption level of a poor people attained around 92 percent of the poverty line in 2011/12, while in Dar es Salaam it rose to 99 percent. The quite important decline of poverty severity suggests a significant improvement in the consumption level of extremely poor population groups, particularly in rural areas where the severity of the poverty index declined by nearly 2.4 percentage points (or 47 percent).

The prediction models support the decline of poverty in the different geographic domains but reveal a lower level of poverty reduction in Dar es Salaam. The prediction models used to adjust for the changes in the HBS methods between 2007

Figure IV.3 Population Distribution by Consumption Quintiles and Area of Residence



Source: HBS 2007 and 2011/12.

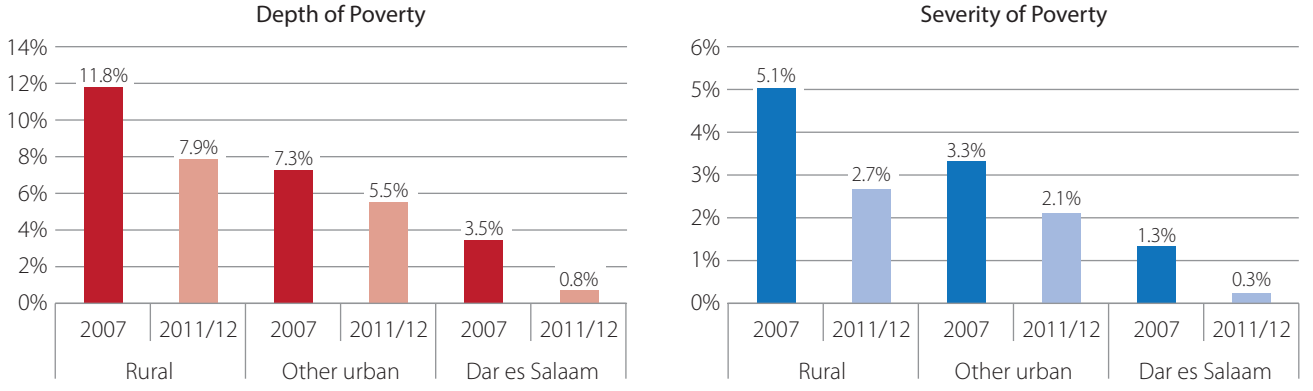
Note: Each quintile represents 20 percent of the population ranked by consumption at the national level. For example, the poorest quintile includes the 20 percent of population with the lowest levels of household consumption per adult at the national level, while the top or richest quintile represents the 20 percent of the population at the upper level of the distribution of consumption at the national level.

and 2011/12 support the decline of poverty observed in Figure IV.1. The decline of poverty at the geographic regions level in Figure IV.5 is very similar to that observed above, except for the chained method with shows a more important decline of poverty in the other urban areas (of 5 percentage points) and only a slight reduction of rural poverty of around 2 percentage points. Also, the prediction models confirm that poverty declined faster in Dar es Salaam than in the other regions, but they show a lower level of poverty reduction in Dar es Salaam compared to the decline observed above.

As discussed in "Decline in Poverty and Extreme Poverty Since 2007" in chapter 1, the prediction models seem to attenuate the effects of inflation in food prices inflation on extreme poverty, implying higher estimates of extreme poverty rates for 2007 and consequently a higher decline in extreme poverty during 2007–2011/12, particularly in rural areas and other urban zones.

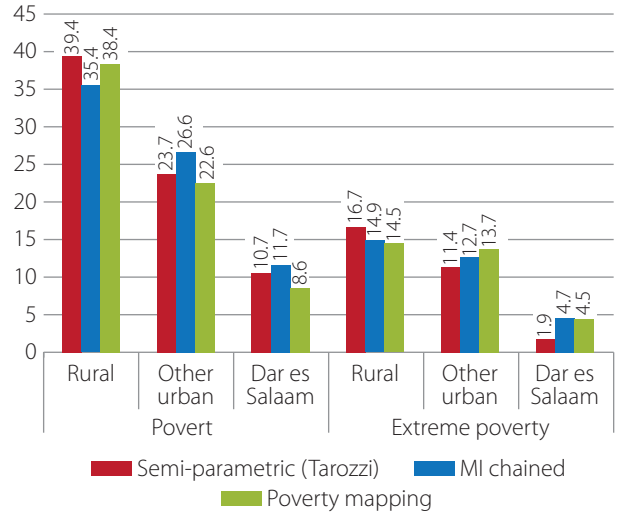
The different prediction models confirm also the decline of poverty severity and depth and, as observed, show a more

Figure IV.4 Depth and Severity of Poverty by Geographic Domain



Source: HBS 2007 and 2011/12.

Figure IV.5 Adjusted Poverty Rates for 2007 by Geographic Domain Using Prediction Methods (%)



Source: HBS 2007 and 2011/12.

pronounced reduction in these indicators than in the poverty headcount.

Finally, and as discussed in chapter 1, the poverty estimates for 2007 using the prediction models are sensitive to the inclusion or exclusion of cell phone ownership. Excluding cell phones in the prediction of consumption levels and poverty rates for 2007 seems to introduce a downward bias in the poverty estimates, suggesting low changes in poverty between 2007 and 2011/12 (Table IV.1).

II. Growth and Distributional Changes by Geographic Domains

The uneven spatial decline of poverty observed is related to the pattern of economic growth, which was almost entirely centered in Dar es Salaam, where are concentrated most of the expanding and flourishing sectors. When using HBS changes in real household consumption per capita, growth is found to average 3.7 per year in Dar es Salaam, while there was almost no growth rural areas and secondary cities, where the annual growth rate was on average of –0.2 percent and -0.1 percent, respectively. The more rapid growth of household consumption in Dar es Salaam resonates well with the sectoral composition of real GDP growth over the period 2008–12. As shown in "A Brief Review of Recent Economic Growth" in chapter 3, Tanzania's GDP growth

Table IV.1 Adjusted Poverty Rates for 2007 by Geographic Domain Using Prediction Methods

	Semi-parametric (Tarozzi)		MI chained (with cell phone)		MI chained (without cell)		Poverty mapping (with cell phone)		Poverty mapping (without cell)	
	Extreme poverty	Poverty	Extreme poverty	Poverty	Extreme poverty	Poverty	Extreme poverty	Poverty	Extreme poverty	Poverty
Headcount										
Rural	16.7%	39.4%	14.9%	35.4%	13.2%	32.1%	14.5%	38.4%	11.3%	31.6%
Other urban	11.4%	23.7%	12.7%	26.6%	10.4%	22.7%	13.7%	22.6%	10.6%	24.8%
Dar es Salaam	1.9%	10.7%	4.7%	11.7%	3.7%	10.0%	4.5%	8.6%	3.9%	9.4%
Depth of Poverty										
Rural	4.3%	12.8%	3.2%	9.4%	2.8%	8.3%	3.1%	9.9%	2.2%	7.6%
Other urban	3.0%	12.8%	3.3%	7.9%	2.6%	6.5%	2.2%	6.0%	2.2%	7.0%
Dar es Salaam	0.4%	2.6%	1.1%	3.0%	0.8%	2.5%	0.8%	2.2%	1.0%	2.5%
Severity of Poverty										
Rural	1.6%	5.9%	1.1%	3.6%	0.9%	3.1%	0.9%	3.6%	0.7%	2.7%
Other urban	1.2%	3.9%	1.3%	3.4%	1.0%	2.7%	0.8%	2.4%	0.7%	2.6%
Dar es Salaam	0.2%	0.9%	0.4%	1.2%	0.3%	0.9%	0.3%	0.8%	0.4%	1.1%

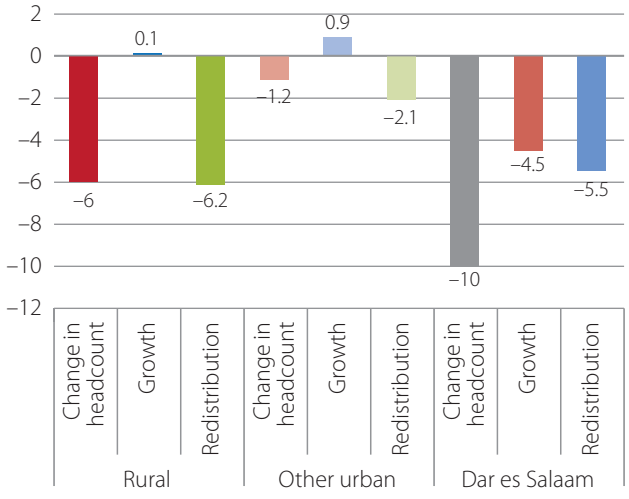
Source: HBS 2007 and 2011/12.

was essentially driven by construction, communications, and financial services sectors, which all saw a growth rate of over 10 percent. With the exception of construction, these sectors created limited jobs. The agricultural sector, which employs three-quarters of the workforce and a vast majority of the poor, grew at only 4.2 percent, a much lower rate than average economic growth.

Despite the limited growth outside Dar es Salaam, poor households have experienced consumption gains and poverty has declined quite significantly, particularly in rural areas. This section examines more in detail the relationship between growth and poverty in the different geographic domains and investigates the underlying causes to the decline of poverty outside the metropolitan city.

Poverty reduction outside Dar es Salaam is driven mainly by inequality reduction. The decline of poverty in Dar es Salaam was driven by both an increase in mean consumption and an improvement in consumption distribution (reduction of inequality), while poverty reductions in rural and other urban areas are due entirely to improvements in consumption distribution (Figure IV.6). In Dar es Salaam the growth component contributes by 45 percent to poverty reduction and the redistribution component contributes by 55 percent, while in the rural and other urban sectors reductions in poverty are due entirely to improvements in consumption distribution, with mean consumption changes resulting in slight increases in poverty.

Figure IV.6 Growth and Redistribution Components of Changes in Poverty at the Regional Level (in percentage points)



Source: HBS 2007 and 2011/12.

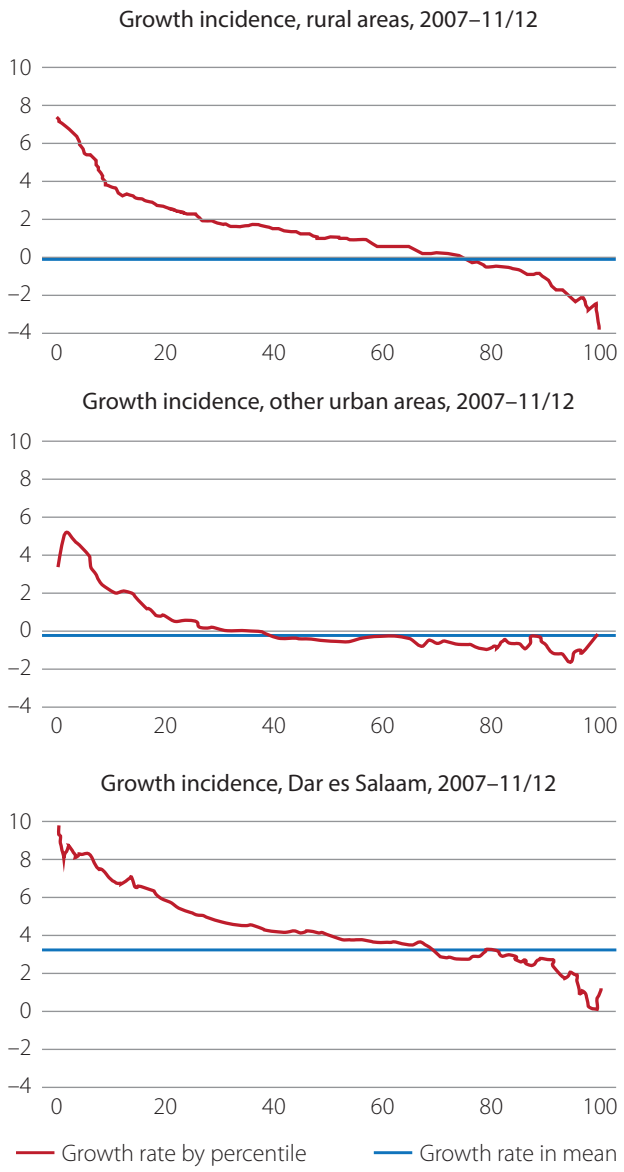
Poor households outside Dar es Salaam experienced an increase in their consumption levels, albeit from low levels. The Growth Incidence Curves (GIC) in Figure IV.7 show consumption gains among households in the poorest quintiles in rural and urban areas other than Dar es Salaam. Stagnant average consumption in these areas masks different experiences across the distribution, with poorer households experiencing more rapid increases in consumption (in relative terms) than the better-off. This is indicated by the downward sloping growth incidence curves. In other urban and rural strata, the better-off experienced declines in consumption, whereas the poorest two quintiles in other urban areas and three quintiles in rural areas appear to have experienced an increase in their consumption levels, albeit from low levels of consumption initially. The same general pattern (downward sloping growth incidence curves) applies to Dar es Salaam over this period, with all households (across the distribution) experiencing increases in real consumption. But poorer households gained more than the better-off—relative to their consumption levels in 2007.

The observed signs of pro-poor growth outside Dar es Salaam are quite puzzling and need to be investigated in more detail. Increases in real consumption can be assumed as due either to an improvement in household characteristics or endowments or increases in the returns to these endowments.

In order to better understand the factors underlying the increase of consumption in each geographic region, this study decomposes the changes in households' consumption over time into the part explained by improvements in endowments and the part explained by changes in the returns to those characteristics. The decomposition procedure is similar to that applied in "The Distributional Pattern of Growth" in chapter 3.

The increase of the consumption of rural poor households is driven essentially by the improvement of their endowments.

Figure IV.7 Growth Incidence Curves by Geographic Domain



Source: HBS 2007 and 2011/12.

Rural households in the 30 percent poorest groups experienced an increase of their consumption by around 20 percent between 2007 and 2011/12. This increase was driven primarily by the improvement of their endowments in assets, mainly, increased ownership of communication and transportation means followed by higher possession of agricultural land (see Figure IV.8 and Table IV.2). The endowments in education also improved among the moderate poor segments.

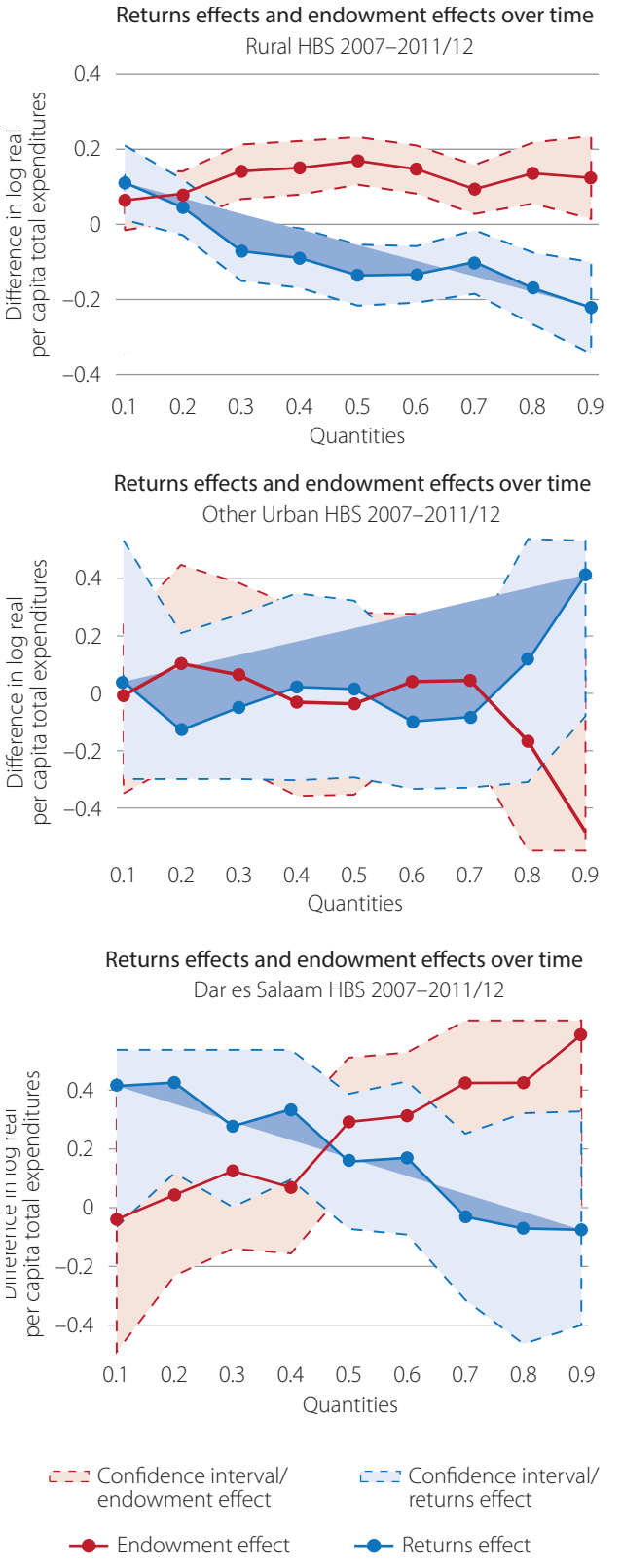
We observe from Table IV.2 a decline in the access of rural poor households to business activities, mainly household agricultural businesses, however a more detailed decomposition shows an increase in the access to cash crop production. This supports the findings in the previous chapters, suggesting a switch away from agriculture and higher engagement of households who remained in the sector in cash crops and commercial agriculture. These changes apply both to the rural population overall, and to the poorest three deciles. The access to local infrastructure, mainly roads, also improved but access to local markets remained limited.

The returns to the endowments of poor rural households increased, but only for the poorest groups. The moderate poor as well as nonpoor households experienced a decline of the overall returns to their endowments. However, this decline masks important differences in the direction of change of the returns to the specific attributes. For instance, returns to both nonfarm and household agricultural businesses, mainly cash crops, seem to have expanded for rural poor households. Returns to land also increased slightly. The returns to local markets seem to have improved as well, suggesting that while farming households are not better served by markets than they were in 2007, these currently play a more positive role in their livelihoods.

The growth of consumption among poor households in the secondary cities is due more to the improvement of their endowments. The consumption level of households in the 30 percent poorest groups increased by about 15 percent, essentially due to the improvement of their endowments in assets and to a lesser extent in land.

One observes important fluctuations of the changes in returns across the different deciles. The overall returns to endowments increased over time for the extreme poor segments as well as for better-off household groups, but declined for the moderate poor (see Figure IV.8). However, the results in Table IV.2 indicate quite significant expansion of the returns to nonfarm activities and wage employment for all households groups, but particularly for the poor. On the other hand, there is evidence from the results of a marked deterioration of the returns to education and to assets.

Figure IV.8 Sources of Households' Consumption Growth by Geographic Domain



Source: HBS 2007 and 2011/12.

The increase of poor households' consumption levels in Dar es Salaam is caused primarily by the improvements of the returns to their characteristics. The consumption level of poor households in Dar es Salaam increased by over 40 percent between 2007 and 2011/12, due mainly to the expansion of the returns to employment in public and private sectors followed by a slight increase of the returns to nonfarm businesses. Moderate poor households also experienced some gains in their endowment base, essentially endowments in education, but the effect of returns was proportionately stronger. However, one observes a decline of the effect of returns at upper deciles, indicating that for better-off households the gains in consumption are explained mainly by the increase of their endowments.

Table IV.2 Endowments and Returns Effects of Some Specific Attributes

	Rural				Other urban				Dar es Salaam			
	Extreme poor	Poor	Middle class	Richest	Extreme poor	Poor	Middle class	Richest	Extreme poor	Poor	Middle class	Richest
Total	0.174***	0.069***	0.034**	–0.097**	0.033*	0.015*	–0.020	–0.070*	0.379***	0.407***	0.454***	0.521***
Endowments	0.063**	0.140***	0.169***	0.125***	–0.008	0.065*	–0.035	–0.485	–0.038	0.127*	0.295***	0.594***
Education	0.000	0.003**	0.004**	0.007**	–0.001	–0.004	–0.006	0	0.055	0.061**	0.091***	0.169**
Wage work	0.002	0.001	0.001	–0.001	–0.019	–0.006	–0.001	0	0.004	0	–0.003	0.012
HH nonfarm business	–0.002	–0.002	–0.001	–0.001	–0.059**	–0.027**	–0.012*	–0.037**	–0.024	–0.003	0.008	–0.052
HH agricultural business	–0.014***	–0.009***	0.000	0.009	0.002	0.001	0	0	0.002	0.002	0.004	–0.005
Assets	0.084***	0.073***	0.078***	0.092***	0.196***	0.194***	0.136***	0.049	–0.014	–0.001	0.070	0.229
Land	0.004	0.006**	0.007***	0.014***	0.016	0.023**	0.018**	0.005	–0.038	–0.004	0.012	0.014
Access local markets	–0.002***	–0.001	0	–0.001	–0.013	–0.004	–0.030**	–0.014	–0.006	0	–0.015	0.035
Access local roads	0.037***	0.046***	0.039***	0.017	–0.023	0.007	–0.011	–0.040	0.006	0.009	0.085***	0.051
Returns	0.111***	–0.071***	–0.135***	–0.222**	0.041	–0.050	0.016	0.415*	0.417***	0.280***	0.159*	–0.073
Education	–0.155***	–0.012	–0.004	0.096**	–0.605**	–0.145*	–0.164*	–0.092	–0.109	–0.594**	–0.481*	–0.490
Wage work	–0.005	0.006	–0.001	0.008	0.119***	0.044**	0.036**	0.063***	0.066	0.145***	0.122***	0.251***
HH nonfarm business	0.012	0.022*	0.002	0.009	0.172***	0.071**	0.058**	0.151	0.170*	0.003	–0.145**	0.344**
HH agricultural business	0.108*	0.089*	0.015	–0.022	0.182***	0.042	0.077**	0.064	0.020	0.011	–0.087***	0.096
Assets	–0.310***	–0.218***	–0.168***	–0.173***	–0.433***	–0.257***	–0.053*	–0.194*	–1.243*	–0.332	–0.184	–0.064
Land	0.003	0.011*	0.003	0.005	–0.044	0.067	0.160*	0.488**	–0.104	–0.091*	0.001	–0.164
Access local markets	0.053***	0.041***	0.022*	0.027	–0.097	–0.071*	0.072**	0.090*	0.087	–0.051	0.001	–0.205
Access local roads	0.014	0.018	0.016	–0.060**	–0.037	0.107	–0.001	–0.208*	–0.328	–0.055	0.486**	–0.043

Source: HBS 2007 and 2011/12.

Note: Extreme poor are population groups in the bottom 10 percent of the distribution; the *poor* are in the third decile; *middle class* are in the fifth decile; and the *richest* are in the top decile.

* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. For rural households the endowments in cash crop agriculture are, respectively, 0.009***, 0.008***, and 0.012*** for the extreme poor, poor, and middle class households. The returns to cash crops are, respectively, 0.003, 0.011**, and 0.015**.

Chapter 5

Increasing Inequality between Geographic Domains

Key Messages

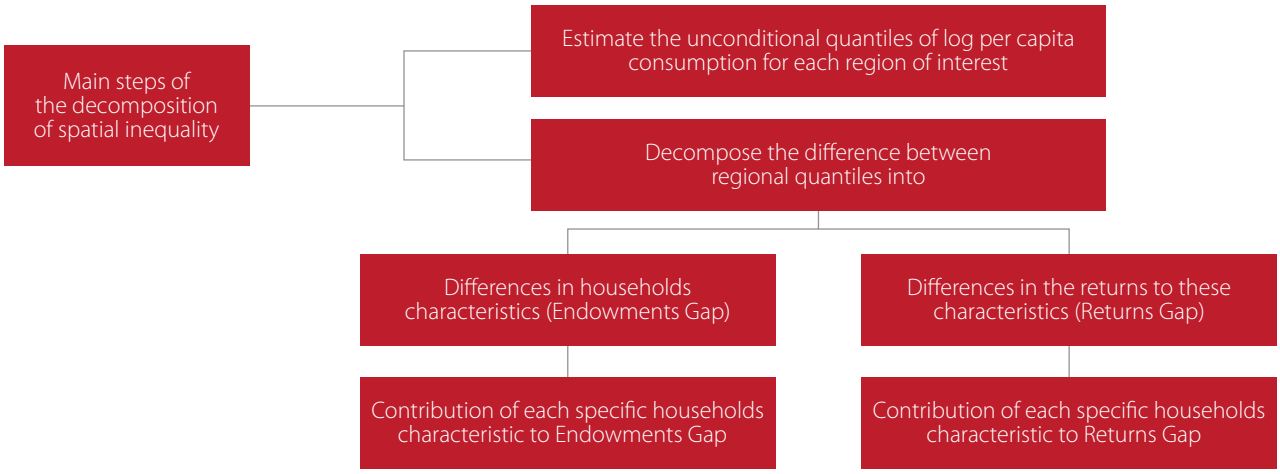
- Inequality between urban and rural areas as well as between Dar es Salaam and the other regions is increasing.
- Interregional inequality between poor households is slightly narrowing, but interregional inequality between better-off households is increasing.
- The interregional differences in returns to household endowments are increasing, but inequality remains due mostly to large differences in households' characteristics.

The previous chapters revealed positive changes in Tanzania, indicating a decline of poverty and emerging signs of "pro-poor" growth. However, the evidence from the results also suggests uneven improvements of the living standards and poverty indicators across the geographic regions. Also, the decomposition of inequality by population groups, noted in "Moderate and Fairly Stable Inequality" in chapter 1, shows an increase of urban-rural and interregional inequality over time. The increasing spatial disparities are worrisome as they can undermine inclusive growth prospects and may jeopardize social cohesion.

This chapter examines in detail the extent and sources of these inequalities. The first section investigates the determinants of urban-rural inequality and the second section explores the sources of inequality between Dar es Salaam (metropolitan) and the rest of the regions (nonmetropolitan).

This study uses the unconditional quantile regression method proposed by Firpo, Fortin, and Lemieux (2009) to decompose inequality between regions into a component that is due to geographic differences in the distributions of household characteristics or *endowments* such as education, demographic structure, ownership of assets, and so forth, and a component explained by differences in the returns to these characteristics (differences in the returns to education, land productivity, and so forth). More specifically, this study decomposes the consumption gap between geographic regions into (i) a component that is due to differences in household characteristics only (*endowment effects*), considering, for example, the gap in consumption that is due to the fact that urban dwellers have higher education levels than rural ones but assuming that people with same education levels receive the same remunerations across the different locations; and (ii) a component that is due to differences in returns to those characteristics only (*returns effect*), considering, for example, the gap in consumption that is due to the fact that a secondary school graduate in the urban areas receives a higher remuneration than a secondary school graduate in the rural areas.

Figures V.1 Decomposing Inequality by Regions



The decomposition proceeds as depicted in Figure V.1 (more technical details are in Appendix 4).

I. The Sources of Urban-Rural Inequality

Urban households are better off than their rural counterparts because they have superior endowments such as education, family structure, and assets ownership. Inequality between urban and rural areas is essentially due to the fact urban households have higher endowments than their rural counterparts. As shown in Figure V.2, the contribution of the difference in households' endowments to the urban-rural gap significantly dominates the contribution of disparity in returns to those endowments across the entire distribution, indicating that urban households have higher consumption levels because they have characteristics superior to rural ones.

Inequality between better-off urban and rural households is larger than inequality between poor urban and rural households. The difference in real per capita consumption between richest urban and rural households is more than double the difference between poorest urban and rural households (see Figure V.2). This is mainly driven, in 2011/12, by larger gaps between urban and rural rich households in both endowments and returns than between urban and rural poor households. In 2001 and 2007, the higher inequality between urban and rural rich households than between poor ones was explained mainly by larger urban-rural differences in returns at upper quantiles, while in 2011/12 better-off urban households experienced a faster increase of their endowments and returns than their rural counterparts, which induced a widening of the consumption gap at upper quantiles.[38]

The urban-rural difference in household endowments was the main source of urban-rural inequality for the poorest segment of the population in the early and middle of the decade, but it seems to be declining in 2011/12. There was an important gap in assets ownership and educational attainment between urban and rural poor households. Starting from 2007, education and the possession of assets improved for all poor households but improved faster for poor rural households, inducing a shrinking of the urban-rural endowment gap at the lower quantiles.

The difference between urban and rural areas in market returns to household characteristics does not seem to be important for poor household groups. This is probably due

[38] Quantiles are values taken at regular intervals from the inverse of the cumulative distribution function of per capita real monthly consumption. If there are 5 quantiles then each quantile will correspond to a *quintile* (20 percent of the population) and if there are 10 quantiles then each quantile will correspond to a *decile* (10 percent of the population) and so forth.

to the fact that these households are generally employed in sectors that pay slightly above the subsistence level. But this difference in returns is affecting households at upper quantiles, particularly the wealthiest. As apparent from Figure V.2, the magnitude of the returns effects is increasing proportionately more than the magnitude of endowments effects at upper quantiles, showing that even though all urban households continue to have superior endowments to those of their rural counterparts, the contribution of differences in returns to households' attributes to inequality is gaining importance for most well-off households.

The urban-rural gap between the rich is widening over time while it is slightly narrowing between the poor. Urban-rural inequality is increasing over time for the middle-class and richest households, driven mainly by widening urban-rural differentials in households characteristics for both population classes and an increasing dispersion of returns to households attributes for the wealthiest. Rural households at the lower tail of the distribution have observed an improvement in their endowments over time, and there are signs of convergence in household endowments between the sectors. This suggests that the development policies implemented in Tanzania were appropriate to tackle some of the rural poor's problems, such as combating illiteracy and promoting basic education, facilitating access to assets and land, and so forth. But these policies did not adequately address the needs of better-off rural households to help them catch up with their urban counterparts. Well-off urban households have been better able to improve their endowments and to benefit from the opportunities generated by economic growth than their rural counterparts.

Differences in the distribution of household demographic characteristics and access to basic services, followed by differences in the sector of employment of the head, matter the most for inequality between urban and rural households (Table 4-4 in Appendix 4). In 2001 and 2007, differences in asset ownership, such as land, livestock, cell phones, and transportation means, are found to significantly contribute to the welfare gap between urban and rural households, particularly for less well-off segments of the population, but the difference in assets possession declined markedly over time, mainly for the poor classes. These improvements have been largely offset by a widening gap in demographic structure and in access to basic services between urban and rural households. The effect of differentials in household human capital (measured by the highest number of years of schooling of the household head or his spouse and the experience of the head) increased between 2001 and 2007 and then decreased in 2011/12, particularly for the poorest quantiles, while differences in the sector of employment of the head kept widening over time. This suggests that despite some improvements in the education level of rural households, the urban dwellers and particularly the richest ones have been more able to access to better job opportunities than their rural counterparts.

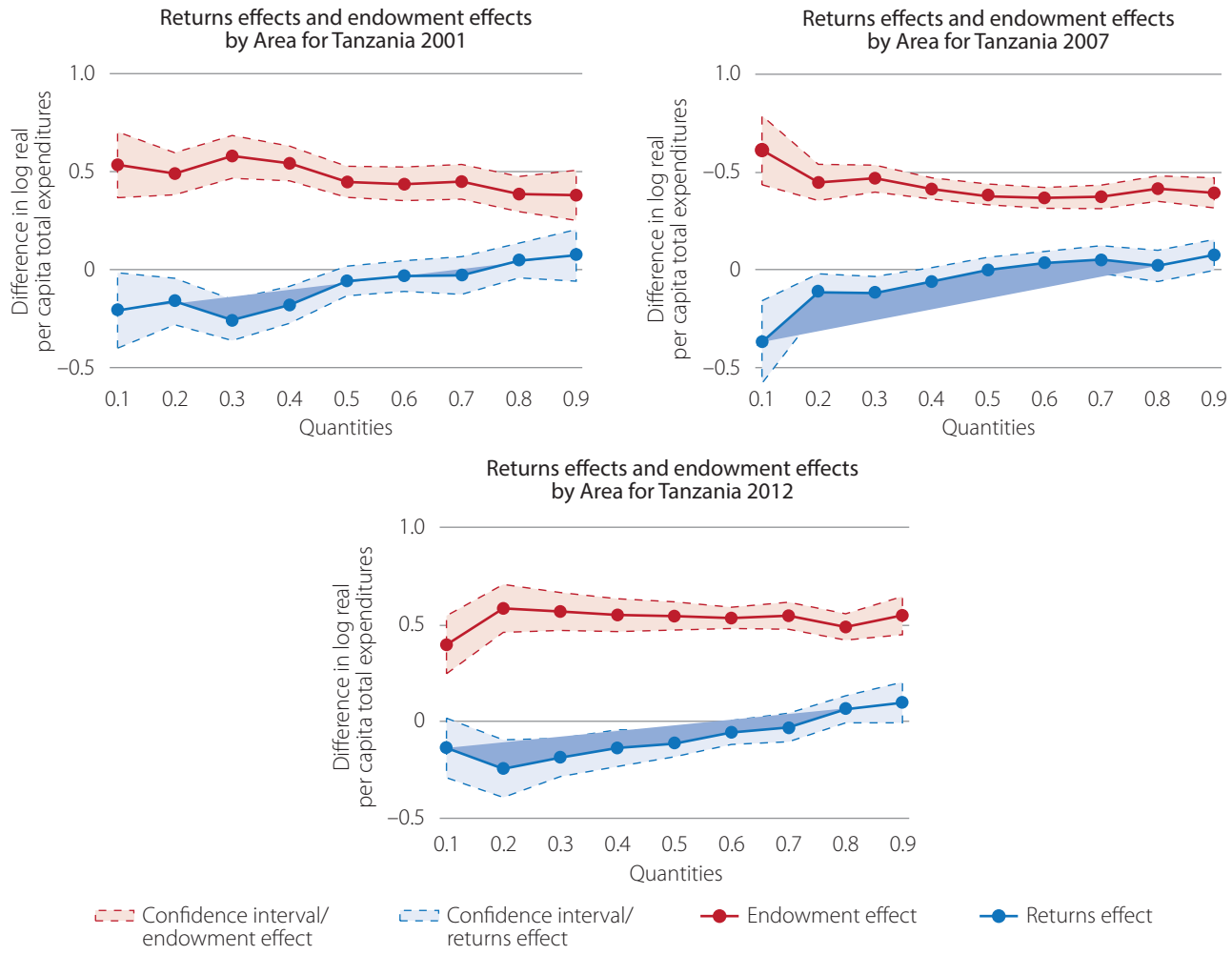
Differences in returns to assets and employment are among the dominant factors accounting for rural-urban gap in returns to household characteristics. There is a quite important difference in the returns to assets between urban and rural areas. This difference contributes more to inequality between the poor than to inequality between the rich, but it is narrowing over time for the poor while it is widening for the rich.

The urban-rural gap in returns to human capital showed a marked increase (particularly at the upper quantiles) in 2007 but started declining since then (tables 4-1 to 4-3 in Appendix 4). Even though urban markets continue to better reward education and experience than rural markets do, the gap seems to have narrowed, particularly for the poorest and richest segments of the population.

The urban-rural differentials in returns to employment of the households have widened over time, driven mainly by a more marked increase of returns to wage employment in the public and private sectors and to a lesser extent to non-farm businesses in the urban areas.

Poor households seem to have benefitted from the policies for basic education to catch up with their urban counterparts. However, they continue to suffer from limited access to basic services, large family sizes, and large number of dependents. Middle-class and well-off rural households have slightly reduced their education gap with the urban ones, but they have not been able to access better job opportunities nor obtain higher returns for their employments and assets. This points to the possibility that employment

Figure V.2 Unconditional Quantile Decomposition of Urban-Rural Inequality of Real Monthly per Capita Consumption



	2001			2007			2011/12		
	Lowest percentile	Middle percentile	Top percentile	Lowest percentile	Middle percentile	Top percentile	Lowest percentile	Middle percentile	Top percentile
Total Gap	0.327	0.390	0.452	0.243	0.385	0.470	0.257	0.427	0.641
	(0.016)	*(0.010)*	*(0.020)*	*(0.026)*	*(0.015)*	*(0.025)*	*(0.017)*	*(0.014)*	*(0.025)*
Endowments	0.535	0.448	0.379	0.600	0.384	0.393	0.394	0.543	0.545
	(0.021)	*(0.014)*	*(0.025)*	*(0.033)*	*(0.017)*	*(0.030)*	*(0.025)*	*(0.019)*	*(0.037)*
Returns	−0.208	−0.058	0.073	−0.357	0.001	0.077	−0.138	−0.115	0.096
	(0.025)	*(0.016)*	*(0.030)*	*(0.039)*	*(0.020)*	*(0.037)*	*(0.029)*	*(0.021)*	*(0.041)*

Source: HBS 2001, 2007, and 2011/12.

Note: Numbers in parentheses are bootstrap standard deviations based on 100 replications.

and profit opportunities are expanding and diversifying more in urban than in rural areas and to the fact that urban households who were initially better educated and enjoyed higher assets than the rural ones have been more able to take advantage of these opportunities to improve their endowments and leverage their returns.

II. Determinants of Inequality between Dar es Salaam and the Other Regions

Inequality between Dar es Salaam and the rest of the regions is increasing because households' endowments are improving faster in the city. Improvements in households' endowments in Dar es Salaam outpaced the improvements in the rest of country, driven by widening differences in family structures and access to education and employment opportunities between the two sectors. As revealed by Figure V.3, the gap in endowments between households living in Dar es Salaam and those living in the rest of the country is larger and increasing faster than the gap in returns, particularly for households at upper quantiles. In the early part of the 2000s first decade, metropolitan households were better off than their nonmetropolitan counterparts because markets in Dar es Salaam pay more for their attributes than markets in other regions would. However, in 2011/12 the endowments in human capital (education), employment, and family structure improved considerably in the metropolitan city compared to the other regions, inducing larger interregional inequalities, particularly among better-off households.

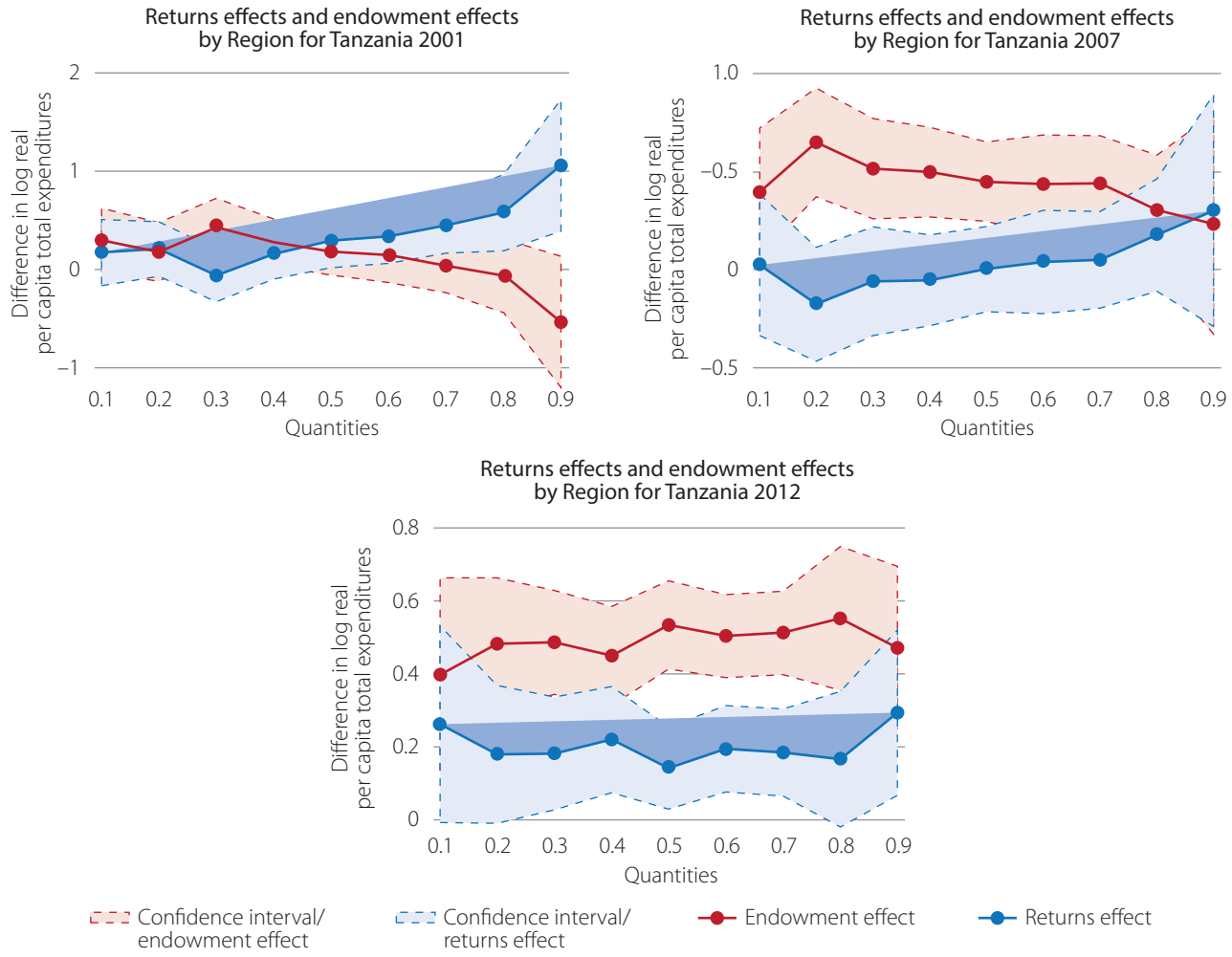
The education and employment opportunities improved for poor households outside Dar es Salaam, but the markets in their areas of residence could not offer them the returns they would have obtained in the city. Inequality in endowments between Dar es Salaam and the rest of the regions increased proportionately more for middle class and richest households, while inequality in returns increased more for the poor. This is due to the faster increase over time of returns to the endowments of poor households in Dar (Table 4-5 in Appendix 4).[39] It appears, therefore, that even though education and employment opportunities improved for poor households outside Dar es Salaam, they could not be offered returns equivalent to those in the city.

The differences in the distribution of household demographic characteristics and human capital endowments between the geographic locations and the unequal access to private assets and productive employments limited the ability of the poor to take up the opportunities generated by economic growth and to improve their living standards. Households in Dar es Salaam and in urban areas who enjoy higher endowments have been able to benefit more from the growth in Tanzania and have seen a larger expansion in returns to their attributes. This, combined with the widening differences in characteristics, contributed to increasing interregional inequalities and self-perpetuating poverty in some regions, mainly rural areas.

Efforts to promote education, family planning, and access to basic services and assets should be further enhanced to improve the endowments of marketable characteristic for households at the lower end of the income-consumption distribution. These efforts need to be accompanied, on the one hand, by policies targeting rural and nonmetropolitan households at upper quantiles to help them catch up with their urban and metropolitan counterparts, and on the other hand by policies to promote local economies' development and dynamism and expand productive activities in order to increase the returns to endowments in the less favored regions

[39] The faster increase of returns in Dar can also be observed in Figure IV.8 and Table IV.2 in the previous chapter.

Figure V.3 Unconditional Quantile Decomposition of Metropolitan-Nonmetropolitan Inequality in Real Monthly per Capita Consumption



	2001			2007			2011/12		
	Lowest percentile	Middle percentile	Top percentile	Lowest percentile	Middle percentile	Top percentile	Lowest percentile	Middle percentile	Top percentile
Total gap	0.478	0.480	0.529	0.420	0.450	0.533	0.661	0.677	0.767
	(0.026)	*(0.026)*	*(0.040)*	*(0.025)*	*(0.016)*	*(0.030)*	*(0.017)*	*(0.015)*	*(0.028)*
Endowments	0.302	0.185	–0.531	0.396	0.448	0.232	0.398	0.535	0.473
	(0.158)	*(0.150)*	*(0.232)*	*(0.104)*	*(0.062)*	*(0.168)*	*(0.066)*	*(0.053)*	*(0.104)*
Returns	0.175	0.295	1.06	0.024	0.002	0.301	0.263	0.143	0.294
	(0.160)	*(0.151)*	*(0.234)*	*(0.105)*	*(0.063)*	*(0.170)*	*(0.067)*	*(0.054)*	*(0.107)*

Source: HBS 2001, 2007, and 2011/12.

Note: Numbers in parentheses are bootstrap standard deviations based on 100 replications.

Chapter 6

Inequality of Opportunity

Key Messages

- Around one-fourth of consumption inequality is explained by family background and circumstances beyond individuals' control.
- Inequality of opportunity is higher in urban areas, but increasing in rural zones.
- Parental education and particularly father's education contributes the most to the disparity of welfare in Tanzania.

Inequality between population groups seems to be increasing in Tanzania despite the signs of improving welfare distribution at the national level. These intergroups' inequalities manifest themselves in unequal outcomes but also unequal opportunities. To the extent that inequality in opportunities is high, it will perpetuate the lack of capabilities in the population and the waste of productive potential and will contribute to poverty and inequality persistence. Hence, development policies focusing on promoting shared prosperity and equity need to address inequality in both outcomes and opportunity.

Inequality of opportunity is defined as the part of inequality stemming from circumstances, such as gender, family background, and place of birth, that are beyond a person's control and is widely recognized to contribute to the persistence of social and economic inequalities and to constrain inclusive development. It is important to distinguish inequalities due to unequal opportunities from inequalities due to individual choices to better inform policy design and institutional arrangements that reduce the unfair influence of people's circumstances and favor a more egalitarian distribution of opportunities.

The previous chapter revealed that the spatial inequalities in Tanzania are due mainly to the lack of capacities and endowments of households in the rural and disadvantaged regions. This chapter takes an intergenerational perspective and explores how family background affects these inequalities. Unlike the previous chapter, where all households' endowments were considered, this chapter focuses only on those inherited and independent of their choices.

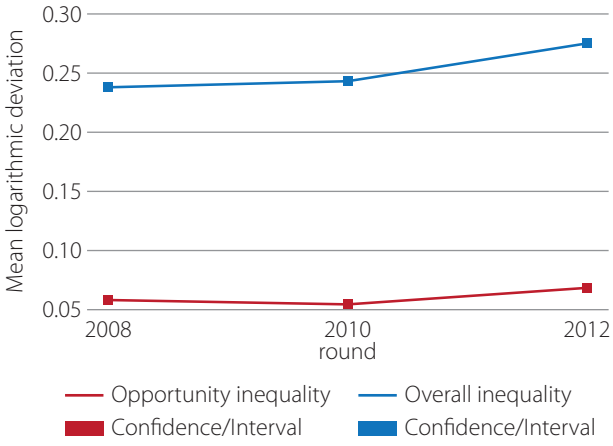
Drawing on data from the National Panel Surveys (NPS) for 2008/09, 2010/11, and 2012/13, the study assesses the extent to which unequal opportunity, resulting from the family and circumstances variables, affects the distribution of both consumption and income.

All survey waves include a rich information at the household and individual levels on consumption and income, parental education, and family circumstances. They include as well a community module that collects detailed information on the access to basic services and distance to population centers, the presence of local investment projects, infrastructure conditions, and demographic and family characteristics in the communities where the households are located. This

information is missing in the Household Budget Surveys (HBS), which makes them unsuitable of the analysis of inequality of opportunity.

This study uses the parametric model proposed by Bourguignon, Ferreira, and Menéndez (2007) and estimate inequality of opportunity as the difference between observed total inequality and the inequality that would prevail if there were no differences in circumstances. Two different welfare indicators are used for the measurement of total inequality: (i) real monthly per capita consumption and (ii) real monthly per capita income. The focus on consumption and income is motivated by the desire to investigate the differentiated impact of the circumstance variables on different household welfare dimensions and to get a more comprehensive understanding of inequality of opportunity in Tanzania. The circumstances included are gender, age, mother's and father's education, age at which father and/or mother died, and region of birth. The chapter explores also the effects of community characteristics on inequality and compares its impact to that of family circumstances. Details related to the variables used and underlying methodology are in Appendix 5.

Figure VI.1 Consumption Inequality and Inequality of Opportunity



Total inequality	Opportunity inequality	Total inequality	Opportunity inequality	Total inequality	Opportunity inequality
0.238***	0.058***	0.243***	0.054***	0.275***	0.068***
(0.007)	(0.005)	(0.008)	(0.005)	(0.008)	(0.005)

Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

I. Inequality of Opportunity in Household Consumption

Inequality of opportunity levels for household consumption ranges between 0.05 and 0.07 during 2008–12, and this level is relatively high by international standards. The estimated level of inequality of opportunity, reported in Figure VI.1, is two times higher than in Egypt and greater than inequality of opportunity levels in many Latin American countries.[40]

The degree of inequality of opportunity, estimated using the mean log deviation (Theil_L) index, should be considered as a lower-bound estimate of the true level of inequality of opportunity.[41] Despite the relative richness of the circumstance variables in the datasets, many relevant circumstances, such as parental employment and occupation status, family wealth, quality of parents' education, and so forth remain unobserved. Adding more circumstance variables would increase the magnitude of inequality of opportunity.

Around 25 percent of consumption inequality can be attributed to unequal opportunities associated with only observed Tanzanian households' circumstances. This is a quite sizeable share by SSA standards, where inequality of opportunity share is estimated at 12 percent in Ghana, 15 percent in Côte d'Ivoire, and 21 percent in Madagascar.[42] It is almost on par with the levels in Latin American countries.[43]

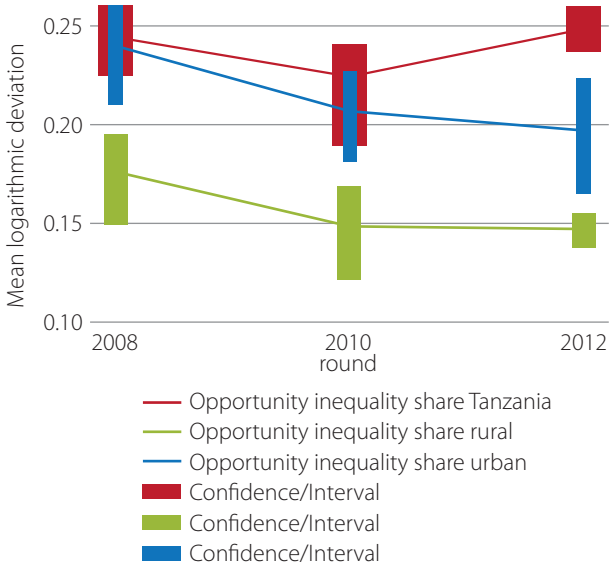
40 See Barros et al. (2009) for inequality of opportunity estimates, based on labor earnings and household consumption and income, for several Latin American countries, and Belhaj Hassine (2011) for inequality of opportunity in labor earnings in Egypt.

41 Theil_L is the only inequality measure with a path-independent decomposition, see Appendix 5 for more details

42 Forthcoming in the poverty flagship report for Africa.

43 In a study by Ferreira and Gignoux (2011), the opportunity shares of consumption inequality were found to range between 24 percent in Colombia and 39 percent in Panama.

Figure VI.2 Share of Inequality of Opportunity in Tanzania Mainland and by Region



2008			2010			2012		
Tanzania	Urban	Rural	Tanzania	Urban	Rural	Tanzania	Urban	Rural
0.244***	0.240***	0.176***	0.224***	0.206***	0.148***	0.248***	0.197***	0.147***
(0.018)	(0.031)	(0.017)	(0.016)	(0.021)	(0.019)	(0.016)	(0.028)	(0.013)

Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

Figure VI.2 shows that the contribution of inequality of opportunity to total inequality is increasing over time at the national level.

Unlike HBS data, NPS shows a slight increase in overall consumption inequality from 0.24 in 2008 to 0.28 in 2012 (and from 0.38 to 0.40 using the Gini index). Inequality of opportunity followed roughly the same pattern but increased more steeply, inducing a larger increase of the opportunity shares. In general, the patterns of inequality of opportunity are relatively stable due to the little variations in the circumstances variable over short periods of time, but the results here show quite sizeable changes in inequality of opportunity levels over the past four years.[44]

The incidence of inequality of opportunity is lower in rural areas than in urban sectors. Opportunity shares of inequality are almost 1.5 times higher in urban than in rural areas. This reflects two facts. First, family background variables have greater influence on households and individuals with higher levels of education and engaged in more diversified occupations and jobs than is the case in urban sectors. Second, to the extent that some unobserved circumstances (such as family composition, parents' financial and asset situation, and so forth) shape the opportunity sets for rural Tanzanians, the estimates of inequality of opportunity excluding these circumstances are significantly biased downward.

The contribution of unequal opportunities to the consumption disparity declined over time in the rural and urban sectors. Overall and opportunity inequalities declined in the urban areas between 2008 and 2012, and as opportunity inequality declined more steeply this induced a reduction of the opportunity share. However, in rural areas both overall

[44] Studies by Lefranc et al. (2008), Barros et al. (2009) on several Latin American countries, and Belhaj Hassine (2011) on Egypt show quite stable patterns in inequality of opportunity levels over time.

and opportunity inequality increased during 2008–12, but overall inequality increased faster, which involved a decline of the opportunity share. The factors contributing to the variation of inequality of opportunity in the urban and rural sectors are explored more in detail below.

In addition to family circumstances, community characteristics also impact on people's income prospects, and the disparity of infrastructure facilities and basic services across local communities contribute to the disparity of welfare in the country. However, community characteristics cannot be considered as being beyond adult individuals' control, assuming that they can migrate, influence public decisions, and so forth, and therefore these cannot be accounted for in the opportunity inequality share.

Policy actions to address the influence of family background on the distribution of welfare generally differ from actions to address the influence of community characteristics, the first being a longer term mission that is often more complex. Thus, from a policy perspective it is important to understand how family background and community characteristics affect individuals' income and consumption and to compare their effects on the distribution of welfare.

This study examines in the following sections the share of consumption inequality arising from family background and community characteristics in Tanzania Mainland as well as in urban and rural areas separately.[45]

Family background variables explain a greater share of inequality than community characteristics. The share of family background exceeds 15 percent at the national level and is around two times that of community characteristics in the rural areas. Although the contribution of family background is underestimated due to the absence of information on parental occupation and employment status, their financial situation, asset ownership and so forth, it appears to be associated with the largest shares of overall inequality (Figure VI.3). Inequality due to family background varies between 15 and 19 percent across the three waves of the survey, while the contribution of community characteristics barely exceeded 10 percent. At the urban and rural levels, the contribution of family background to inequality is higher than that of community characteristics and is almost double of this latter in rural areas.

The contribution of family background and community characteristics to inequality of opportunity both increased in 2012 at the national level and in rural areas. Family background is also increasing slightly in urban areas while the contribution of community characteristics is declining, suggesting a possible convergence in infrastructure and service provision between the urban communities.

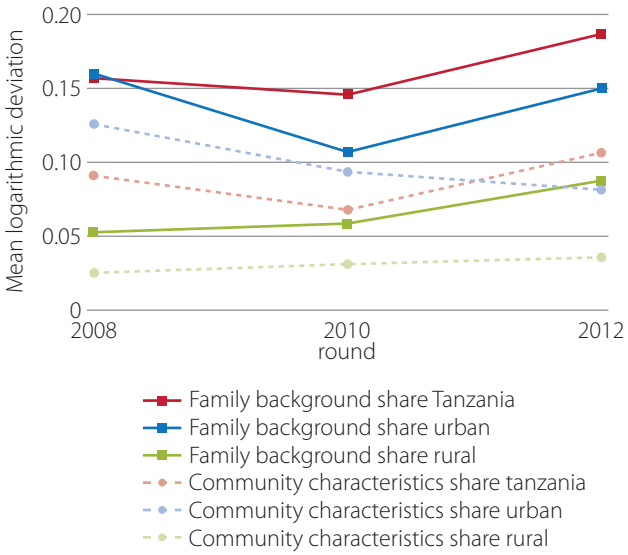
The following material turns to the partial contributions of individual circumstances, and groups of circumstances, to inequality. Being able to distinguish between these sources of inequality of opportunity is important for formulating policies that reduce it. The parametric approach allows the estimation of the partial effects of individual circumstances on outcomes, by fixing one or a group of circumstances at their mean values while allowing others to vary.

Of all observed circumstance variables, father's education is associated with the largest shares of consumption inequality. The analysis of the contribution of individual circumstances, reported in Figure VI.4, shows that inequality of opportunity related to father's education increased from 11 percent in 2008 to 15 percent in 2012 at the national level.

Inequality of opportunity resulting from region of birth, which had the largest share in 2008, slightly declined from 12 percent to 9 percent during 2008–10 and then increased again to 11 percent in 2012. Mother's education also plays an important role in determining inequality, accounting for nearly 10 percent of total inequality for the entire population. It

[45] Family background group includes father's and mother's educational attainment, whether one or both parents of the head live with the household, and whether the head lost his father and/or his mother before the age of 15. The community characteristics group includes the distance to regional or district headquarters, distance to health centers, distance to primary and to secondary schools, distance to main markets; the presence and amounts of investment projects for schooling, irrigation water provision, and infrastructure development; the sources of drinking water; and access to electricity.

Figure VI.3 Contributions of Family Background and Community Characteristics to Inequality



	2008			2010			2012		
	Tanzania	Urban	Rural	Tanzania	Urban	Rural	Tanzania	Urban	Rural
Family Background	0.157***	0.160***	0.0528***	0.146***	0.107***	0.0581***	0.187***	0.150***	0.0876***
	(0.016)	*(0.030)*	*(0.013)*	*(0.015)*	*(0.024)*	*(0.013)*	*(0.016)*	*(0.027)*	*(0.013)*
Community Characteristics	0.0914***	0.126***	0.0246**	0.107***	0.0937***	0.0308***	0.107***	0.0812***	0.0358***
	(0.006)	*(0.010)*	*(0.008)*	*(0.006)*	*(0.011)*	*(0.006)*	*(0.006)*	*(0.007)*	*(0.005)*

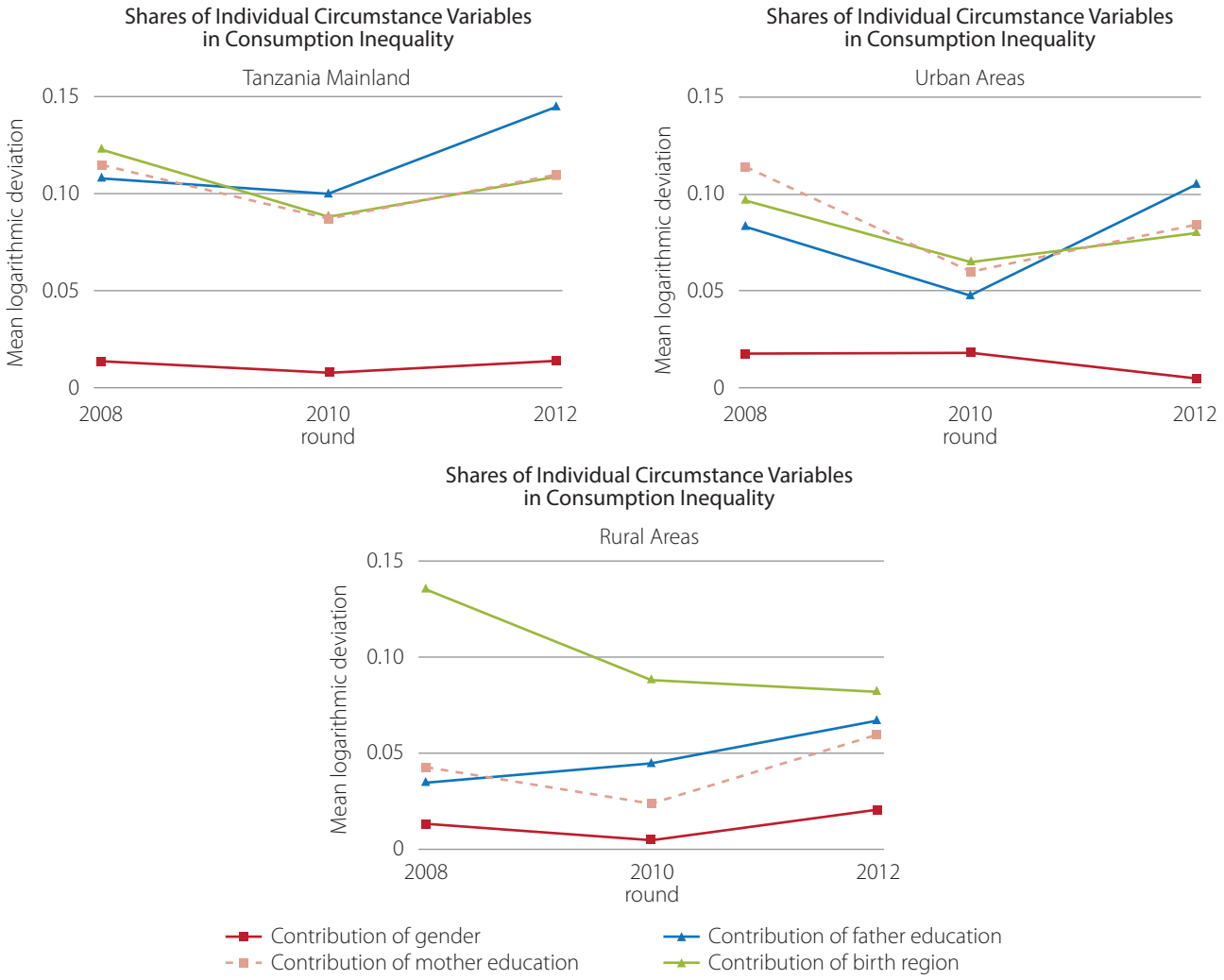
Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

declined slightly in 2010 but regained importance according to the latest survey. Gender makes a limited contribution to inequality but seems to have gained importance during the last year of the survey, reflecting the appearance of a possible form of discrimination against women in welfare distribution.

Mother's education is among the most important factors shaping opportunity in urban areas. Mother's education accounts for around 9 percent of urban inequality. However its effect is declining over time while the effect of father's education is increasing quite importantly.

In rural areas, inequality is shaped mainly by the region of birth, but its contribution is declining over time while the influence of father's and mother's education is increasing. This indicates that the wide disparity in welfare between people who were born in other regions and moved and the natives is shrinking over time. As there seems to be an increase in employment opportunities outside agriculture in the rural areas, the influence of parents' education on efforts and welfare became more apparent. Although the effect of parents education remains weak in rural areas compared to its effect in urban regions, as more than 80 percent of household heads have parents with an education level of two years or less, it is catching up quickly to the levels in the urban areas. The contribution of mother's and father's education to opportunity inequality in rural areas increased to over 6 percent in 2012, getting closer to the levels observed in the urban areas. This effect can be expected to increase as the share of rural households with more educated parents is expanding over time. The contribution of gender is also increasing over time, indicating that the disadvantage of being a women is more apparent in the recent years.

Figure VI.4 The Contribution of Individual Circumstances to Inequality of Opportunity



	Tanzania Mainland			Urban			Rural		
	2008	2010	2012	2008	2010	2012	2008	2010	2012
Gender	0.014***	0.008***	0.014***	0.017**	0.018*	0.005	0.014***	0.005*	0.021***
	(0.001)	*(0.002)*	*(0.001)*	*(0.006)*	*(0.009)*	*(0.003)*	*(0.002)*	*(0.002)*	*(0.003)*
Mother Education	0.115***	0.087***	0.110***	0.114***	0.060*	0.084**	0.043***	0.024*	0.060***
	(0.016)	*(0.016)*	*(0.015)*	*(0.023)*	*(0.026)*	*(0.031)*	*(0.010)*	*(0.012)*	*(0.011)*
Father Education	0.108***	0.100***	0.145***	0.083**	0.047**	0.105***	0.035**	0.045***	0.067***
	(0.017)	*(0.014)*	*(0.015)*	*(0.026)*	*(0.025)*	*(0.027)*	*(0.011)*	*(0.011)*	*(0.011)*
Region of Birth	0.123***	0.088***	0.109***	0.083**	0.065**	0.080***	0.135***	0.088***	0.082***
	(0.014)	*(0.013)*	*(0.011)*	*(0.026)*	*(0.023)*	*(0.020)*	*(0.017)*	*(0.016)*	*(0.012)*

Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

II. Inequality of Opportunity in Household Income

Overall inequality and inequality of opportunity levels for household incomes are higher than for inequality for household consumptions. Total income inequality is considerably higher than consumption inequality, supporting the view that consumption expenditures are more accurately measured and considered to be more reliable than income data. Moreover, current incomes tend to be more volatile and more sensitive to macroeconomic fluctuations than consumption and expenditures, which are likely to be closer to permanent income.[46] The levels of income-based inequality of opportunity are higher than the levels of consumption-based inequality of opportunity, but the gap between the measures is much lower than the gap between overall income and consumption inequality measures. (See figure VI.5 for more.)

Income opportunity inequality shares are lower than consumption opportunity shares. While the levels of inequality of opportunity are higher for households' incomes than for consumptions, the opposite is true for estimates of opportunity shares. The share of income opportunity inequality varies from the high of 22 percent in 2008 to the low of 13 percent in 2012 compared to a share of consumption opportunity inequality of around 24 percent. This is due to the higher volatility of current incomes and to measurement error and idiosyncratic shocks to certain components of income. Some components of the income aggregates are transitory and cannot be explained by circumstances, and their variance can be misleadingly confounded with the part of income inequality due to effort (Barros et al., 2009; Aaberge, Mogstad, and Peragine, 2011).

The opportunity shares of income inequality are declining over time**.** Unlike consumption, total income inequality and opportunity inequality levels are both declining over time, but opportunity inequality is declining more sharply. This led to a reduction of the share of opportunity inequality in producing income inequality. Also, the higher volatility of income compared to consumption induced a higher volatility over time in the estimates of income opportunity shares.

Rural opportunity inequality shares are much lower than urban ones. As in the consumption-based analysis, the opportunity shares are found to be much higher in urban areas than in rural sectors. Inequality of opportunity share increased slightly in the urban areas between 2008 and 2010 and the declined, while it kept declining over time in the rural zones.

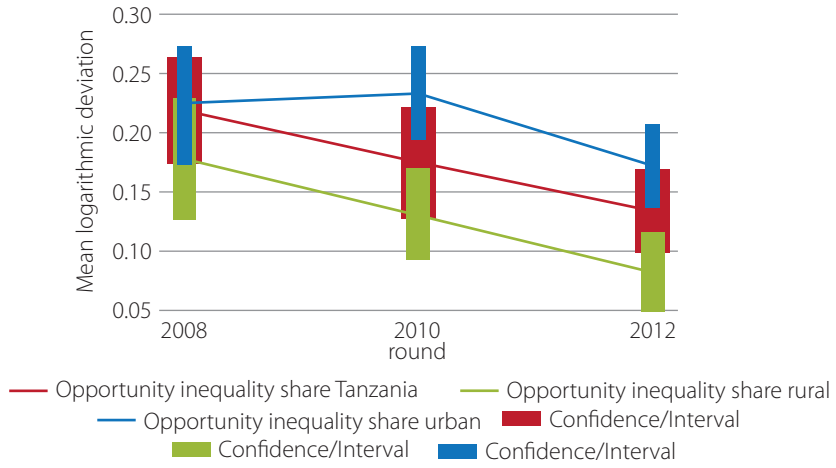
Family background is playing a more important role in shaping income inequality than are community characteristics. In a country where private businesses and household enterprises are important sources of livelihoods, one would expect income disparities to be more affected by community characteristics than parental ones, but the results displayed in Figure VI.6 show that the share of inequality associated with family circumstances is higher than the share associated with community features. Nevertheless, the contribution of community characteristics is increasing over time and almost doubled between 2008 and 2012 at the national level and in urban areas. Family background effect increased also over time but less sharply.

Father's education is once again associated with the largest share of opportunity inequality. Figure VI.7 displays a similar ranking of the contribution of each circumstance variable to income inequality as that observed for consumption, with the exceptions that father's education plays the largest role in shaping opportunities in all areas and that the region of birth seems less important.

Mother's education and gender appear also to make a nonnegligible contribution to inequality, and its impact is increasing over time at the national level and in rural sectors. On can see from Table 5-3 in Appendix 5 that female-headed households have significantly lower incomes than male-headed ones, indicating the engagement of Tanzanian women in low productivity and low remuneration jobs and businesses. This situation does not seem to be improving over time despite some policy measures for empowering women.

[46] See Barros et al. (2009).

Figure VI.5 Inequality of Opportunity in Income

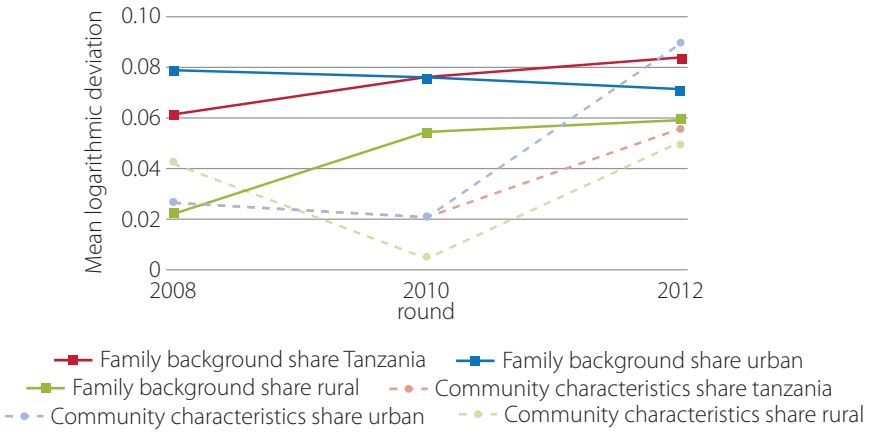


2008			2010			2012		
Tanzania	Urban	Rural	Tanzania	Urban	Rural	Tanzania	Urban	Rural
0.219***	0.225***	0.178***	0.175***	0.234***	0.131***	0.134***	0.172***	0.082***
(0.023)	*(0.046)*	*(0.026)*	*(0.024)*	*(0.046)*	*(0.020)*	*(0.018)*	*(0.033)*	*(0.017)*

Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

The effect of parental education and family background on economic (consumption and income) outcomes indicates significant problems of intergenerational transmission of inequality and poverty. Father's and mother's education to a large extent shape opportunities for their children and affect their chances to move up the economic ladder. Without additional policy actions, there are little chances for the next generations to spring out of the poverty and inequality lived by their parents, engendering poverty and inequality traps in the country.

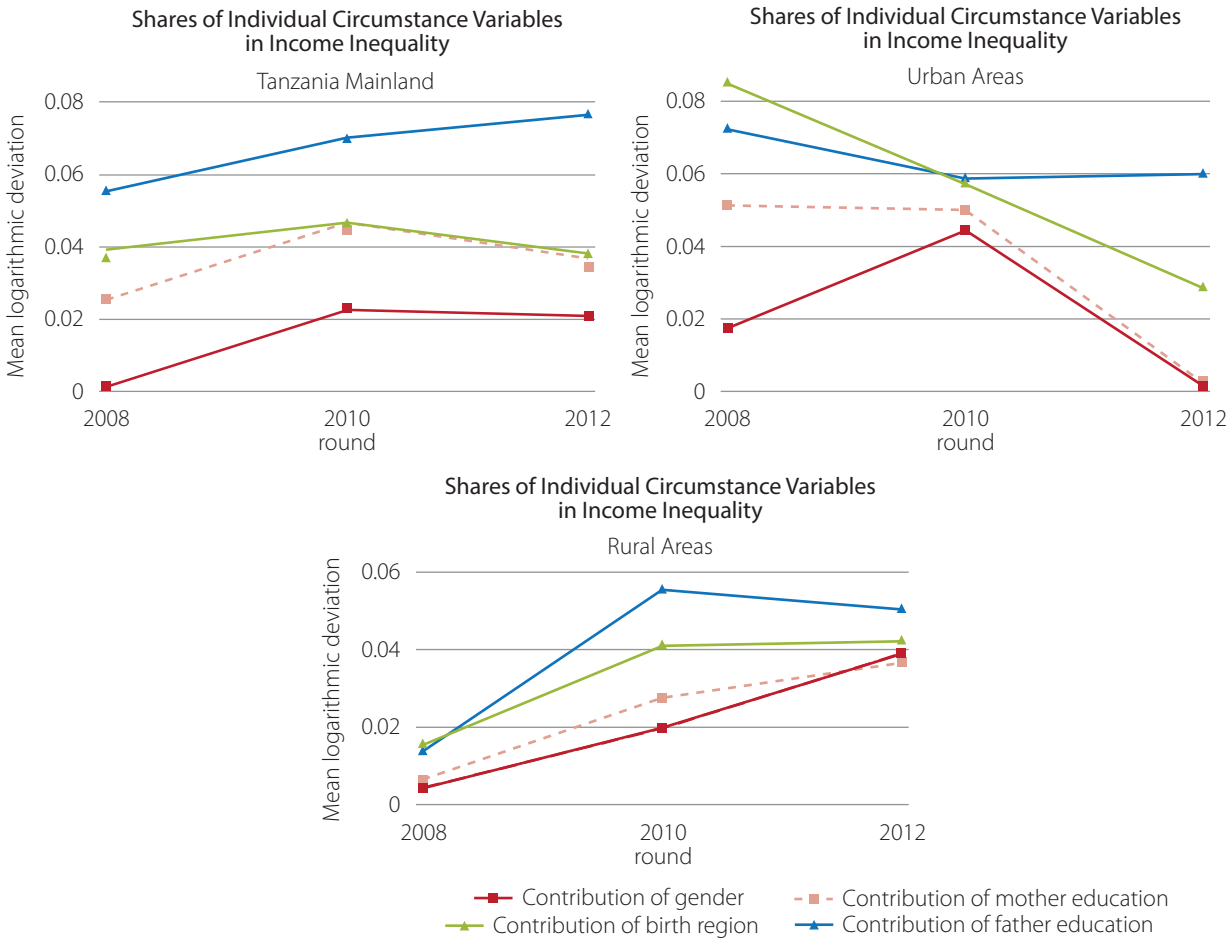
Figure VI.6 Contributions of Family Background and Community Characteristics to Income Inequality



	2008			2010			2012		
	Tanzania	Urban	Rural	Tanzania	Urban	Rural	Tanzania	Urban	Rural
Family background	0.062***	0.079*	0.022	0.076***	0.076**	0.055**	0.084***	0.072**	0.059***
	(0.016)	*(0.039)*	*(0.018)*	*(0.015)*	*(0.027)*	*(0.020)*	*(0.013)*	*(0.025)*	*(0.010)*
Community characteristics	0.027	0.027	0.042***	0.038	0.021**	0.005	0.056***	0.065*	0.051***
	(0.020)	*(0.023)*	*(0.009)*	*(0.023)*	*(0.007)*	*(0.026)*	*(0.013)*	*(0.029)*	*(0.014)*

Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.

Figure VI.7 The Contribution of Individual Circumstances to Income Inequality of Opportunity



	Tanzania Mainland			Urban			Rural		
	2008	2010	2012	2008	2010	2012	2008	2010	2012
Gender	0.001	0.023***	0.021***	0.017	0.045***	0.016	0.004	0.020***	0.039***
	(0.005)	*(0.004)*	*(0.004)*	*(0.021)*	*(0.012)*	*(0.011)*	*(0.006)*	*(0.005)*	*(0.005)*
Mother education	0.025	0.047***	0.037***	0.051**	0.050*	0.002	0.006	0.028**	0.037***
	(0.014)	*(0.012)*	*(0.010)*	*(0.019)*	*(0.021)*	*(0.018)*	*(0.011)*	*(0.010)*	*(0.007)*
Father education	0.055***	0.070***	0.077***	0.072**	0.059**	0.060*	0.014	0.055***	0.050***
	(0.013)	*(0.013)*	*(0.011)*	*(0.023)*	*(0.022)*	*(0.024)*	*(0.014)*	*(0.016)*	*(0.008)*
Region of birth	0.039*	0.047**	0.038**	0.085	0.057	0.029	0.016	0.041	0.042**
	(0.017)	*(0.015)*	*(0.012)*	*(0.062)*	*(0.031)*	*(0.024)*	*(0.023)*	*(0.025)*	*(0.014)*

Source: NPS 2008, 2010, and 2012.
* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level. Numbers in parentheses are bootstrap standard deviations based on 100 replications.


HUDUMA
ZINATOLEWA
HAPA

Chapter 7

Demographic Pressures Pose a Challenge to Poverty Reduction

Key Messages

- Tanzania is in the very early stages of demographic transition, but demographic pressures will continue to affect economic growth and poverty reduction prospects.
- Women's empowerment, through education and employment, can contribute to the control of fertility.

The persistence of high population growth in Tanzania weighs heavily on the country's future economic growth and its capacity to reduce poverty. At the national level, demographic pressures pose challenges for public service provision, labor markets, land, resources, and so forth and can put a brake on growth in per capita incomes. At the household level, it affects the ability of families with a large number of children to reduce poverty. This chapter analyses more in detail the relationship between demography and poverty in Tanzania. The first section presents the macro perspective of the relationship. The second section analyzes the demographic transition in the country. The third section examines the determinants of fertility and the last section summarizes the main findings of the chapter and explores directions for further research on demographic transition and fertility.

I. Macro Perspective

At the macro level, the relationship between demography and economic growth has been a heated topic for decades (or even centuries, considering the early work by Thomas Malthus some 200 years back). The "population-alarmist" view of the 1950s and '60s, that rapid population growth inhibits economic development, was challenged in the 1980s by the revisionists who drew more nuanced conclusions about the impact of population growth and argued that economies could accommodate demographic change through compensating technology and institutional change (Birdsall 2001; Fox 2009).[47] During the 1990s, the focus of the literature moved away from studying the impact

[47] The change in mindset also reflected, at least in parts, different theoretical models of economic growth, where the emphasis had shifted from physical capital accumulation to technological change as the key driver of economic progress. Most economic growth models converge on the view that population growth puts a brake on physical and human capital accumulation, with negative implications on (per capita) income growth, but the nature of this effect depends on the specification of the production function. Models that assume a fixed capital-output coefficient (such as the traditional Harrod Domar model) or complementarities between human and physical capital (as some endogenous growth models) tend to find larger effects than the neoclassical Solow model, which assumes declining returns to capital (see Klasen 2005).

of aggregate population growth to disentangling the differential effects of various components of demographic change. Studies by Kelley and Schmidt (1995) and Williamson (2001) suggest that increases in population density and the share of the working-age population are positively associated with growth, while increases in the share of dependent children have a negative association.

Today a consensus of sorts has emerged that it is crucial for economies to go through a demographic transition in order to benefit from a demographic window of opportunity. The passage from the first phase (high fertility, declining mortality) to the second phase (declining fertility) of the transition goes hand in hand with favorable changes in the age structure of society, particularly a lower ratio of dependent children and elderly to working-age adults. This affects growth through three distinct channels: (i) mechanically through the higher ratio of the labor force to the total population, (ii) through higher savings rates among working adults (who can build up more capital for retirement due to the declining number of children), and (iii) through a demand-driven investment boom as the working-age population requires housing, machinery, and infrastructure. Bloom and Williamson (1998) argue that as much as half of the East Asian economic miracle over the period 1965–90 can be explained through the lens of population dynamics.

The magnitude of this "demographic gift" depends on the pace of fertility decline and complementary policies. The faster the reduction in fertility, the larger the demographic gain the country may experience during the transition period. The economic policy framework also plays an important role because the economic benefits from a growing labor force can only materialize if the economy can absorb the additional workers productively. In this respect East Asia's export-led and labor-intensive growth model clearly was a factor that contributed to the demographic dividend.

Research suggests that there are differential effects of demographic transition on the elasticity of poverty to growth, which may contribute to potential explanations for the pro-poor trends of growth observed in Tanzania. For example, Lipton and Eastwood (2014) find that the growth effect on poverty is largest in high-fertility and low-income countries, when looking at the impact of fertility on poverty via the growth channel in developing and transitional economies. On the other hand, Iceland (2003) finds that over the period 1960–90 poverty became more responsive to demographic shifts in the United States as the elasticity of poverty to income growth decreases with an increase in income and a rise in the number of female-headed households. They find an increase in elasticity between poverty and growth in the 1990s, when poverty became more responsive to the upward trends of economic growth, as the shifts in family structure slow and empirically, the effect of family structure disappears.

We use a global model to illustrate the potential growth payoffs of the demographic transition for the case of Tanzania. This is based on the demographic forecasting model proposed by Lindh and Malmberg (2007). The objective of the analysis is not to project actual GDP levels into the future, as GDP change would be affected by many factors other than demography, but to isolate the potential impact of demographic change on per capita income growth. The results of this exercise should be viewed as indicative and approximate given uncertainties about the underlying parameters, the reduced form nature of the estimation which does not capture the structural characteristics of the country, and the difficulty to establish causality in a cross-country framework.[48]

As a first step, a statistical relationship between per capita GDP and demographic variables is estimated using panel data. GDP per capita at 2005 PPPs (from the Penn World Table 7.0) is estimated as a function of life expectancy at birth and age structure (from United Nations 2014). The regression is estimated on a sample of 108 countries that had at least 20 observations for the period 1950–2009. The panel nature of the models make it possible to control for unobserved heterogeneity across countries and common time-specific effects, such as the world business cycle, through country- and time-specific fixed effects (see Appendix 6 for further details). While this allows for some flexibility, the model still relies on the simplifying assumption that the relationship between per capita GDP and demographic variables is the same across countries.

[48] Some caveats are in order. While the model's forecasting performance is adequate on average, it does not predict well Tanzania's historical growth trajectory. This reconfirms the notion that country-specific factors, particularly policies, play an important role.

We then use the 2012 United Nations population projections for Tanzania to simulate per capita income trends over the period 2010–50. These population projections, which are produced by the UN's Population Division, show demographic trends—in terms of changes in the population's age composition and life expectancy—under different assumptions about trends in total fertility. In particular, the high, medium and low fertility variants assume that the total fertility rate declines from 5.58 in 2005–10 to 3.84, 3.34, or 2.84 children per women by 2045–50, while the constant fertility variant assumes that fertility stays at the 2005–10 level. Generally, the medium variant, which is based on probabilistic model of fertility change over time, is considered the most likely scenario; the high and low fertility variants are simply projected as 0.5 above and below the medium variant. The effect of demographic change on economic growth is isolated as the difference between simulated GDP per capita growth (over the period 2010–50) under the low/medium/high fertility variant and simulated GDP per capita growth over the same period under the constant fertility variant. In other words, we are interested in the predicted change in per capita growth induced by a reduction in fertility below the level that was found in 2005–10.

The results suggest that reductions in fertility significantly accelerate per capita income growth. A reduction in fertility to 3.34 children per women under the medium population scenario is predicted to increase per capita income growth by 1.3 percentage points per year over the period 2010–50. As expected, the growth pay-off is larger for the low fertility variant (+1.9 percentage points per year) and lower for the high fertility variant (+0.8 percentage points per year). All this suggests that Tanzania could reap significant economic benefits from a reduction in fertility and accelerated demographic transition, which would accelerate per capita income growth and poverty reduction.

The next section explores where Tanzania stands in terms of its demographic transition and analyzes factors that are associated with fertility. First we draw on UN population projections to examine the demographic trends (in terms of overall population size, population density, and changing age composition) that Tanzania can expect over the coming decades (focusing on the period until 2050). Second we analyze current patterns and intermediate determinants of fertility using data from the 2010 Demographic and Health Survey; this allows identifying policies that may accelerate the demographic transition.

The focus on fertility is warranted by the following reasons: First, while fertility, mortality, and the age structure of the female population jointly determine population growth at the macro level, fertility decline is generally regarded as the primary demographic momentum that triggers the change in age structure and induces the second phase of the demographic transition. Second, public interventions that reduce the fertility rate—such as female education, access to reproductive health and family planning services, and so forth—are the key means through which governments can lower the rate of population growth.

II. The Demographic Transition in Tanzania

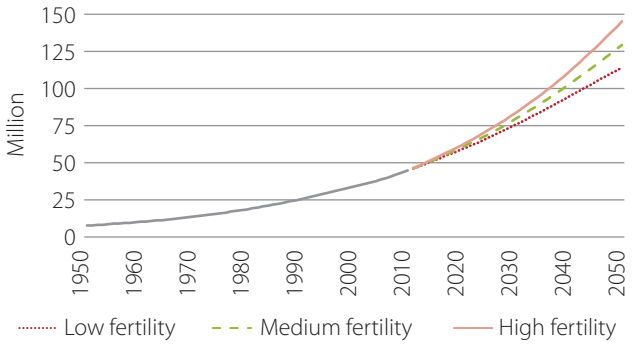
With a population growth rate of 2.7 percent per year, Tanzania's population increases rapidly, albeit at a rate similar to other African counties. The population growth rate reported here, which is taken from the 2012 Population and Housing Census, matches the average for SSA in the World Development Indicator (WDI) database. However, since the WDI are typically updated with some lag, population growth is most likely above the SSA average.[49]

Population growth will remain high over decades to come. Figure VII.1 shows the 2012 official UN population estimates and projections for Tanzania under different scenarios about fertility trends (low, medium, and high fertility).[50] These projections suggest that Tanzania's population will be in the

[49] The WDI database also still reports a population growth rate of 3 percent for Tanzania.

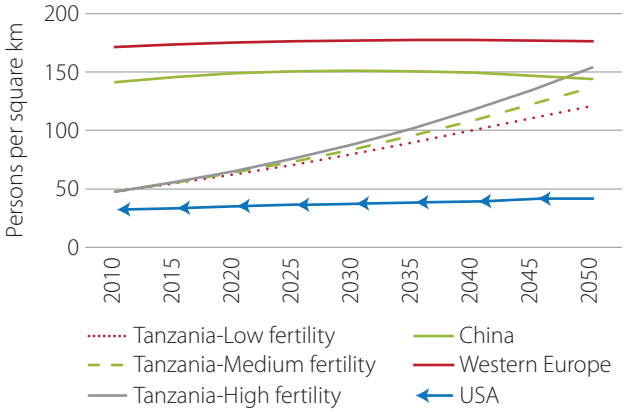
[50] The figures are based on the 2012 revision, which reports estimates for the period 2005–10 and projections up to 2100. Since we are interested in medium trends we focus on the projections up to 2050. We do not report the constant fertility variant, because this projection assumes that the total fertility rate remains at its level in 2005–10, which is rather unlikely. The projections also make assumptions about mortality trends in terms of life expectancy at birth by sex and international migration. See United Nations 2014 for details.

Figure VII.1 Tanzania's Population Is Projected to Reach 100 Million around 2040



Source: United Nations 2014.

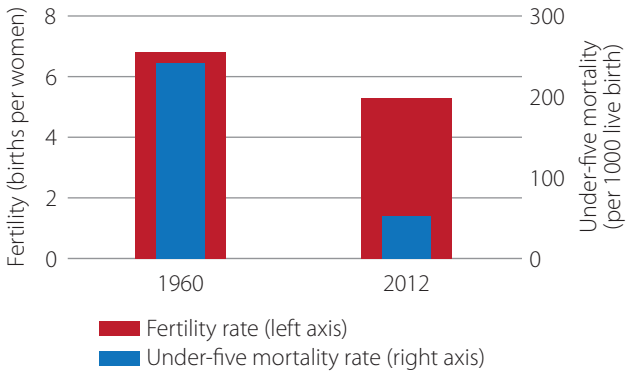
Figure VII.2 Population Density Will Be Similar to China's by 2050



Source: United Nations 2014.

Note: Based on UN medium fertility scenarios for countries other than Tanzania.

Figure VII.3 Mortality Has Fallen Rapidly but Fertility Remains High



Source: World Development Indicators (WDI 2014).

range of 114 to 145 million by 2050, compared to around 45 million in 2012.[51] Even under the low fertility projection, the total population will stabilize only well into the 22nd century.

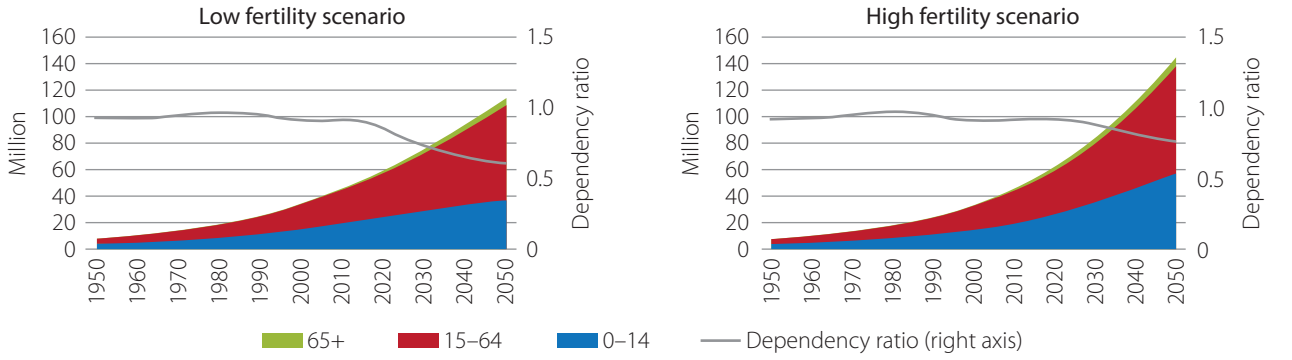
The increase in population size will radically alter Tanzania's economic geography. Population density is expected to increase from 48 persons per square kilometer in 2010 to 137 persons per square kilometer in 2050. The country would then be around 3.3 times more densely populated than the United States and have a similar population density as China, though still somewhat lower than Western Europe (Figure VII.2). While this will bring with it certain economic advantages—particularly lower unit cost in the provision of public infrastructure such as roads, grid electricity or piped water, and greater opportunities for trade—the increase in population density will also exert a significant pressure on agriculture. At present Tanzania is still endowed with large swaths of uncultivated land and past agricultural growth has been largely driven by area expansion. However, there is already evidence that land pressure is emerging in some of the more productive agricultural regions.[52]

Tanzania's high population growth reflects that the country is in the early stages of the demographic transition. Population growth is naturally high during this phase of development. While fertility has not yet come down much, child mortality has already fallen rapidly, so that more children survive to adulthood (see Figure VII.3). However, even if fertility were to decline immediately, the demographic momentum of high population growth would continue for some time. This is because the fertility rate has surpassed the replacement rate for many decades, so that an increasing

[51] The UN projections overestimate the population in 2012 (48 million), compared to 45 million in the 2012 Population and Housing Census. This is because the UN projections were derived before the latest census results were released.

[52] According to the Agricultural Sample Census, the average land holding size of rural households in Kilimanjaro region declined by 22 percent from 2002/03 to 2007/08; Arusha experienced a 17 percent decline.

Figure VII.4 Age Structure and Dependency Ratio, 1950–2050

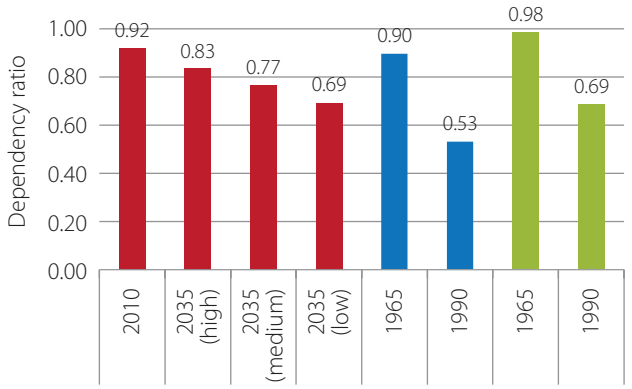


Source: United Nations 2014.

number of women will enter the reproductive age group in each year.

Tanzania could gain from a demographic dividend starting around 2020–30, but the reduction in the dependency ratio will not match that of East Asia. Figure VII.4 shows that the dependency ratio is expected to decline by 17 to 34 percent between 2010 and 2050, depending on the projected decline in fertility. However, even under the low fertility scenario the rate of decline of the dependency ratio is lower than the rate of reduction that was achieved by Thailand and Malaysia over the period 1965–90, suggesting that the economic benefits will also be lower (Figure VII.5).

Figure VII.5 The Decline in the Dependency Ratio Will Be Smaller than in East Asia



Source: United Nations 2014.

For Tanzania to reap economic gains from a growing labor force, it needs to accelerate the creation of productive jobs. The total working-age population is projected to increase from the current 23 million in 2012 to between 71 and 83 million by 2050—implying that an additional 48 million to 59 million people have to be absorbed into the labor force over a 40-year period. As discussed in World Bank (2014), this requires policy actions on several fronts, such as increasing the growth of nonfarm enterprises, improving agricultural productivity, and enabling domestic firms to penetrate export markets.

III. Patterns and Determinants of Fertility in Tanzania

From a policy perspective, the key variable needed to reduce population growth and accelerate demographic change is the fertility rate. While the number of children a family decides to have is not directly amenable to policy (with the exception of more coercive policy measures, such as China's one-child policy), there is a large body of evidence that fertility rates respond to the economic and cultural environment.

The salience of economic and cultural factors also manifests in regional variations in fertility. In 2010, the total fertility rate was highest in the Tanzania's western zone (7.1 children per woman) and lowest in the eastern zone (3.9 children per woman). Families in the eastern part of Tanzania already had achieved in 2010 the fertility level projected by the United

Nations for the whole of Tanzania for almost four decades into the future (3.84 children per women under the medium fertility variant in 2045–50). Moreover, while most regions saw a decline in fertility rates between 1996 and 2010, fertility levels actually increased in the western and central zones. (See Figure VII.6).

Research has identified the following determinants of fertility at the family level:

- *Demographic transition theory emphasizes the causal link from high levels of child mortality to high levels of desired fertility.* This link is difficult to pin down from survey data, because couples are making their fertility choices based not on the number of their surviving children but on their perception of the probability of a child's survival, which is based on experiences of their community, country, and so forth. However, the link between the two variables has been documented in cross-country analyses (for example, McCord et al. 2010 for SSA and Palloni and Rafalimanana 1999 for Latin America).

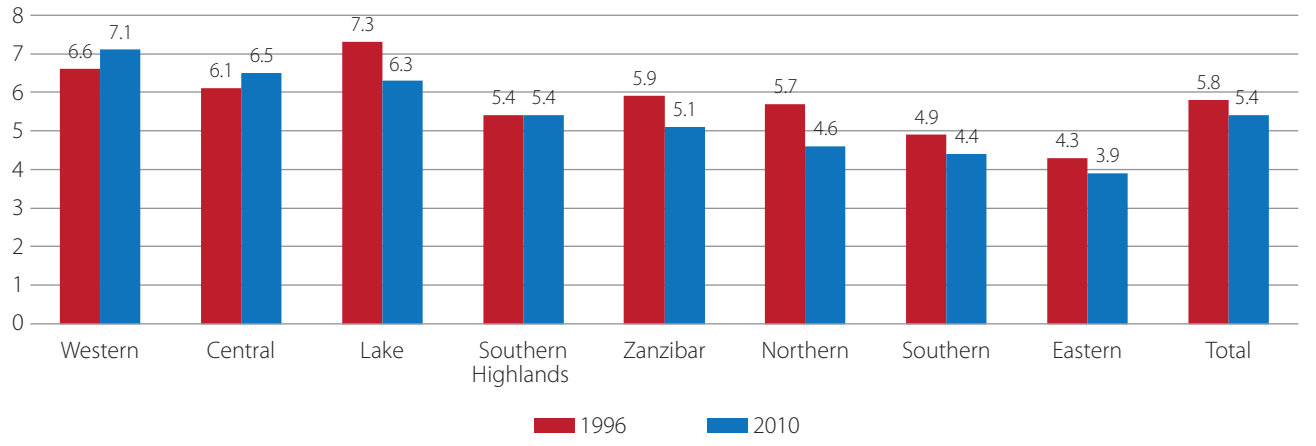
- *Demographers focus on the direct (proximate) determinants of fertility, which are biological and behavioral in nature.* These include the exposure to the risk of conceiving (percentage of women who are in union), the use of contraceptives (linked in part to the availability of services), the rates of abortion and pathological sterility, and postpartum infecundability (affected by postpartum abstinence and duration of breastfeeding).

- *Economists traditionally emphasize indirect (or intermediate) drivers of fertility.* Examples are (female) education, family income, child mortality, culture, the labor force participation of women, and female empowerment.

We follow in the economist tradition and model the relationship between fertility and (intermediate) socioeconomic conditions. The analysis is based on an econometric approach developed by the World Bank for Ethiopia (World Bank 2007a) and models the total number of children ever born to women ages 15 to 49 years. The analysis is conducted based on data from the 2010 Demographic and Health Survey. The regression results are reported in Table 6-3 in Appendix 6.

Female education is associated with having fewer children in total. Women who have at least completed some primary education have fewer children than women without any education. Nonetheless, the effect is relatively small, which may be related to the fact that we are controlling for whether the woman has ever been married. That is, previous literature on other SSA countries (see, for instance, World Bank 2007a) has found that the main effect of education on fertility operates is through marital status, such that once marital status was controlled for, the association between education and fertility was substantively reduced.

Figure VII.6 Fertility Levels and Trends Differ across Geographic Zones



Source: DHS Statcompiler 2014.

Cash employment of women is also linked to lower fertility. The regressions show that women who receive any cash earnings have fewer children than women who are not employed or who receive only in-kind earnings. This effect points to the role of female empowerment, as a women's cash earnings are linked to their bargaining position within the family.

Early sexual life initiation is associated with higher total fertility. An increase in the age at first sexual intercourse by one year is associated with almost 0.2 children less children in total. However, it should be noted that the median age at the first sexual intercourse among women ages 20–49 in the sample is 17.4, so that large increases in age seem unrealistic.

Poverty is an important correlate of fertility. Women in the richest 20 percent of households have fewer children than their counterparts in the bottom 20 percent. This might be because better-off people face lower infant and child mortality rates and, thus, as the demographic transition theory states, have lower desired (and actual) fertility. However, as discussed in the introduction to this chapter, the causality might also go in the opposite direction, as high levels of fertility (and large numbers of dependent children) make it more difficult for families to escape from poverty.

The role of access to family planning services appears inconclusive. In the regressions, women with an "unmet need for contraception"—defined as those who do not want to have any more children (limiters) or want to wait at least two years before having another child (spacers) but are not using contraception—have more children than other women, which suggests that lack of access to family planning might play a role. However, there is some evidence of reverse causality, in the sense that women who have been more fertile in the past are less likely to want any more children at present (and are hence more likely to be "limiters" or "spacers"). Further analysis also shows that women who are currently using contraception have had more children than other women. All this casts doubt on whether the lack of access to family planning methods really predates high fertility. Moreover, only 25 percent of the women in the sample use any kind of contraception (including traditional methods), although 85 percent of women know a source of contraception (private or governmental clinics, NGOs, religious associations, and so forth).

Urban location is associated with lower fertility, and other regional variation also remains important. Rural women have had about 0.18 more children than their urban counterparts, everything else being equal. Furthermore, most regional fixed effects are significant and (apart from Mtwara and Lindi) positive, indicating that families living in Dar es Salaam (the reference category in the regression model) tend to have lower fertility levels than families in other parts of the country.

IV. Main Findings and Directions for Further Analysis

The analysis in this chapter indicates that the acceleration of the demographic transition could be beneficial for the Tanzanian economy. The following are some implications of those findings in terms of possible follow up research and relevant interventions aimed at maximizing the benefits from the demographic transition.

Female education, especially at the secondary level, has a strong link with fertility in Tanzania. Furthermore, there is a potential positive feedback loop between increased female education and reduction in fertility. That is, when women receive more education they tend to have fewer children, which in turn gives them an opportunity to receive more education. Interventions to help keep girls in secondary school may thus have an impact on fertility. These may range from conditional cash transfer programs to supply-side interventions such as the expansion of the school system in rural areas and the expansion of other types of infrastructure that are known to have large spill-over effects on education (for example, road construction, improvement of sanitary and health infrastructure, and interventions to increase food security).[53] Furthermore, specific programs aimed at empowering girls and making them aware of their own worth and human rights, as well as gender equality awareness programs for all, have been used in similar contexts and added to the

[53] Unconditional cash transfer programs have also recently been attracting attention from policy actors. In that case, however, no effect has been found on school enrolment. See, for instance, the program administered by the NGO GiveDirectly in Kenya, whose evaluation is undertaken in Haushofer and Shapiro (2013).

school curriculum in order to respond to parents' reluctance to send their daughters to school.

Even controlling for other variables, regional variation in fertility remains large in Tanzania. Exploring the possibility of addressing unmet demand for family planning may be particularly relevant not only among young women but also among women in rural areas who do not have easy access to health facilities. Policy options in this area can be considered in ways that do not affect women's ability to make decisions on child bearing and range from the supply side (for example, ensuring that contraceptives are available and affordable throughout the country) to the demand side (for example, carrying out information campaigns on the use of contraceptives and the lack of adverse side effects of their use for both men and women). Regarding the latter, it may be necessary to design strategies for reaching out to rural areas that lack access to electricity and where it is not possible to use sophisticated communication means.

While theory and cross-country evidence emphasize the causal link from high child mortality to high desired fertility, the data at hand are insufficient to establish such strong relationship in Tanzania. However, there is considerable scope for further reducing infant and child mortality and this may arguably have an impact on fertility. Indeed, the demographic transition theory and cross-country evidence emphasize the causal link from high child mortality to high desired fertility. To establish this in the case of Tanzania, one would need to analyze full fertility histories in order to see what the desired number of children for each woman was before starting child bearing, and whether she responded with higher fertility given child mortality experiences so as to meet her original desired fertility. This is not possible to investigate as women interviewed in a given wave of the Demographic and Health Survey are not necessarily interviewed in future waves. Redesigning the future DHS surveys would be useful, but meanwhile available cross-country evidence appears sufficient to hypothesize that such a links is likely to exist in Tanzania.

Experience from East and Southeast Asian countries would help to inform policies to take advantage of the expected demographic dividend in Tanzania. In 1960, South Korea, Hong Kong, Singapore, and Thailand had total fertility rates (TFR) greater than or equal to five children per woman (and higher than six in Thailand). In 2010, all these countries had TFRs around 2.1 children per woman, and most of them had already reached such low levels in the 1990s. During the same time, these countries benefited from spectacular economic growth rates. When the first window of demographic opportunity became available, public authorities in Asia seized the opportunity. They complemented demographic changes with energetic policies and investments, including but not restricted to the areas of health and education.

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Appendices

Appendix 1.A: Poverty Estimation in the HBS 2007 and 2011/12

This appendix covers technical issues in the design, implementation and poverty estimation methodology of the two surveys which affect the analyses and comparability of poverty numbers over time. These issues have been mentioned in the body of the report as well, but are elaborated here.

A. Introduction

Official estimates of poverty in (mainland) Tanzania are based on the Household Budget Surveys (HBS), which go back to the early 1990s. The HBSs are a series of repeated cross-sectional surveys conducted by the Tanzania National Bureau of Statistics (NBS). As shown in Table 1.A-1 there have been four HBS rounds so far—1991/92, 2000/01, 2007 and 2011/12. All HBS collect data on household consumption, demographics (including education and health), asset ownership, housing, etc. The most recent 2011/12 HBS also contained a detailed labor force and agricultural module.

There exists a second survey series suitable for poverty analysis, the National Panel Survey, which has had three round so far (2008/09, 2010/11 and 2012/13). The NPS is a longitudinal survey (tracking individuals) conducted every two years by the NBS and has a smaller sample size than the HBS. However, the panel nature of the data makes it a particularly attractive survey for studying poverty dynamics and transitions. Due to differences in the way the HBS and NPS surveys capture consumption we follow the NBSs approach in that we draw (mainly) on the HBS data to measure poverty trends over time, though we make use of the NPS to analyze poverty movements and dynamics.

The HBSs are using a diary approach to collect consumption, where every individual in a household is asked to record (on a daily basis) all food and non-food consumption transactions that occurred over the course of (approximately) one month, including consumption of self-produced items.[54] Enumerators visited the households regularly to check and code the individual records. The HBSs further included a recall module for non food expenditures, particularly (semi-)durables and other irregularly purchased items.

The HBS instrument has evolved over time and there were significant changes between the HBS 2007 and HBS 2011/12. First, while the 2007 HBS recall module for non-food consumption was designed mainly to capture expenditures on semi-durable and durable goods and only probed for a limited number of item categories, the 2011/12 HBS included a much more detailed and broader recall module. Second, the 2007 HBS non-food recall

[54] The 2007 HBS used a 28-day diary and staggered the start date of the diary, while previous HBS fielded the diary over the course of one calendar month.

Table 1.A–1: Overview of Consumption Household Surveys in Mainland Tanzania

Survey	Period	Coverage	Type	No. of households
Household Budget Surveys:				
1991–92 HBS	Dec. 1991 – Nov. 1992	Tanzania Mainland	Cross–section	~ 5,000
2000–01 HBS	May 2000 – June 2001	Tanzania Mainland	Cross–section	22,178
2007 HBS	Jan. 2007 – Dec. 2007	Tanzania Mainland	Cross–section	10,575
2011–12 HBS	Oct. 2011 – Oct. 2012	Tanzania Mainland	Cross–section	10,186
National Panel Surveys:				
2008–09 NPS	Oct. 2008 – Sept. 2009	Tanzania (incl. Zanzibar)	Panel	3,265
2010–11 NPS	Oct. 2010 – Sept. 2011	Tanzania (incl. Zanzibar)	Panel	3,924
2012–13 NPS	Oct. 2012 – Sept. 2013	Tanzania (incl. Zanzibar)	Panel	5,088

Notes: HBS denotes Household Budget Survey. NPS denotes National Panel Survey. Number of households can differ slightly from official NBS publications.

module used a uniform recall period of 12 months, while the 2011/12 HBS used recall periods of 1, 3 and 12 months depending on the type of consumption item. Third, there is some evidence of better supervision in the HBS 2011/12, which could have affected the capture of food consumption in the diary. The following paragraphs discuss these issues in turn.

B. HBS 2011/12 Design and Implementation and Comparison to 2007

The 2011/12 HBS differs from the preceding 2007 HBS in the following ways:

a. ***Number of items and aggregation in the recall module:*** The HBS 2011/12 probed for a much larger number of items than the HBS 2007. For example, the HBS 2011/12 asked explicitly for expenditures on 70 different clothing items. Conversely, the HBS 2007 only probed for three broad categories of clothing (of males, females and children), though enumerators still recorded item-specific expenditures (using codes provided in separate manual). We would expect that the increase in the number of item categories in the HBS 2011/12 enhances the household's recollection of expenditures and hence increases measured consumption. However, at the same time, the HBS 2011/12 omits certain non-food categories that were included in the HBS 2007, which may counteract the former effect of more non-food consumption being captured by the HBS 2011/12.[55] On the other hand the HBS 2011/12 recall module appears to capture non-food consumption more comprehensively than the HBS 2007 recall module.

b. ***Diary-recall reconciliation:*** Both the 2007 and 2011/12 HBS collect non-food expenditures not only through the recall module but also through the consumption diary.[56] In 2007, the diary and recall module used the same item codes which allowed comparing reported expenditure for the same item across the recall and diary (though over a different time period). This comparison suggests that none of the two sources alone captured non-food expenditures comprehensively in 2007. In the HBS 2011/12 item codes in the diary did not correspond to the recall module and the latter grouped some of the items together that were recorded separately in the diary, which makes a comparison of expenditures across the two sources more difficult.

c. ***Recall periods:*** The HBS 2007 uses a uniform 12-month recall period (with the exception of rent), while the HBS 2011/12 uses recall periods of 1, 3 and 12 months depending on the item (see Table 1.A-2 for an overview). A large literature shows that changes in the recall period can have effects on measured consumption and poverty (e.g. Beegle *et al.,* 2010; Lanjouw, 2005; Gibson, Huang and Rozelle, 2005).

d. ***Survey supervision:*** There is evidence of improved supervision and survey implementation in the HBS 2011/12 compared to the HBS 2007. In particular, the HBS 2007 diary showed a strong pattern of respondent's fatigue, as the number of transactions and measured consumption declined over the course of the diary. The HBS 2011/12 does not show such a trend, except for a drop from the first to the second day (Figure 1.A-2), which suggests that efforts to improve the quality of data collection have paid off.[57]

[55] For instance, the HBS 2011/12 does not ask for expenditures on personal care items, though enumerators could record such expenditures under 'other personal articles' or 'other expenditures' in an aggregated manner. Conversely, the HBS 2007 included 'personal care items' as a separate category and enumerators recorded all expenditures item-by-item.

[56] This is despite efforts by the NBS to minimize overlap, see the discussion in the Appendix 2.A for further details.

[57] While the HBS 2007 started each diary on the beginning of the month, the HBS 2011/12 staggered the beginning of the diary. This allows disentangling to what effect the pattern in HBS diary consumption is influenced by patterns over the course of the calendar month (e.g. related to pay days) or to enumerator fatigue. There is no strong pattern of declining consumption over the course of the calendar month, which suggests that this was not the reason for the decline in transactions in the HBS 2007.

Table 1.A-2: HBS 2007 and 2011/12 Recall Modules

Consumption and expenditure categories	HBS 2011/12 Recall period (months)			HBS 2007 Recall period (months)		
	1	3	12	1	3	12
Clothing and footwear (COICOP 3)			X			X
Housing and utilities (COICOP 04 + selected other)						
Rents	X			X		
Utilities	X					X
Energy		X				X
Building maintenance			X			X
Housing equipment (COICOP 05)						
Household durables, furniture and furnishings			X			X
Small household appliances		X				X
Expenditures on domestic workers	X					X
Health expenditures (COICOP 06)	X					X
Transportation (COICOP 07)						
Vehicle purchases and registration			X			X
Other expenses on vehicles and public transport	X					X
Communication equipment (COICOP 08)			X			X
Recreation and culture (COICOP 09)						
TV/DVD/Hifi equipment and books			X			X
Other leisure (purchases, rentals, entrance fees)		X				X
Education (COICOP 10)						
Education related expenses excl. registration fees		X				X
Registration fees			X			X
Travel, restaurants and hotels (COICOP 11)			X			
Miscellaneous goods and services (COICOP 12)						
Miscalleneaous other	X					X
Fees and use charges			X			X

Source: Comparison of HBS questionnaires.

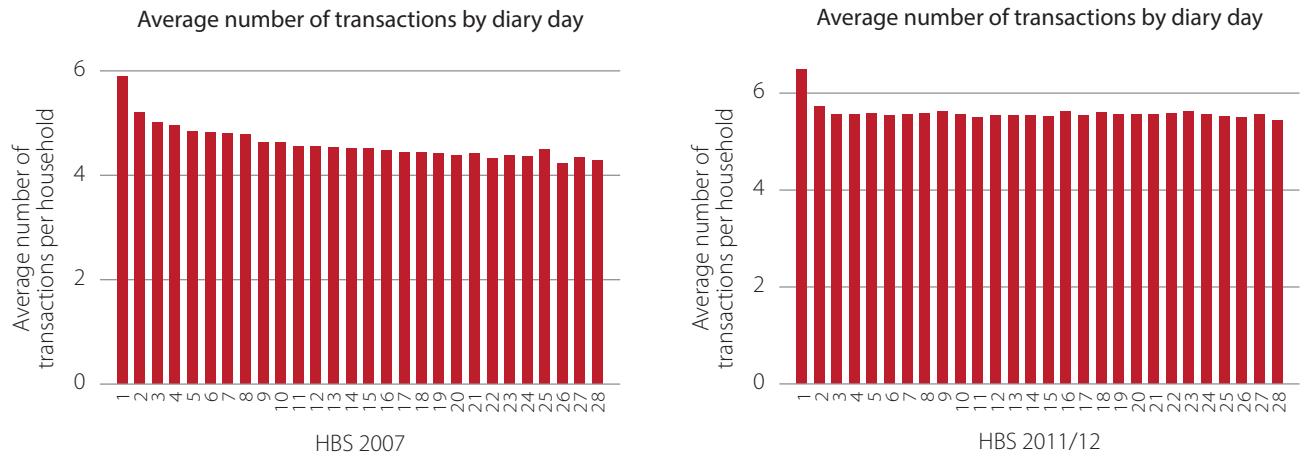
C. The HBS 2011/12 Poverty Estimation Methodology

The HBS 2011/12 methodology has employed an updated methodology to estimate poverty levels in Tanzania. This section describes the technical features of the HBS 2011/12 poverty estimation methodology. The next section describes how it differs from previous poverty analysis in Tanzania (as described in URT 2002 and 2009 for the HBS 2000/01 and 2007).

D. Calculation of the Consumption Aggregate

The Tanzanian poverty estimates are traditionally based on aggregate household consumption as the key welfare indicator. As in many other parts of sub-Saharan Africa, consumption is considered a more reliable indicator of welfare than income. First, consumption is typically less fluctuating than income and gives a better and steadier picture of long-term welfare. Second, individuals feel more comfortable answering questions related to consumption than to income. Third, income measurement in countries with a large

Figure 1.A-1: Transactions by Diary Day – 2007 and 2011/12



Source: Household Budget Surveys 2007 and 2011/12.

agricultural or informal sector is often highly inaccurate. The consumption aggregate captures both food, and non-food consumption.

a. *Food consumption*

Food consumption is based on the food transactions recorded in the 28-day diary (Form V) of the HBS 2011/12. The food consumption aggregate captures food consumed by household members during the day, including consumption from purchases and own-production (section B1) and food consumed outside the household (section B3). Households recorded all food consumed either the total amount paid (in the cases of purchases) or an estimate of the monetary value in TZS[58] (for own produced food and gifts received). Total food consumption sums both actual expenses and estimated monetary values. Food consumption includes the following COICOP categories and consists of 175 different items[59]: (1) Bread and cereals, (2) Meat, (3) Fish, (4) Milk, cheese and eggs, (5) Oils and fats, (6) Fruits, (7) Vegetables, (8) Sugar, jam, honey, chocolate and confectionary, (9) Food products not elsewhere classified, (10) Coffee, tea and cocoa, (11) Mineral waters, soft drinks, fruit and vegetable juices.

b. *Non-food consumption*

The non-food consumption aggregate of the HBS 2011/12 captures expenditures on the following goods and COICOP categories: (2) Alcoholic beverages and tobacco, (3) Clothing and footwear, (4) Housing, water, electricity, gas and other fuels, (5) Furnishings, household equipment, maintenance of the house, (6) Health, (7) Transport, (8) Communication, (9) Recreation and culture, (10) Education, (11) Restaurants and hotels, (12) Miscellaneous goods and services.

The recall periods of these items in Form II are 12 months, 3 months or 1 month, based on the assumed frequency of purchase. All spending on non-food goods and services is converted to monthly expenditure.[60] 86% of non-food consumption (unweighted) is based on the non-food recall module (Form II). However, a limited set of diary expenditures were added in the following two cases.

58 Estimates of the value of own produced goods and gifts were made by the respondents and so have the risk of being over or under-estimated. Interviewers were trained to double check estimates that seemed unrealistic.

59 Alcoholic beverages, as usual, were categorised as non-food.

60 28 day diary consumption data were converted to average monthly levels by dividing the consumption amount by 28 to get the daily amount and then multiplying this amount by 30.416 (365 days/12 month). Three and twelve month expenditure from Form II were divided by 3 and 12 respectively.

i. Non-food consumption from the first ten days of the A2 data file (diary non-food)

Diary expenses that were recorded during the first ten days of the diary's implementation period were added to expenditures already recorded in the recall module.[61]

Form II was administered on the 10th day of fieldwork and the first 10 days of the diary implementation period do not overlap with the recall module. When Form II was administered enumerators were instructed to be careful not include large items in Form II that had already been captured in the diary. For example if in week 1 the household had happened to purchase a mobile phone and this was in the diary then it should not be double counted and entered in Form II as well. An examination of A2 data shows very low reporting of these larger items. Section B2 in the diary was actually mostly used to record the small non-food items (see URT 2014 for further details). From day 11 onwards all non-food is taken from only Form II except for the following items specified below.

ii. Consumption of in-kind water, in-kind firewood and tobacco for all 28 diary days

Consumption of the three items mentioned above were added from all days of the diary as these few items were not specifically captured in Form II.

c. *Exclusions from the consumption aggregate*

The consumption aggregate excludes housing related expenditures, neither actual rent or imputed rental values for home owners. The consumption aggregate also excludes use values for large durable items even though it includes the purchasing values of a fairly large number of smaller, semi-durable goods.[62] Finally, household level investments from Section 10 of Form II (purchase of houses, apartments, garages, payments for hiring labour for own construction, expenditures on ceremonies such as weddings, funerals, business expenditures etc.) were also excluded.

d. *Normalizing consumption for differences in household composition*

To normalise total household consumption for differences in household size and composition and to adjust for differences in consumption needs between children and adults the following equivalence scale is used:[63]

Table 1.A-3: Adult Equivalence Scale

Age (years)	Male	Female
0–2	0.40	0.40
3–4	0.48	0.48
5–6	0.56	0.56
7–8	0.64	0.64
9–10	0.76	0.76
11–12	0.80	0.88
13–14	1.00	1.00
15–18	1.20	1.00
19–59	1.00	0.88
60+	0.88	0.72

Source: The scale has been developed by the World Health Organization and is reported in Collier et al (1986).

e. *Normalising consumption for differences in cost of living*

Households with the same level of nominal consumption (per adult) might have different levels of real consumption if they face different costs of living. Nominal consumption of the household should hence be adjusted for temporal and spatial cost-of-living differences. Temporal price differences are associated with the duration of the fieldwork over the course of a full year, while spatial differences are associated with the location of households interviewed in the survey.

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61 Only for items with a recall period of one month. No adjustment was made for items with recall periods of three months or a year as the 10 day potential overlap would be short in comparison to the total recall period.

62 The distinction between durables, semi-durables and non-durable items is based on UNStats.un.org official COICOP classification in which ND=Non durable, SD=Semi Durable and D=Durable.

63 No further allowance is made for possible economies of scale within households. Such economies of scale would assume that consumption requirements of households do not rise linearly when additional persons are added (because some items in households, e.g. housing, utilities, durable goods, can be shared).

The price indices used to adjust nominal consumption are computed entirely from the HBS 2011/12 data—no external information (e.g. from the Consumer Price Index database) is used. A price index is a combination of prices and budget shares in a base and a comparison period. The budget shares are the weights that each commodity has in the index and are equivalent to their share in the cost of the bundle being analysed. The HBS 2011/12 can provide information on budget shares and prices (unit values) for all (food and non-food) items captured in the diary.

To deflate nominal consumption NBS uses the Fisher ideal index. Fisher price indices are more accurate than Laspeyres or Paasche price indices in capturing differences in consumption patterns across domains as a consequence of differences in relative prices. They also avoid overstating or understating the true inflation (as it would be the case with Laspeyres and Paasche respectively). Separate food and non-food fisher price indices are estimated by geographic stratum (Dar es Salaam, other urban and rural) and quarter (a period of three consecutive months) according to the following formula:[64]

$$F_i = \sqrt{L_i P_i}$$

where *i* is a combination of stratum and quarter, L refers to a Laspeyres price index and P refers to a Paasche price index. The Laspeyres and Paasche price indices are defined as:

$$L_i = \sum_{K=1}^{n} w_{0k}\left(\frac{p_{ik}}{p_{0k}}\right) \qquad P_i = \left[\sum_{K=1}^{n} w_{ik}\left(\frac{p_{ik}}{p_{0k}}\right)^{-1}\right]^{-1}$$

where *w0k* is the average household budget share of item *k* in the country, w_{ik} is the average household budget share of item *k* in stratum and quarter *i*, p_{0k} is the national median price of item *k* and p_{ik} is the median price of item *k* in stratum and quarter *i*.

It should be noted that all prices that feed into the deflators are computed as unit values (value/quantity) from the HBS 2011/12 diary. The HBS food diary has six different measurement units for food items[65]—gram, kilogram (kgr), millilitre (ml), litre(l), piece and unit. Prices are based on the most frequent unit for each item (with grams being converted to kg and ml being converted to l).[66]

The overall (food and non-food) price deflator is computed as the weighted average of food and non-food indices, where the weights are the average budget shares on food/non-food of households in the 2nd to 5th deciles of the distribution of total consumption per adult equivalent.[67]

iii. Poverty Lines

The HBS 2011/12 poverty lines are based on a food basket concept and correspondingly anchored in nutrition. The HBS 2011/12 food poverty line (TZSs. 26,085.5 per adult per month) is based on the cost of a food basket that delivers 2,200 calories per adult per day. The cost of buying 2200 calories is derived from the food consumption patterns prevailing in a reference population—the 2nd to 5th quintile of the distribution of total consumption per adult equivalent. Consumed quantities are converted into calories using the NBS's calorie conversion factors and valued at national median prices (the same as the reference for the Fisher deflators).[68]

The non-food component of the basic needs poverty line is based on average non-food consumption of households whose total consumption is close to the food poverty line.[69] In the HBS 2011/12 households in this reference group devoted approximately 71.5% of their total consumption to food. Scaling up the food poverty line by this ratio delivers the basic needs poverty line of TZS. 36,482 per adult per month (see next section for an assessment of the Tanzanian poverty lines).

64 There are hence 12 price indices in total for each method.

65 The diary includes "metre" and "pair" but these measures were never used.

66 If the household consumed the food item in a unit that does not have a metric conversion to the most frequent unit (e.g. piece to kg) the respective price is not used for the computation of the deflator. For most items the most frequent unit is kg or liter, but there are some exceptions (e.g. eggs overwhelmingly being consumed in units).

67 This intends to make the deflator more tailored to the specific consumption patterns of poor households in Tanzania.

68 As in the context of the Fisher price deflator, only transactions in the most frequent unit are used for the computation of median prices and to derive the budget shares.

69 More precisely, these are households whose total consumption lies within the following interval [food poverty line; 1.2*food poverty line].

Table 1.A-4 Value of Temporal and Spatial Price Deflators by Survey Quarter and Strata

	Urban			Rural			Dar-es-salaam		
Food	Paasche Food	Laspeyres Food	Fisher Food	Paasche Food	Laspeyres Food	Fisher Food	Paasche Food	Laspeyres Food	Fisher Food
I – 10.2011–12.2011	0.980	1.035	1.007	0.918	0.927	0.922	1.021	1.176	1.096
II – 01.2012–03.2012	1.030	1.045	1.037	0.929	0.948	0.939	1.136	1.265	1.199
III – 04.2012–06.2012	1.051	1.084	1.067	0.975	0.989	0.982	1.136	1.279	1.205
IV – 07.2012–10.2012	1.036	1.094	1.065	0.965	0.971	0.968	1.120	1.250	1.183
	Urban			Rural			Dar-es-salaam		
Non food	Paasche Non-food	Laspeyres Non-food	Fisher Non-food	Paasche Non-food	Laspeyres Non-food	Fisher Non-food	Paasche Non-food	Laspeyres Non-food	Fisher Non-food
I – 10.2011–12.2011	0.999	1.042	1.020	0.943	0.936	0.940	1.082	1.365	1.215
II – 01.2012–03.2012	0.993	0.980	0.986	0.941	0.932	0.936	1.065	1.238	1.148
III – 04.2012–06.2012	0.933	0.955	0.944	0.999	0.969	0.984	1.063	1.437	1.236
IV – 07.2012–10.2012	1.015	1.100	1.057	0.979	0.975	0.977	1.041	1.568	1.278

Source: Household Budget Survey (HBS) 2011/12.

iv. Poverty Concepts

NBS distinguishes two different poverty concepts — ***basic needs poverty*** (often simply referred to as poverty) and ***food poverty*** (often also referred to as extreme poverty). A household is considered 'basic needs poor' if its consumption per adult falls below the basic needs poverty line. If consumption per adult also falls below the food poverty line, a household is necessarily consuming less than the minimum food requirement and so is considered 'food poor' or 'extreme poor'. By definition, a household that is food poor is also basic needs poor.

E. Evaluation of the 2011/12 Basic Needs Poverty Line

The HBS 2011/12 poverty lines follow the Cost of Basic Needs methodology (Ravallion, 1998; 2008), which is a frequently used method to derive poverty lines in Sub-Saharan Africa and other developing regions. The food poverty line (TZS 26,085.5 per adult per month) is based on the cost of a food basket that delivers 2,200 calories per adult per day given consumption patterns prevailing in a reference population—the 2nd to 5th quintile of the distribution of total consumption per adult equivalent. This calorie norm is within the range of what other countries in the region are using (e.g. Kenya with 2,250 or Ethiopia with 2,200 calories per adult), though there are countries that use significantly higher calorie thresholds (e.g. Rwanda with 2,500 or Uganda with 3,000 calories per adult).

The approach used to generate the non-food component of the poverty line (described in the previous section) is a variant of the so called 'lower-bound' approach (Ravallion, 1998). In its more conventional application, this approach computes average non-food consumption of households whose *total* consumption lies within a small interval around the poverty line. Increasing the interval bandwidth iteratively and taking the mean of all the averages delivers the non-food component of the poverty line. If we use exactly this method, the total poverty line amounts to TZS. 35,939 per adult per month, which is just below the official 2011/12 basic needs poverty line.

There also exists an 'upper-bound' approach, which looks at households whose total *food* consumption lies within a small interval around the food poverty line (otherwise repeating the steps outlined above for the lower-bound approach). Intuitively, these households are already consuming enough food to meet basic nutrition requirements and are hence less poor than the reference group under the more austere lower bound approach. If we use this method, the total poverty line is estimated at TZS 50,967—hence considerably higher than the 2011/12 basic needs poverty line.

We can also compare the Tanzanian poverty line to the international 1.25 USD per capita per day poverty line. The TZS 36,482 basic needs poverty line translates into approximately 1 USD per capita per day at 2005 purchasing power parities (based on 2005–12 CPI inflation in the World Development Indicators), which is lower than the international poverty line.

This shows generally that the HBS 2011/12 basic needs poverty line of TZS 36,482 is at the lower end of the spectrum. As Tanzania continues to increase its per capita income and move to middle income status, Tanzanian policy makers might wish to consider revising the poverty line upwards to set itself more ambitious goals in the fight against poverty and to meet its vision of a society with a "high quality livelihood".

F. Comparison of the New (HBS 2011/12) Poverty Estimation Methodology with the Previous Methodology to Measure Poverty

The following Table gives an overview over similarities and differences between the new 2011/12 poverty methodology (URT 2014) and the previous poverty analysis of the HBS 2000/01 and 2007 data as described in URT (2002, 2009). It also shows how the new 2011/12 methodology was retro-actively applied to the 2007 data to assess the poverty trend between 2007 and 2011/12 based on the new (2011/12) methodology. It should be noted that the reconstruction of the 2007 consumption aggregate and poverty line described here cannot account for differences in design and implementation This is why we further use cross-survey imputation and reweighting methods to triangulate the change in poverty (see Appendix I.B).

For areas where the same methods were used in both surveys, the description runs across the three columns in the table. For other areas, the details are listed separately for 2011/12 and 2007 in the first and third columns respectively. The middle column describes how the 2007 dataset was re-analyzed to take account of the differences in order to produce a poverty line and headcount based on the same methods as adopted in 2011/12.

Table 1.A-5: Comparison of Poverty Estimation Methodologies

	New methodology in HBS 2011/12	Application of 2011/12 methodology to 2007 data	Previous methodology HBS 2007 and HBS 2000/01
Construction of the consumption aggregate	• Food consumption based on diary (with own produced goods being valued at the estimated monetary values provided by the households) • Excludes: Rent and housing related expenditures, durable goods (neither expenditures nor use values) and non-consumption expenditures		
	• Includes: Education, health, and communication expenditure • Consumption standardized to one month • Non-food consumption mostly from recall module (except for 10 day diary overlap and few other selected items—see previous section for a discussion)	• Education, health, and communication expenditure added into the consumption aggregate • Non-food consumption from diary and recall. For each household and item it is checked whether non-food consumption is reported (i) only in the recall, (ii) only in the diary, or (iii) in both sources. In case of (i) and (ii) the reported expenditures from either source are included in the consumption aggregate, in case of (iii) a simple average across the two sources is used—after standardization to a common reporting period	• Excludes: Education, health, and communication expenditure • Consumption standardized to 28 days • Non-food consumption from diary and recall. For each item a decision is taken whether the diary or recall data is deemed a more reliable source of information contingent on a comparison of reported frequencies and spending amounts across the diary and recall in the 1991/92 and 2000/01 HBS. Non-food consumption for the respective item is than taken only from the source deemed more reliable for all households in the survey

(continues to next page)

Table 1.A-5: Comparison of Poverty Estimation Methodologies *(continued)*

	New methodology in HBS 2011/12	Application of 2011/12 methodology to 2007 data	Previous methodology HBS 2007 and HBS 2000/01
Normalizing for household composition	• Adult equivalence scale based on Collier et al (1986) • No allowance for economies of scale at the household level		
	• Scale corresponds exactly to Collier et al (1986)	• Two incorrect coefficients in 2007 corrected to match those in 2011/12	• Scale corresponds to Collier et al (1986) except for variations in two coefficients (uses a coefficient of 0.4 (instead of 0.48) for male children aged 3–4 years and of 0.8 (instead of 0.88) for males aged 60+ years))
Normalizing for within-survey price differences	• Survey-internal Fisher food and non-food price deflators based on (median) unit values from the consumption diary (only metric units; except for eggs measured in pieces/numbers) • Non-food Fisher deflator based on a limited number of non-food items • Overall deflator is a weighted average of the food and non-food Fisher deflators		
	• Spatial and temporal price correction (by geographic domain and quarter) • The weights of the overall deflator are the share of food and non-food spending in the 2nd to 5th deciles of the distribution of nominal consumption per adult equivalent – the same as the reference group for the food basket/food poverty line	• Spatial and temporal price correction applied, using food/non-food weights as in 2011/12	• Spatial price correction only (by geographic domain) • The weights of the overall deflator are the shares of food and non-food spending amongst the poorest 25% of the population—the same as the reference group for the non-food component of the poverty line)
Poverty line	• Cost of basic needs (CBN) methodology anchored in nutrition (2,200 kcal per adult per day)		
	• New poverty line computed in 2011/12 • Standardized to one month • Food basket based on average expenditure shares aggregated across reference population (2nd to 5th quintile of the distribution of total consumption per adult equivalent)—i.e. it is not the average across the proportionate shares of individual households • Non-food component based on the average budget share spent on non-food items amongst households whose total consumption lies within the following interval [food poverty line; 1.2*food poverty line]	• 2007 poverty line is derived by deflating the 2011/12 poverty line backwards using a survey-internal Fisher deflator, with food and non-food weighted by the food/non-food ratio of the total distribution	• 2007 poverty line is derived by inflating the 2000/01 basic needs poverty line using a survey-internal Fisher deflator • Standardized to 28 days • Food basket based on median quantities in the reference population (poorest 50% of the population) • Non-food component based on average budget share spent on non-food items amongst the poorest 25% of the population

Appendix 1.B: Prediction Methods to Establish Comparability between the 2007 and 2011/12 Data

A. Semi-parametric Approach (Tarozzi, 2002):

The method exploits the existence of consumption and non-consumption auxiliary variables, which are not affected by the changes in the survey design and are related consistently to total consumption. The consumption distribution in 2007 is then recovered based on the distribution of these consumption and other non-consumption auxiliary variables. In our application here we consider sub-groups of food consumption and a range of household characteristics as collected comparably across the two surveys.

B. The Second Method is a Variant of the Small Area Estimation (poverty mapping) Methodology Developed by Elbers, Lanjouw and Lanjouw (2003):

Unlike the Tarozzi method, this technique does not require that some components of consumption are collected comparably in the two surveys but relies entirely on (non-monetary) characteristics of the household. The first step is to identify a set of household characteristics that were collected in the same way in both surveys. It then estimates the relationship between these variables and consumption in 2011/12; that is it calculates the extent to which possession of each of these characteristics by a household predicts their level of consumption in 2011/12. This relationship is then used to impute consumption (per adult) for the 2007 survey households by applying these coefficients to the same set of comparable household characteristics as observed in 2007. Since the simulated 2007 consumption distribution is expressed in 2011/12 prices, there is no need to adjust for inflation between the surveys and the 2011/12 poverty line can be used to compute the simulated poverty estimates in 2007.

This technique has its origin in small area estimation of poverty ('poverty mapping'), where census and survey data are combined to generate regionally disaggregated poverty maps. However, it has also become a popular method to assess changes in poverty over time, in situations where consumption data are not comparable or where only one survey collects consumption data (e.g. World Bank 2012a, 2012b, 2012c). Christiaensen *et al.* (2012) show that the small-area estimation technique often performs relatively well in tracking poverty over time.

An issue arises with the cross-survey imputation method in relation to the choice of predictive variables, particularly cell phone ownership. It turns out that there is a large difference in the results when possession of a cell phone (at the household level) is included or excluded in the set of variables used to predict household consumption. This is a consequence of the very large increase in the possession of cell phones over the five years between the two surveys and the strong correlation between cell phone ownership and consumption. Households across a wide range of the consumption distribution owned cell phones by 2011/12, compared with 2007 when cell phone ownership tended to be limited to the better off, particularly in urban areas. This sensitivity of the results is not important for the other predictive variable (i.e. omitting any other individual variable makes very little difference to the final result).

There are arguments for and against the inclusion of cell phones as predictive variables in the regression model. The main argument for the inclusion of cell phones is that they are an important predictor of consumption and that the increase in cell phone ownership captures and proxies for a substantive increase in household consumption, which may otherwise be overlooked. The main argument against their inclusion is that during a period of rapid cell phone accumulation the relationship between cell phone ownership and consumption is likely to change over time, especially if the increase largely comes from poorer groups (due to relative price changes, etc.). Including cell phones as a predictive variable in the model might thus lead to an overestimation of the decline in poverty. Due to this ambiguity we show the results for both models, including and excluding cell phone ownership.

Appendix 1.C: Welfare Dynamics

Table 1.C-1 Trends in Dwelling Material by Area of Residence

		2007 (percent)	2011/12 (percent)	absolute Δ (percentage points)	relative Δ (percent)
Dwelling material					
Improved roof material	National	55.8	66.2	10.4	18.6
	Rural	42.0	54.8	12.7	30.3
	Urban	84.6	90.5	5.9	7.0
	Dar es Salaam	95.3	99.2	3.9	4.0
Improved floor material	National	33.3	38.8	5.6	16.7
	Rural	17.0	22.3	5.3	31.4
	Urban	62.9	69.2	6.3	10.0
	Dar es Salaam	88.1	96.8	8.7	9.9
Improved wall material	National	34.1	46.1	12.0	35.3
	Rural	21.9	33.1	11.2	51.2
	Urban	50.6	67.8	17.2	34.0
	Dar es Salaam	85.8	97.1	11.3	13.2

Source: Household Budget Surveys (HBS) 2007 and 2011/12.

Table 1.C-2 Trends in Dwelling Material by Quintiles

	Improved Roof material		Improved Floor material		Improved Wall material	
	2007	2011/12	2007	2011/12	2007	2011/12
Poorest Quintile	35.7%	50.1%	12.0%	18.2%	19.0%	36.8%
2nd Quintile	45.4%	59.0%	18.3%	26.4%	22.7%	36.7%
3rd Quintile	55.7%	65.6%	30.5%	35.6%	31.3%	42.1%
4th Quintile	64.1%	76.7%	44.1%	51.7%	41.4%	53.6%
Top Quintile	78.0%	86.5%	61.5%	74.1%	56.1%	71.9%

Source: Household Budget Surveys (HBS) 2007 and 2011/12.

Note: each quintile represents 20 percent of the population.

Table 1.C-3 Trends in Assets Ownership by Location

		2007 (percent)	2011/12 (percent)	absolute Δ (percentage points)	relative Δ (percent)
ICT/ Electronics					
Radio	National	65.6	54.6	–11	–16.8
	Rural	61.8	51.5	–10.3	–16.7
	Urban	72.4	60.5	–11.9	–16.4
	Dar es Salaam	78.2	64.7	–13.5	–17.2
TV	National	8.1	13.8	5.7	70.2
	Rural	1.8	3.8	1.9	106.3
	Urban	15.5	28.4	12.8	82.7
	Dar es Salaam	36.9	58	21.1	57.3
Video	National	5.2	10.3	5.1	96.5
	Rural	1.2	3.4	2.2	181.9
	Urban	11.7	20.5	8.8	75.0
	Dar es Salaam	20.4	40.0	19.6	96.2
Telephone (landline)	National	1.0	0.5	–0.6	–53.3
	Rural	0.6	0.1	–0.4	–77.7
	Urban	1.8	1.5	–0.4	–20.8
	Dar es Salaam	2.7	1.1	–1.7	–61.4
Cell phone	National	24.3	55.8	31.6	130.1
	Rural	13.8	45.2	31.4	226.6
	Urban	42.1	77.5	35.4	84.2
	Dar es Salaam	61.4	88.4	27	44.0
Computer	National	0.5	1.7	1.3	271.2
	Rural	0.1	0.4	0.3	514.5
	Urban	0.5	2.6	2.1	449.2
	Dar es Salaam	3.2	10.0	6.8	215.9
Transportation					
Bicycle	National	40.1	34.1	–6.0	–15
	Rural	45.1	37.9	–7.2	–16
	Urban	35.5	33.3	–2.2	–6.3
	Dar es Salaam	15.1	7.4	–7.8	–51.3
Car	National	1.1	1.2	0.1	13.5
	Rural	0.3	0.2	–0.1	–26.0
	Urban	2.1	2.5	0.4	18.9
	Dar es Salaam	4.3	5.9	1.6	37.3
Motor cycle / moped	National	3.1	3.9	0.8	26.6
	Rural	2.5	3.8	1.4	54.9
	Urban	4.8	5.3	0.4	8.7
	Dar es Salaam	4.2	1.9	–2.3	–54.1

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Table 1.C-3 Trends in Assets Ownership by Location *(continued)*

		2007 (percent)	2011/12 (percent)	absolute Δ (percentage points)	relative Δ (percent)
Household appliances and other items					
Fridge	National	4.8	6.4	1.5	31.6
	Rural	1.1	1.3	0.2	17.6
	Urban	7.9	11.4	3.4	43.3
	Dar es Salaam	24.3	33.7	9.4	38.9
Cooking stove	National	41.7	62.2	20.5	49.2
	Rural	25.9	51.7	25.8	99.5
	Urban	76.3	85.8	9.6	12.6
	Dar es Salaam	84.2	90	5.8	6.9
Iron	National	26.1	22.6	–3.5	–13.5
	Rural	18.3	14.5	–3.8	–20.9
	Urban	41.2	35.7	–5.5	–13.4
	Dar es Salaam	50.8	55.1	4.3	8.5
Sewing machine	National	6.5	6.5	–0.1	–1.1
	Rural	4.1	4.6	0.5	11.4
	Urban	12.0	11.0	–1.0	–8.5
	Dar es Salaam	12.9	10.9	–1.9	–15.1
Water heater	National	14.0	4.4	–9.6	–68.8
	Rural	14.1	2.7	–11.4	–80.7
	Urban	15.4	5.8	–9.7	–62.7
	Dar es Salaam	10.7	13.6	2.9	27.5
Mosquito net	National	68.9	86.5	17.7	25.6
	Rural	61.3	85.6	24.3	39.7
	Urban	84.1	88.4	4.3	5.1
	Dar es Salaam	92.0	89.1	–3.0	–3.2
Furniture					
Chair	National	79.0	75.3	–3.6	–4.6
	Rural	76.6	75.5	–1.0	–1.4
	Urban	85.9	77.4	–8.4	–9.8
	Dar es Salaam	82.5	69.2	–13.4	–16.2
Sofa	National	26.6	12.2	–14.4	–54.1
	Rural	14.0	5.3	–8.7	–62.4
	Urban	50.0	22.9	–27.1	–54.2
	Dar es Salaam	69.1	41.3	–27.8	–40.3
Bed	National	90.9	85.9	–5.0	–5.5
	Rural	89.5	83.6	–5.9	–6.6
	Urban	93.4	90.2	–3.2	–3.4
	Dar es Salaam	95.8	93.4	–2.4	–2.5
Table	National	70.1	66.0	–4.1	–5.8
	Rural	63.6	60.1	–3.5	–5.6
	Urban	85.3	79.1	–6.2	–7.2
	Dar es Salaam	86.1	82.0	–4.1	–4.8

Source: Household Budget Surveys (HBS) 2007 and 2011/12.

Table 1.C-4 Trends in Some Assets Ownership by Quintiles

	Cell Phone		TV		Radio		Mopped		Bicycle		Mosquito Net	
	2007	2011/12	2007	2011/12	2007	2011/12	2007	2011/12	2007	2011/12	2007	2011/12
Lowest Quin.	5.4%	35.7%	0.8%	1.9%	48.2%	44.0%	0.0%	0.9%	34.6%	34.3%	58.9%	83.0%
2nd Quintile	11.2%	48.1%	1.8%	4.6%	60.3%	49.5%	0.0%	1.1%	41.6%	36.9%	64.3%	85.5%
3rd Quintile	22.1%	55.7%	4.7%	9.7%	66.9%	55.4%	0.0%	1.6%	43.0%	36.9%	67.6%	86.7%
4th Quintile	33.1%	68.1%	9.9%	20.4%	73.4%	61.2%	0.1%	1.8%	43.1%	34.3%	74.7%	89.1%
Top Quintile	49.5%	78.3%	23.4%	41.4%	79.0%	64.8%	0.1%	2.8%	38.2%	23.0%	78.8%	88.9%

Source: Household Budget Surveys (HBS) 2007 and 2011/12.

Note: each quintile represents 20 percent of the population.

Appendix 1.D: Static Decomposition of Inequality

The static decomposition carried out, in the first section, to examine the importance of certain individual and family characteristics in determining the level of consumption inequality is based on eight household attributes: the gender, age, educational attainment, activity status and sector of employment of the head, the regional location, the urban/rural status, and the demographic composition of the household.

The gender of the household head is simply male or female. His age is split into five categories: (i) under 30, (ii) 30–39, (iii) 40–49, (iv) 50–59, and (v) 60+ years. The head educational attainment is classified into six categories: (i) no education & illiterate; (ii) less than completed primary; (iii) completed primary; (iv) lower secondary; (v) upper secondary or equivalent; and (vi) university. Three groups are considered for the head activity status: (i) employed; (ii) unemployed; and (iii) inactive, disabled or retired. The employment sector comprises six categories: (i) Government; (ii) Private sector, NGOs and international companies; (iii) self-employed with others; (iv) self-employed alone; (v) household duties; and (vi) unemployed & inactive. The regional locations are the 21 regions in the HBS surveys.[70] Households are also grouped into five categories by the demographic types: (i) "single parent with no kids", (ii) "single parent with kids", (iii) "couple with no kids"; (iv) "couple with kids", and (v) "families of elderly whose head is aged 65 years old or above".

[70] The high number of regions (low number of observations in each group) may induce biases in the between groups inequality estimates. However, even when the regions are grouped into five main zones, a similar trend of sharply increasing interregional inequalities over the last ten years is observed.

Appendix 2.A: Characteristics of the Poor and Poverty Correlates

Table 2.A-1 Household Characteristics by Poverty Status, Quintile and Region, 2011/12

	Poverty Status		Quintile					Region			
	Poor	Non-poor	Poorest	Q2	Q3	Q4	Richest quintile	Rural	Urban	Dar-es-Salaam	All
Share of the population (%)	28.2	71.8	20.0	20.0	20.0	20.0	20.0	71.2	18.7	10.1	100.0
Age of the household head											
Mean	48.4	45.7	48.8	47.5	46.9	45.7	43.4	47.0	45.6	44.0	46.4
Median	46	43	47	45	45	43	41	45	43	41	44
Household size											
Mean	8.3	6.4	8.5	7.7	6.9	6.2	5.4	7.3	6.3	5.5	6.9
Median	7	6	8	7	6	6	5	6	6	5	6
Number of children (below 15 years)											
Mean	4.3	2.9	4.4	3.8	3.3	2.8	2.1	3.7	2.6	1.9	3.3
Median	4	2	4	3	3	2	2	3	2	2	3
Education of head (years)											
Mean	4.3	6.2	4.4	4.7	5.3	6.1	7.9	4.9	7.2	8.7	5.7
Median	7	7	7	7	7	7	7	7	7	7	7
Number of migrants											
Mean	0.8	1.3	0.7	1.0	1.0	1.2	1.6	0.8	1.4	2.5	1.1
Median	0	0	0	0	0	0	1	0	0	2	0
Employment sector of household head											
Government employee	1.0	5.4	0.8	1.7	3.4	4.7	10.3	2.4	8.8	8.5	4.2
Private/NGO/other employee	1.7	7.1	1.5	2.7	3.3	6.6	13.7	1.8	8.9	25.6	5.6
Self-employed (with employees)	5.7	7.4	4.7	6.5	6.0	5.9	11.6	5.4	11.3	9.9	6.9
Self-employed (own-account)	77.9	65.9	79.3	75.6	73.2	67.3	50.9	78.3	54.2	33.5	69.2
Unpaid family worker, household duties	2.1	3.5	2.1	1.9	2.4	3.7	5.4	1.6	4.8	10.9	3.1
Unemployed/Inactive	11.6	10.7	11.7	11.6	11.8	11.7	8.1	10.6	12.0	11.6	11.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Household Budget Survey (HBS) 2011/12.

Note: Population quintiles and population weighted.

Table 2.A-2 Access to Public Infrastructure by Poverty Status, Quintile and Region, 2011/12

	Poverty Status		Quintile					Region			
	Poor	Non-poor	Poorest	Q2	Q3	Q4	Richest quintile	Rural	Urban	Dar-es-Salaam	All
Share of the population (%)	28.2	71.8	20.0	20.0	20.0	20.0	20.0	71.2	18.7	10.1	100.0
Access to piped water (dry season, %)											
Private connection (inside/outside house)	6.9	17.0	6.8	8.0	10.3	17.3	28.2	5.3	37.2	33.2	14.1
Public tap	19.2	20.7	20.6	17.4	20.3	21.4	21.8	19.2	23.4	22.3	20.3
Access to electricity (%)											
Public grid (TANESCO) connection	2.9	21.1	2.8	5.3	10.5	19.1	42.2	3.5	34.8	69.4	16.0
Access to road infrastructure (%)											
Trunk road (in community)	41.3	46.0	41.2	39.4	43.8	45.0	54.1	40.5	51.4	61.8	44.7
Tarmac road (in community)	16.0	26.4	15.0	18.0	21.7	25.5	37.3	15.8	34.0	57.6	23.4
Access to local markets (%)											
Daily markets (in community)	26.0	35.2	25.7	27.9	32.1	34.6	42.9	28.6	44.3	39.4	32.6
Weekly markets (in community)	28.5	27.9	28.3	29.7	28.9	27.1	26.3	31.6	25.8	7.7	28.1

Source: Household Budget Survey (HBS) 2011/12.

Note: Population quintiles and population weighted. Access to road infrastructure is missing for six enumeration areas (1.5 percent of the population).

Table 2.A-3 Private Productive Assets and Durable Goods by Poverty Status, Quintile and Region, 2011/12

	Poverty Status		Quintile					Region			
	Poor	Non-poor	Poorest	Q2	Q3	Q4	Richest quintile	Rural	Urban	Dar-es-Salaam	All
Share of the population (%)	28.2	71.8	20.0	20.0	20.0	20.0	20.0	71.2	18.7	10.1	100.0
ICT and electronics (ownership, %)											
Cell phone	42.5	69.5	39.7	55.5	58.5	71.1	84.6	52.2	82.8	90.8	61.9
Radio	46.6	61.5	45.4	52.6	56.1	62.7	69.7	54.2	63.4	67.5	57.3
TV	2.0	19.4	1.8	3.7	8.9	17.6	40.4	3.8	29.9	61.2	14.5
Transportation assets (ownership, %)											
Car	0.1	2.3	0.0	0.0	0.1	0.4	7.7	0.3	3.3	8.1	1.6
Motor cycle/ moped	2.7	6.7	2.2	4.6	2.6	6.5	11.9	5.6	6.9	2.7	5.6
Bicycle	40.4	40.3	39.7	45.4	40.6	41.3	34.8	45.0	39.2	9.6	40.4
Other household items (ownership, %)											
Cooking stove (electric, gas or traditional)	48.1	69.2	46.8	56.2	61.4	70.1	81.6	52.0	88.4	95.6	63.2
Mosquito net	84.3	88.8	83.5	86.8	85.8	90.3	91.1	86.8	88.9	89.9	87.5
Bed	83.8	87.8	83.3	85.4	85.1	88.0	91.6	84.6	90.8	93.9	86.7
Table	57.8	72.8	55.9	64.6	67.6	72.5	82.2	62.8	82.0	84.3	68.5
Dwelling characteristics (ownership, %)											
Improved roof	52.5	73.1	51.3	57.9	67.0	74.7	85.6	56.7	90.4	99.1	67.3
Improved wall	36.0	51.2	36.7	35.4	41.0	51.6	69.7	34.4	67.3	97.2	46.9
Improved floor	17.5	45.0	15.3	23.0	32.0	46.3	69.7	21.0	67.2	96.6	37.3
Land and livestock											
Any owned land (%)	86.7	67.9	87.8	82.5	78.9	68.0	48.7	89.1	47.2	8.9	73.2
Any rented land (%)	7.8	8.8	7.2	11.6	8.4	8.4	7.0	10.1	6.7	0.5	8.5
Any livestock (%)	69.9	57.9	69.3	68.9	67.1	57.4	43.7	74.2	38.3	12.6	61.3
Owned land (mean acres)*	7.6	5.4	8.0	7.2	5.3	5.3	4.5	7.4	4.0	0.6	6.0
Rented land (mean acres)*	0.2	0.3	0.2	0.4	0.2	0.3	0.4	0.3	0.3	0.0	0.3

Source: Household Budget Survey (HBS) 2011/1.

Note: Population quintiles and population weighted. * Mean includes households with zero land.

Appendix 2.B: Multivariate Regression

We perform a regression analysis to examine the main factors affecting households' consumption and poverty. This allows us to identify the main correlates of poverty.

We use two regression models. The first examines the impact of the household socioeconomic characteristics on the logarithm of real per adult equivalent household consumption, and the second investigates the determinants of the probability of being poor. The first model is estimated using the Ordinary Least Square (OLS) method and the second using the probit approach. The estimation results are reported respectively in Tables 2.B-1 and 2.B-2.

It is worth mentioning that the direction of causality is sometimes difficult to establish in these kinds of analysis. The results below allow the identification of variables closely related with poverty, but the direction of causation will necessitate more sophisticated analysis.[71]

[71] Identifying how important each explanatory variable is in a regression of this sort has to consider two main factors: first, the impact on the dependent variable, given by the size of the estimated coefficient; second, the statistical significance of the coefficient—typically whether it is significantly different from zero.

Table 2.B-1 Correlates of Consumption, 2011/12

	(1) National	(2) Rural	(3) Urban
Household characteristics			
Household size	−0.0272***	−0.0225***	−0.0516***
	(−6.794)	(−5.175)	(−9.833)
Share of members aged 0–14 years	−0.379***	−0.318***	−0.384***
	(−9.330)	(−6.181)	(−8.815)
Share of members aged 65+ years	−0.0124	0.0615	−0.124
	(−0.209)	(0.903)	(−1.281)
Education of the head (Omitted: no education)			
Less than completed primary	0.0539*	0.0647**	0.0117
	(1.876)	(2.153)	(0.176)
Completed primary	0.120***	0.102***	0.141**
	(4.826)	(4.055)	(2.241)
Lower secondary	0.385***	0.362***	0.390***
	(11.55)	(7.654)	(6.265)
Upper secondary	0.681***	0.709***	0.647***
	(12.27)	(6.266)	(8.983)
Migrant household	0.134***	0.0661	0.167***
	(4.378)	(1.427)	(6.190)
Economic activity and assets			
Household activity (Omitted: no reported working hours)			
Mainly engaged in agriculture	−0.104**	−0.0927*	−0.134**
	(−2.478)	(−1.828)	(−2.157)
Mainly engaged in non-farm enterprise	0.157***	0.135**	0.157***
	(3.553)	(2.341)	(3.053)

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Table 2.B-1 Correlates of Consumption, 2011/12 *(continued)*

	(1) National	(2) Rural	(3) Urban
Mainly engaged in wage work	0.154***	0.0632	0.175***
	(3.330)	(0.940)	(3.440)
Uses irrigation	0.0928	0.0959	0.0883
	(1.645)	(1.369)	(1.519)
Sells agricultural output	0.0790***	0.0731**	0.136**
	(2.654)	(2.368)	(2.588)
Size of landholdings (square root)	0.0418***	0.0524***	0.0338***
	(4.293)	(3.954)	(3.087)
Has any livestock	–0.0128	–0.0139	0.0554*
	(–0.495)	(–0.497)	(1.719)
Community characteristics			
Daily market	0.0703*	0.0624	0.0768*
	(1.926)	(1.303)	(1.948)
All season passable road	0.0731	0.0836	–0.0418
	(1.539)	(1.587)	(–0.637)
Mobile phone signal	0.0812	0.0678	0.0890*
	(1.530)	(1.089)	(1.717)
Geographic zone (Omitted: Coastal)			
Northern Highlands	–0.0956	–0.0224	–0.0967
	(–1.403)	(–0.228)	(–1.412)
Lake	–0.132**	–0.0691	–0.169***
	(–2.470)	(–0.807)	(–2.880)
Central	–0.180***	–0.125	–0.109
	(–3.231)	(–1.446)	(–1.122)
Southern Highlands	–0.200***	–0.174*	–0.119*
	(–3.021)	(–1.700)	(–1.844)
South	–0.392***	–0.259**	–0.553***
	(–5.100)	(–2.589)	(–7.256)
Constant	10.92***	10.79***	11.17***
	(139.5)	(105.4)	(141.3)
Observations	9,930	4,064	5,866
R-squared	0.314	0.163	0.416

Source: HBS 2011/12.

Notes: t-statistics in parentheses. Standard errors corrected for clustering and stratification. OLS. Dependent variable is log consumption per adult. *** p<0.01, ** p<0.05, * p<0.1

Table 2.B-2 Correlates of Poverty, 2011/12

	(1) National	(2) Rural	(3) Urban
Household characteristics			
Household size	0.0600***	0.0513***	0.114***
	(5.628)	(4.406)	(6.208)
Share of members aged 0–14 years	0.748***	0.817***	0.249
	(5.312)	(5.073)	(1.382)
Share of members aged 65+ years	0.0961	0.0438	0.275
	(0.520)	(0.210)	(0.897)
Education of the head (Omitted: no education)			
Some primary	–0.132*	–0.139*	–0.0754
	(–1.700)	(–1.705)	(–0.422)
Completed primary	–0.289***	–0.264***	–0.318*
	(–4.338)	(–3.830)	(–1.891)
Lower secondary	–0.883***	–0.971***	–0.903***
	(–6.332)	(–4.562)	(–4.045)
Upper secondary	–1.529***	–2.168***	–1.105***
	(–7.608)	(–5.171)	(–4.406)
Migrant household	–0.227**	–0.101	–0.417***
	(–2.323)	(–0.803)	(–4.678)
Economic activity and Assets			
Household activity (Omitted: no reported working hours)			
Mainly engaged in agriculture	0.168	0.172	0.133
	(1.592)	(1.335)	(0.850)
Mainly engaged in non-farm enterprise	–0.470***	–0.439***	–0.484***
	(–3.992)	(–2.925)	(–3.725)
Mainly engaged in wage work	–0.353***	–0.0978	–0.582***
	(–2.718)	(–0.531)	(–4.900)
Uses irrigation	–0.282*	–0.304*	–0.133
	(–1.956)	(–1.862)	(–0.694)
Sells agricultural output	–0.237***	–0.221**	–0.475***
	(–2.771)	(–2.458)	(–2.865)
Size of landholdings (square root)	–0.0749**	–0.0939**	–0.0351
	(–2.417)	(–2.364)	(–0.830)
Has any livestock	–0.0182	0.00730	–0.201**
	(–0.234)	(0.0865)	(–2.201)
Community characteristics			
Daily market	–0.148	–0.148	–0.136
	(–1.385)	(–1.139)	(–1.210)
All season passable road	–0.235*	–0.266*	0.276
	(–1.839)	(–1.943)	(1.422)
Mobile phone signal	–0.110	–0.0677	–0.252
	(–0.713)	(–0.386)	(–1.379)

(continues to next page)

Table 2.B-2 Correlates of Poverty, 2011/12 *(continued)*

	(1) National	(2) Rural	(3) Urban
Geographic zone (Omitted: Coastal)			
Northern Highlands	0.0957	−0.0759	0.368*
	(0.473)	(−0.292)	(1.848)
Lake	0.269*	0.145	0.552***
	(1.747)	(0.711)	(4.085)
Central	0.387**	0.265	0.594***
	(2.278)	(1.204)	(3.011)
Southern Highlands	0.587***	0.568**	0.358*
	(3.356)	(2.463)	(1.765)
South	0.914***	0.671***	1.354***
	(4.719)	(2.830)	(6.970)
Constant	−0.770***	−0.652**	−1.285***
	(−3.526)	(−2.424)	(−5.636)
Observations	9,930	4,064	5,866

t-statistics in parentheses. Standard errors corrected for clustering and stratification. Probit. Dependent variables equals to unity if household is below the poverty line. Table reports coefficients (not marginal effects).

*** p<0.01, ** p<0.05, * p<0.1

Appendix 2.C: Migration

A. Data Description and Migration Flows

Data description

The analysis in this section is based on the three waves of the National Panel Survey (NPS) described in the previous appendices. For the simplicity of notation, the three waves will be labeled respectively NPS1, NPS2 and NPS3. Table 2.C-1 summarizes the sample size and recontact rates of NPS. At the end of NPS3, 90% of the original respondents that were still living were re-interviewed; 95% of the original households were also recontacted in NPS3. This survey is ideal for analyzing migration patterns in Tanzania as it tracks individuals over time rather than households. However, this survey does not allow us to examine international migration since individuals are recontacted only if they are present in Tanzania.

Based on how far individuals have moved from their usual location of residence, each of the above definition has three categories: non-migrant, intra-regional migrant, and inter-regional migrant. If an individual has lived in the same district at two points in time, then this person is classified as a non-migrant. If an individual has moved to a different district in the same region, then this person is an intra-regional migrant. Finally, if an individual has moved to another region, then this person is an inter-regional migrant.

A migration matrix representing location in two different points in time could be informative of the patterns of migration. Table 2.C-2 is a matrix of inter-regional migration between NPS1 and NPS3. We see that short term migration, defined as migration over a four-year period here, is relatively small. As one would expect, people to be more likely to move over a longer period of time. Table 2.C-3 is a matrix that compares the current region of residence of individuals with their previous region if they migrated in the previous 10 years. This gives a picture of migration over a longer period of time. Here we see that individuals are much more likely to have migrated over a longer period of time. Approximately 40% of individuals lived in a different region 10 years ago than now. We see similar magnitudes of migration if we compare the region of individuals' birth with their current location (not presented here).

Table 2.C-1 Sample Size and Recontact Rates of Tanzania National Panel Survey

	NPS1	NPS2	NPS3
Households	3,265	3,924	5,011
Individuals	16,709	20,559	25,413
Re-interviewed from previous wave	—	15,597	18,968
Not interviewed (deceased or untraced)	—	1,112	1,591
New individuals	—	4,962	6,445
Recontact rate, individuals*		94%	90%
Recontact rate, households*		97%	95%

* Eligible individuals (not deceased) or households from NPS1

Migration Decision

The migration decision is examined using a multinomial logit model. The outcome variable is the decision to migrate between NPS1 and NPS3, and includes three categories: 1) Not to migrate; 2) Migrate to a different but within the same region; 3) Migrate to a different region. The explanatory variables include individuals and households characteristics, and the distance of household's residence from the district headquarters that affect the migration decision in NPS1. The results are presented in Table 2.C-4.

II. Impact of Migration on Individuals and Households Welfare

The Effects of Migration on Consumption Growth

The analysis of the impact of the migration decision on consumption growth relies on the methodology proposed by Beegle *et al.* (2011). We consider the growth rate of per capita consumption between NPS1 and NPS3. The estimated equation is the following:

$$\Delta lnC_{it+1,t} = \alpha + \beta M_i + \gamma X_{it} + \delta_h + e_{ih} \quad (1)$$

Where, $\Delta lnC_{it+1,t}$ is the difference in logarithm of consumption between t and t+1 (NPS1 and NPS3 in our dataset). M_i is a dummy variable indicating whether an individual moved out of the district between NPS1 and NPS3. X_{it} includes individual characteristics at the baseline that could also affect consumption growth. δ_h is the initial household fixed effect

Table 2.C-2 Inter-regional Migration between NPS1 and NPS3

Region in NPS3 (columns) Region in NPS1 (rows)	Dodoma	Arusha	Kilimanjaro	Tanga	Morogoro	Pwani	Dar es salaam	Lindi	Mtwara	Ruvuma	Iringa	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyanga	Kagera	Mwanza	Mara	Manyara	KASKAZINI UNGUJA	KUSINI UNGUJA	MJINI/MAGHARIBI UNGUJA	KASKAZINI PEMBA	KUSINI PEMBA	Total
Dodoma	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	100
Arusha	0	93	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	100
Kilimanjaro	0	0	98	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	100
Tanga	0	1	0	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	100
Morogoro	1	1	0	0	96	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Pwani	1	0	0	0	0	94	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	100
Dar es salaam	0	0	1	1	0	1	92	1	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	100
Lindi	0	0	0	0	0	0	0	98	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Mtwara	0	0	0	1	0	0	0	1	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Ruvuma	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Iringa	0	0	0	0	0	0	0	0	0	0	99	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	100
Mbeya	0	0	0	0	0	0	1	0	0	0	1	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
Singida	0	0	0	0	1	0	0	0	0	0	0	0	94	1	0	0	4	0	0	0	0	0	0	0	0	0	100
Tabora	0	0	0	0	0	0	0	0	0	0	0	0	1	94	0	0	2	0	1	0	0	0	0	0	0	0	100
Rukwa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	0	0	0	2	0	0	0	0	0	0	0	100
Kigoma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	100
Shinyanga	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	97	0	0	1	0	0	0	0	0	0	100
Kagera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	94	5	0	0	0	0	0	0	0	100
Mwanza	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	95	0	0	0	0	0	0	0	100
Mara	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	98	0	0	0	0	0	0	100
Manyara	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	0	0	0	0	0	100
KASKAZINI UNGUJA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	0	0	0	0	100
KUSINI UNGUJA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	14	0	0	100
MJINI/MAGHARIBI UNGUJA	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	94	0	1	100
KASKAZINI PEMBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	99	1	100
KUSINI PEMBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100

Table 2.C-3 Did you move to your current region in the last 10 years?

Region in NPS3 (columns); Region in NPS1 (rows)	Dodoma	Arusha	Kilimanjaro	Tanga	Morogoro	Pwani	Dar es salaam	Lindi	Mtwara	Ruvuma	Iringa	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyanga	Kagera	Mwanza	Mara	Manyara	KASKAZINI UNGUJA	KUSINI UNGUJA	MJINI/MAGHARIBI UNGUJA	KASKAZINI PEMBA	KUSINI PEMBA	Total
Dodoma	57	3	2	0	10	0	3	0	0	0	2	0	1	1	0	1	0	2	0	0	17	0	0	0	0	0	100
Arusha	0	53	21	2	1	0	3	0	0	0	0	1	7	0	0	1	1	0	0	1	8	0	0	0	0	0	100
Kilimanjaro	0	23	38	8	8	1	9	0	0	0	2	0	4	0	1	2	1	0	2	0	2	0	0	0	0	0	100
Tanga	0	1	1	68	0	7	5	0	5	0	2	0	3	0	0	0	0	1	0	0	6	0	0	0	1	0	100
Morogoro	6	1	4	3	45	1	6	0	4	1	2	2	3	4	0	2	14	2	0	0	0	0	0	0	0	0	100
Pwani	9	0	3	1	2	47	31	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	100
Dar es salaam	3	1	4	4	5	4	63	2	1	0	2	1	1	1	0	1	1	1	3	1	0	0	0	0	0	0	100
Lindi	0	0	0	0	3	4	5	66	18	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	100
Mtwara	3	0	0	2	0	0	6	9	72	1	0	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	100
Ruvuma	0	1	0	0	0	0	4	2	5	69	1	0	1	15	0	0	0	0	2	0	0	0	0	0	0	0	100
Iringa	4	0	2	0	1	0	2	0	0	3	70	10	0	0	2	0	0	0	5	2	0	0	0	0	0	0	100
Mbeya	1	0	0	0	0	0	5	0	0	3	8	71	1	2	6	0	0	0	3	0	0	0	0	0	0	0	100
Singida	0	0	3	0	1	0	1	0	0	0	0	2	66	13	0	0	12	0	0	0	1	0	0	0	0	0	100
Tabora	0	0	0	0	0	0	0	0	0	1	1	4	4	51	1	4	28	1	4	1	0	0	0	0	0	0	100
Rukwa	0	0	1	0	0	0	0	0	0	0	0	12	0	1	58	2	10	0	14	1	0	0	0	0	0	0	100
Kigoma	0	0	3	0	0	0	1	0	0	0	0	0	0	1	1	89	0	1	3	2	0	0	0	0	0	0	100
Shinyanga	1	0	0	2	0	0	2	0	0	1	0	0	3	3	0	2	65	3	14	3	0	0	0	0	0	0	100
Kagera	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	72	18	2	0	0	0	0	0	0	100
Mwanza	0	0	1	1	2	1	1	0	0	0	0	0	0	1	0	1	9	8	68	7	0	0	0	0	0	0	100
Mara	0	0	0	1	1	0	6	0	0	0	0	0	1	0	0	3	8	0	9	70	0	0	0	0	0	0	100
Manyara	1	25	11	1	0	0	3	0	0	0	0	0	4	0	0	0	2	0	0	0	52	0	0	0	0	0	100
KASKAZINI UNGUJA	0	0	0	2	0	0	5	0	0	0	0	0	0	23	0	0	2	0	1	0	0	44	4	11	1	6	100
KUSINI UNGUJA	0	0	0	0	4	0	9	0	0	0	0	0	0	5	0	0	0	0	26	0	0	0	27	27	0	2	100
MJINI/MAGHARIBI UNGUJA	0	0	0	1	0	1	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8	3	65	3	9	100
KASKAZINI PEMBA	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	7	68	17	100
KUSINI PEMBA	4	0	0	3	0	0	3	1	0	0	0	0	0	0	0	0	2	0	0	0	0	1	0	10	20	56	100

Table 2.C-4 Multinomial Logit Model of Migration Decisions

	Non-migrant		Intra-regional Migrant		Inter-regional Migrant	
	β	s.e.	β	s.e.	β	s.e.
Asset index	–0.003**	(0.001)	0.001	(0.001)	0.002**	(0.001)
Years of education	–0.002	(0.001)	–0.000	(0.001)	0.002**	(0.001)
Household size	0.002**	(0.001)	–0.002**	(0.001)	0.000	(0.000)
Age group (Base: 0–14 years)						
Age group: 15–29 years	–0.052***	(0.011)	0.028***	(0.008)	0.025***	(0.008)
Age group: 30–44 years	–0.034**	(0.014)	0.021**	(0.010)	0.014	(0.011)
Age group: 45–59 years	–0.000	(0.016)	0.012	(0.011)	–0.011	(0.013)
Age group: 60+ years	0.011	(0.020)	0.019*	(0.011)	–0.030*	(0.018)
Female	–0.001	(0.009)	0.003	(0.006)	–0.002	(0.007)
Unmarried male	0.001	(0.014)	–0.007	(0.010)	0.006	(0.010)
Unmarried	–0.008	(0.012)	–0.000	(0.008)	0.009	(0.009)
Household head or spouse	0.049***	(0.013)	–0.025***	(0.009)	–0.025**	(0.010)
Child of household head	0.016	(0.011)	–0.008	(0.007)	–0.008	(0.008)
Male child of household head	0.022	(0.014)	–0.006	(0.010)	–0.016	(0.010)
Distance to district HQ, km	0.000	(0.000)	–0.000**	(0.000)	0.000***	(0.000)
Observations	*10,681*		*10,681*		*10,681*	

Sources: National Panel Survey, NPS1 and NPS3.

Note: A key assumption of the multinomial logit model is the Independence of Irrelevant Alternatives (IIA), which suggests that the choice between two alternatives is unaffected by the addition or subtraction of alternative choices. The Small-Hsiao test of IIA suggests that this assumption, that the odds between two choices are independent of other alternatives, cannot be rejected.

, **, and * indicate statistical significance at the levels of 10, 5 and 1 percent respectively. The figures represent marginal effects.*

and ε_{ih} is a random error term. β is our variable of interest and represents the impact of migration on consumption growth between t and t+1.

Although estimating equation (1) by differences-in-differences would wipe out the effects of time-invariant individual-specific characteristics that could affect consumption growth, this is not sufficient to tease out the impact of migration on consumption growth. Initial household characteristics such as assets and social networks could influence consumption growth. Since we know the original household that all respondents belonged to in NPS1, we use this feature to identify the effect of migration on consumption. Following Beegle *et al*. (2011), we identify the impact of migration on consumption growth by estimating equation (1) using initial household fixed effects (IHHFE), effectively using variation within the initial household to control for initial growth paths of households.

The results of this IHHFE estimation are presented in Table 2.C-5. Column (1) is a parsimonious model without any covariates. In this specification, we see that migrants had a 15.7 percentage point higher growth of consumption than non-migrants. This is an economically significant impact of migration, given the fact that the sample average consumption growth between NPS1 and NPS3 is 41.8%.

Column (2) contains a set of individual characteristics at the baseline as conditioning variables, but the coefficient on migration is virtually identical to the parsimonious model. Although column (2) controls for household-level heterogeneity and individual-level heterogeneity, we could still worry that it does not control for unobservable individual-specific characteristics such as motivation and social network that could also affect consumption growth. We address this endogeneity concern by implementing the instrumental variable estimation. The estimation

procedure proceeds in two stages: the estimation of the migration decision in the first stage and the estimation of the consumption growth in the second stage. The key to identification is a set of instruments that affect the migration decision but not the consumption growth. Similar to Beegle *et al.* (2011), we use the following push and pull factors as instruments of migration: head or spouse, child of head, distance of household from district headquarters interacted with age, and an index of self-reported shock index (constructed through Principal Component Analysis) interacted with age. Column (4) presents the estimates from the first stage of 2SLS estimation. These results suggest that the set of instruments chosen pass the under-identification and weak-identification tests.

Column (3) presents results from the 2SLS estimation with IHHFE. These results suggest that even after controlling for the endogeneity resulting from unobservable individual characteristics, migration has a significant impact on consumption growth. Migrants have 21.2 percentage point higher consumption growth in consumption in this estimation, which is slightly higher than the IHHFE estimates. Taken together, Table 2.C-5 suggests that migrating to a different district could lead to a significantly increase in consumption growth than staying in the same district, even during a relatively short time-period of about 4 years.

The Effect of Remittance Receipt on Children School Attendance

The impact of remittance receipt on the school attendance of children in Tanzania is examined using a probit regression model, where the outcome variable is a binary indicator of whether or not a school-age child is currently attending school. The primary explanatory variable is whether the child's household receives remittances, which captures the effect of receiving remittances on relaxing the financial constraints of the household and allowing children spend less time in income-generation activities. The analysis considers both, whether the household receives remittances and the amounts received. The estimation results are presented in Table 2.C-6, where columns 1–3 include a dummy variable representing whether the child's household received remittances in the previous 12 months and columns 4–6 consider the natural log of remittances received by the household. To uncover the effect of remittances on children's schooling, the analysis controls for various individual and household-specific characteristics that may affect school attendance. Given that receiving remittances may be associated with the migration status of the household, the analysis controls also for this variable considering as migrant household a household in which at least one member moved to a different district in NPS3.

The estimation results in Table 2.C-6 may be biased by differences between households who receive remittances and those who do not. Controlling for households characteristics does not help to fully address this selection bias. This problem is difficult to handle in the absence of a randomized experiment, but we tried to address it through the quasi-experimental method of Propensity Score Matching (PSM). The approach consists in matching the treatment group to a comparison one within the sample of non-participants using the propensity score (the predicted probability of participation given observed characteristics). Although the PSM approach does not completely solve the problem of selection bias, it helps to attenuate it and in our case it provides a consistent estimation of the impact of remittances on the probability of attending school.[72]

The PSM results are presented in Table 2.C-7 and show that receiving remittances is associated with a higher probability of school attendance. Children living in households that received remittances in the previous 12 months were 3.3–5.8 percentage points more likely to attend school compared with the counterfactual. This impact is much smaller than the impact reported in Table 2.C-6, suggesting that selection issues may be important. Similar to the probit model, the coefficient on migration is the opposite of the coefficient on remittances, suggesting that the beneficial impact of remittances on school attendance may be mitigated by the adverse effects of migration.

[72] Rosenbaum and Rubin (1983) propose that under the assumptions of selection on observables and the overlap condition, the difference between the mean outcomes for treatment and control groups at each level of the propensity score provides an unbiased estimate of the average treatment effect on the treated (ATT).

Table 2.C-5 The Impact of Migration on Consumption Growth

	(1) IHHFE	(2) IHHFE	(3) 2SLS with IHHFE	(4) 2SLS with IHHFE First Stage
Moved outside of district	0.157***	0.160***	0.212**	
	(0.038)	(0.009)	(0.105)	
Characteristics at baseline:				
Years of education		0.005***	0.005***	0.006***
		(0.001)	(0.001)	(0.001)
Age, years		0.001	0.000	0.003**
		(0.001)	(0.001)	(0.001)
Age, squared		–0.000	–0.000	–0.000**
		(0.000)	(0.000)	(0.000)
Unmarried male		–0.007	–0.004	–0.028*
		(0.012)	(0.013)	(0.015)
Unmarried		0.040***	0.039***	0.074***
		(0.010)	(0.015)	(0.013)
Male		0.009	0.007	–0.022***
		(0.006)	(0.007)	(0.008)
Instruments for migration:				
Head or spouse				–0.116***
				(0.017)
Child of head				–0.058***
				(0.011)
Distance from HQ X 15–30yrs				0.001***
				(0.000)
Shock index X 15–30 years				0.010*
				(0.005)
Constant	0.241***	0.199***		
	(0.042)	(0.013)		
Observations	14,473	12,127	10,380	10,380
Cragg-Donald statistic			16.56	
Anderson LM statistic			65.80	
Sargan statistic			17.77	

Source: National Panel Survey, NPS1 and NPS3.

Standard errors in parentheses. * p < .10, ** p < .05, *** p < .01

Table 2.C-6 Determinants of Whether a Child (6–18 years) is Currently Attending School

	(1)	(2)	(3)	(4)	(5)	(6)
Remittance-recipient household	0.230***	0.198***	0.205***			
	(0.056)	(0.056)	(0.060)			
Log of remittances received				0.017***	0.015**	0.015**
				(0.006)	(0.006)	(0.007)
Migrant household			–0.189**			–0.193**
			(0.077)			(0.076)
Age (years)		–0.114***	–0.111***		–0.114***	–0.111***
		(0.008)	(0.008)		(0.008)	(0.008)
Male		–0.534***	–0.451***		–0.553***	–0.472***
		(0.134)	(0.143)		(0.135)	(0.144)
Male X Age		0.045***	0.038***		0.046***	0.039***
		(0.010)	(0.011)		(0.010)	(0.011)
Household size		–0.012*	–0.010		–0.012*	–0.011
		(0.007)	(0.007)		(0.007)	(0.007)
Household dependency ratio		0.276**	0.242*		0.277**	0.246**
		(0.122)	(0.125)		(0.121)	(0.123)
Household head is literate		0.251***	0.254***		0.251***	0.253***
		(0.048)	(0.049)		(0.048)	(0.049)
Household asset index		0.115***	0.116***		0.116***	0.118***
		(0.014)	(0.015)		(0.014)	(0.015)
Urban		0.139**	0.151**		0.142**	0.156**
		(0.068)	(0.070)		(0.069)	(0.070)
Constant	0.404***	0.929***	0.916***	0.435***	0.952***	0.938***
	(0.030)	(0.192)	(0.200)	(0.030)	(0.192)	(0.199)
Observations	8009	7970	7245	8009	7970	7245

Source: National Panel Survey, NPS3.

Note: Standard errors in parentheses. * p < .10, ** p < .05, *** p < .01. All specifications use survey weights. Columns 2, 3, 5, and 6 also control for the region of individual's residence.

Table 2.C-7 Determinants of School Attendance, Age 6–18 years (Propensity Score Matching)

Treatment variable=>	(1) Household received remittances	(2) Household received remittances	(3) Migrant household
ATE in population[2]	0.033**	0.058***	–0.058***
	(0.018)	(0.017)	(0.019)
ATE on the treated	0.052***	0.063***	–0.087***
	(0.018)	(0.019)	(0.022)
Control variables:			
Migrant household	No	Yes	No
Other control variables[1]	Yes	Yes	Yes

Standard errors in parentheses. * p < .10, ** p < .05, *** p < .01.

[1] The following variables were used to generate the propensity score: age of child in years, male, male X age, household size, household dependency ratio, household head is literate, and household asset index.

[2] ATE refers to the Average Treatment Effect

Table 2.C-8 Access to Health Care

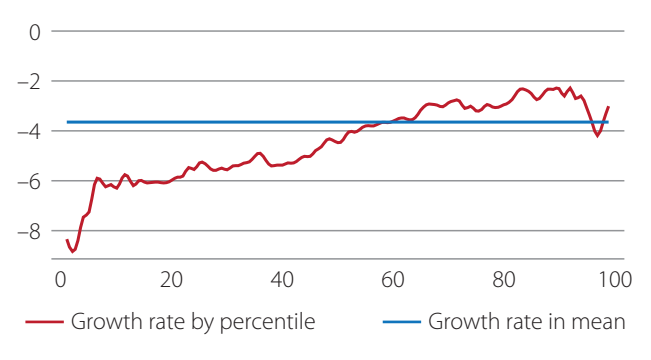
	Non-lifetime migrants	Lifetime migrants	Difference
Consulted health care provider in the last 4 weeks	18.30%	19.71%	
Hospitalized in the last 12 months	6.29%	6.01%	
Medical exemption	4.45%	3.15%	**
Mean amount spent on illnesses and injuries (TZSS)	2,136	6,017	**
	Non-long run migrants	**Long run migrants**	**Difference**
Consulted health care provider in the last 4 weeks	14.13%	18.99%	***
Hospitalized in the last 12 months	4.85%	5.59%	
Medical exemption	2.86%	3.33	
Mean amount spent on illnesses and injuries (TZSS)	2,668	2,648	
	Non-recent migrants	**Recent migrants**	**Difference**
Consulted health care provider in the last 4 weeks	14.84%	18.59%	**
Hospitalized in the last 12 months	4.41%	4.26%	
Medical exemption	3.33%	3.55	
Mean amount spent on illnesses and injuries (TZSS)	2,426	2,883	

Appendix 3: Comparison of Poverty Trends Using NPS and HBS Data

Box 3.1 A Divergent Perspective of Poverty Trends: National Panel Survey vs Household Budget Survey

Tanzania has a second survey series that collects consumption data and is hence suitable for poverty analysis, the National Panel Survey (NPS), with three rounds so far (2008/09, 2010/11, and 2012/13). The NPS is a longitudinal survey (tracking individuals) conducted every two years by the National Bureau of Statistics. The NPS is representative for the whole of Tanzania (including Zanzibar), and has a smaller sample size than the HBS. The panel nature of the data make it a particularly attractive survey for studying poverty dynamics and transitions, and the survey series is used in this poverty assessment for this and other purposes.

The NPS shows a different trend in poverty than the HBS series. In particular, the poverty headcount for mainland Tanzania in the NPS increased from 11.4 percent in 2008/09 to 21.1 percent in 2012/13 and growth incidence curves show a decline in consumption that is most pronounced for the poorest groups.



Source: National Panel Survey (NPS), 2008/09 and 2012/13.

These discrepancies to the HBS are striking and not easy to explain. Part of the difference in poverty trends is likely to be related to various technicalities of the underlying survey data and poverty estimation methodology. For instance, the NPS uses a food price deflator to update the poverty line, while the HBS uses a combined food and nonfood price deflator. Since food price inflation outpaced nonfood price inflation in recent years, the NPS poverty lines escalate more rapidly than the HBS poverty lines, which contributes to the increase in poverty in the NPS. Differences in the way the surveys collect data on consumption are also likely to play a role but require further investigation and triangulation. (See URT 2011 for a discussion).

However, more substantive explanations also need to be considered. In particular, the NPS base year (2008/09) does not perfectly coincide with the HBS base year (2007). This difference can matter, given the sensitivity of the poverty estimates to price changes and the high variability of incomes in agriculture and the informal household enterprise sector. In fact, the NPS data show a significant amount of churning, i.e. individual movements into and out of poverty. This confirms once again that many Tanzanians are vulnerable to poverty, and that what is observed at any given time is just a snapshot of what is in reality a rapidly evolving scenario.

It is important to note, however, that while the NPS shows an increase in consumption poverty 2008/09–2012/13, the data still show improvements in housing conditions, assets, and access to basic services. In sum, we believe that the decline in poverty in the HBS is more plausible and more consistent with other indicators of well-being than the increase in poverty in the NPS, but further analytical work is need to cross-triangulate HBS and NPS poverty estimates and explain the discrepancies between the two data sets.

Appendix 4: The Unconditional Quantile Regression Model & Analysis of Spatial Inequality

The static decomposition of inequality by population groups is a useful descriptive analysis and can be informative regarding the role played by certain household characteristics in inequality. However, it has several limitations. First, handling an important number of population groups with different categories for each population partition is often unwieldy and limits the reliability of the estimates. Second, it does not allow to infer causality in the relationship between inequality and the different household attributes. Some of the variables used to explain inequality may themselves be determined by the welfare patterns and the direction of causation cannot be determined from the descriptive analysis. Third, and most importantly, the decomposition gives little information regarding the importance of the welfare gaps across the various quantiles of the distribution and about the sources of these gaps.

We attempt to address this drawback via the unconditional quantile regression model. The model analyzes the sources of inequality between rural and urban areas, and between metropolitan and non-metropolitan locations. The procedure allows to understand how the difference in the distributions of observed household characteristics between the locations contribute to the welfare gap and how the marginal effects of these characteristics vary across the entire distribution.

Popular approaches used in the decomposition of distributional statistics and the analysis of the sources of inequality include the standard Oaxaca–Blinder decomposition method, the reweighting procedure of DiNardo, Fortin, and Lemieux (1996) and the quantile-based decomposition approach of Machado and Mata (2005). The main drawback of the Oaxaca–Blinder technique is that it applies the decomposition to only the mean welfare differences between two population sub-groups and yields an incomplete representation of the inequality sources. The other conventional methods extend the decomposition beyond the mean and permit the analysis of the entire distribution, nevertheless they all share the same shortcoming in that they involve a number of assumptions and computational difficulties (Fortin *et al*., 2010).

The Recentered Influence Function (RIF) regression approach recently proposed by Firpo, Fortin and Lemieux (2009) addresses these shortcomings and provides a simple regression-based procedure for performing a detailed decomposition of different distributional statistics such as quantiles, variance and Gini coefficient. The RIF-regression model is called unconditional quantile regression when applied to the quantiles. The technique consists of decomposing the welfare gaps at various quantiles of the unconditional distribution into differences in households endowment characteristics such as education, age, employment etc., and differences in the returns to these characteristics. These components are then further decomposed to identify the specific attributes which contribute to the widening welfare gap.

We apply the RIF unconditional quantile regression to examine the rural-urban as well as the metropolitan-nonmetropolitan welfare differentials at various points of the consumption distribution. The procedure is carried out in two stages. The first stage consists of estimating unconditional quantile regressions on log real per capita monthly household consumption for rural and urban (metropolitan and non-metropolitan) households, then constructing a counterfactual distribution that would prevail if rural (non-metropolitan) households have received the returns that pertained to urban (metropolitan) area. The comparison of the counterfactual and empirical distributions allows to estimate the part of the welfare gap attributable to households characteristics differentials, the *endowment effect*, and the part explained by differences in returns to characteristics, the *return effect*. The second stage involves dividing the *endowment* and *return* components into the contribution of each specific characteristic variable.

The method can be easily implemented as a standard linear regression, and an ordinary least squares (OLS) regression of the following form can be estimated:

$$RIF(y,Q_\theta)=X\beta+\varepsilon \qquad (1)$$

where y is log real per capita monthly household consumption, and $RIF(y,Q_\theta)$ is the RIF of the θ^{th} quantile of y estimated

by computing the sample quantile Q_θ and estimating the density of y at that point by kernel method:

$RIF(y, Q_\theta) = Q_\theta + (\theta - I\{y \leq Q_\theta\}) / f_Y(Q_\theta)$, is the marginal density function of y and I is an indicator function. RIF can be estimated by replacing Q_θ by θ^{th} sample quantile and estimating f_Y by kernel density.[73]

X is the regressors matrix including the intercept, β is the regression coefficient vector and ε is the error term. The regressors include eight groups of variables: (1) the household demographic and general characteristics variables including household size, the proportion of household members aged below fourteen years and the proportion of those aged over 65 years, and the gender of the household head; (2) the household human capital measured by the number of years of schooling of the more highly educated of the head or his spouse, and the head's years of experience.[74] The choice of the years of schooling variable is motivated by capturing the influence that family members with more education may have in household decision making; (3) the household head employment sector and other attributes, which include a dummy variable indicating whether the head is over 65 years old, his marital status, and his sector of employment recoded as a categorical variable: : (i) Government; (ii) Private sector, NGOs and international companies; (iii) self-employed with others; (iv) self-employed alone; (v) household duties; (vi) farming and fishing; and (vii) unemployed & inactive; (5) asset ownership including the area of land owned, rented and provided for free; dummy variables indicating respectively whether the household owns livestock, bicycle, cell phone, telephone, computer; and dummies capturing the housing conditions; (6) the sources of income, captured by categorical variables indicating the main source of income of the household and including: (i) cash and in-kind income from employment; (ii) income from non-agricultural household business; (iii) income from agricultural household business; (iv) transfers/assistance/remittances; and (v) other sources; (7) access to basic services measured by categorical variables indicating the sources of lighting and of drinking water; (8) external factors to the household capturing the community characteristics such as access to transportation, schooling and hospital facilities as well as geographic location fixed effects. It is worth mentioning that the 2011/12 household surveys includes observations on migration status and access to drinking water that are absent in the previous surveys, and that the categories of sector of employment and source of income variables differ somewhat in 2011/12 data. However, the results remain consistent to different specifications, whether considering the same variables and categories across the three waves or using the more detailed information available in the latest survey.

We estimate model (1) for the 10th to 90th quantiles and use the unconditional quantile regression estimates to decompose the rural-urban inequality, as well as the metropolitan-nonmetropolitan, inequality into a component attributable to differences in the distribution of characteristics and a component due to differences in the distribution of returns as follows:

$$\hat{Q}_\theta^i - \hat{Q}_\theta^{i'} = \left\{\hat{Q}_\theta^i - \hat{Q}_\theta^*\right\} + \left\{\hat{Q}_\theta^* - \hat{Q}_\theta^{i'}\right\} = \left(\bar{X}^i - \bar{X}^{i'}\right)\hat{\beta}_\theta^i + \bar{X}^{i'}\left(\hat{\beta}_\theta^i - \hat{\beta}_\theta^{i'}\right) \quad (2)$$

where $\hat{Q}_\theta$ is the θ^{th} unconditional quantile of log real per capita monthly household consumption, $\bar{X}$ represents the vector of covariate averages and $\hat{\beta}_\theta$ the estimate of the unconditional quantile partial effect. Superscripts i, i' and * designate respectively the urban (or metropolitan), rural (or nonmetropolitan) and counterfactual values.

$\hat{Q}_\theta^* = X^{i'}\hat{\beta}^i$ is the counterfactual quantile of the unconditional counterfactual distribution which represents the distribution of welfare that would have prevailed for group i' (rural/non-metropolitan households) if they have received group i (urban/metropolitan households) returns to their characteristics.[75]

The first term on the right-hand side of equation (2) represents the contribution of the differences in distributions

[73] For more details see Firpo, Fortin and Lemieux (2009).

[74] The squared schooling years and the squared experience were not significant in any equation, thus we excluded them.

[75] The decomposition results may vary with the choice of the counterfactual distribution. For example, if the counterfactual used is the distribution that would have prevailed for group i if they have received group i' returns we would obtain different results. The choice of the counterfactual in this analysis is motivated by the aim of emphasising household groups living in disadvantaged areas.

of household characteristics to inequality at the θ^{th} unconditional quantile, denoted *endowment effect*. The second term of the right-hand side of the equation represents the inequality due to differences (or discrimination) in returns to the household characteristics at the θ^{th} unconditional quantile,

The *endowment* and *return* effects can be further decomposed into the contribution of individual specific households characteristics (or group of some characteristics) as follows:

$$\hat{Q}^{i}_{\theta} - \hat{Q}^{*}_{\theta} = \sum_{k} \left(\bar{X}^{i}_{k} - \bar{X}^{i'}_{k} \right) \hat{\beta}^{i}_{\theta,k}$$

$$\text{and} \quad \hat{Q}^{*}_{\theta} - \hat{Q}^{i'}_{\theta} = \sum_{k} \bar{X}^{i'}_{k} \left(\hat{\beta}_{\theta,k}{}^{i} - \hat{\beta}_{\theta}{}^{i'}_{,k} \right) \; k : 1 \ldots K \qquad (3)$$

where *k* designates the individual specific household characteristics.

Tables 4-1 to 4-3 below, present the estimation results of equation (1) for the survey years 2001, 2007 and 2011/12, respectively. The decomposition results of equations (2) and (3) are summarized in tables 4-4 and 4-5.

Table 4-1 Estimated Coefficients for Unconditional Quantile Regression Model, 2001

	2001											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
HH size	−0.056***	−0.065***	−0.062***	−0.062***	−0.044***	−0.057***	−0.068**	−0.08***	−0.084***	−0.057***	−0.048***	−0.05***
	−(4.580)	−(12.200)	−(8.570)	−(4.840)	−(7.510)	−(7.060)	−(3.310)	−(6.800)	−(5.160)	−(4.750)	−(8.640)	−(7.620)
pch14	−0.402***	−0.576***	−1.09***	−0.437**	−0.671***	−1.313***	−0.099	−0.346*	−0.932**	−0.448***	−0.653***	−1.183***
	−(4.120)	−(7.670)	−(9.510)	−(3.210)	−(9.220)	−(8.270)	−(0.550)	−(1.850)	−(3.370)	−(3.830)	−(10.000)	−(9.590)
peld65	0.038	−0.498**	−0.888***	−0.36	−0.35**	−0.283	0.659	−0.832**	−1.674***	−0.246	−0.222	−0.262
	(0.140)	−(3.470)	−(4.740)	−(1.190)	−(2.420)	−(0.900)	(1.230)	−(2.350)	−(4.060)	−(0.900)	−(1.600)	−(1.020)
Male head	−0.005	−0.096**	0.17**	−0.044	−0.003	0.263**	0.068	−0.121	0.249	−0.052	0.003	0.24**
	−(0.060)	−(2.210)	(2.490)	−(0.400)	−(0.060)	(2.130)	(0.590)	−(1.080)	(1.410)	−(0.570)	(0.060)	(2.790)
Head over 65 yrs	−0.192	0.02	0.144**	0.078	0.096	−0.025	−0.527	−0.032	0.481**	0.028	0.053	−0.025
	−(1.390)	(0.350)	(2.330)	(0.610)	(1.430)	−(0.250)	−(1.510)	−(0.220)	(2.740)	(0.240)	(0.850)	−(0.320)
Marital status (Omitted=married)												
Never Married	0.091	0.026	0.601***	−0.057	0.124**	0.698**	0.036	0.106	0.636**	−0.031	0.104**	0.733***
	(1.210)	(0.570)	(6.020)	−(0.680)	(2.250)	(3.300)	(0.250)	(0.890)	(2.850)	−(0.460)	(2.230)	(4.830)
Divorced	0.087	0.114**	0.311***	−0.055	0.094*	0.463***	0.419***	0.32**	0.359**	−0.021	0.062	0.408***
	(1.050)	(2.410)	(4.250)	−(0.450)	(1.780)	(3.660)	(3.570)	(2.990)	(2.070)	−(0.210)	(1.310)	(4.440)
Widowed	0.049	−0.021	0.182**	−0.022	−0.003	0.295*	0.349*	−0.043	0.279	0.009	−0.051	0.248*
	(0.420)	−(0.330)	(2.240)	−(0.180)	−(0.040)	(1.720)	(1.850)	−(0.290)	(1.240)	(0.090)	−(0.760)	(1.930)
Max. Education	0.022**	0.019***	0.023**	0.003	0.012**	0.032**	0.021*	0.03**	0.025	0.007	0.012**	0.027***
	(3.310)	(4.020)	(3.220)	(0.350)	(2.100)	(3.320)	(1.810)	(2.970)	(1.530)	(0.830)	(2.400)	(3.930)
Sector of Employment (Omitted= Farming & Fishing)												
Government	0.073	0.238**	0.31	0.072	0.225**	0.711**	0.302	0.247	−0.145	0.079	0.202**	0.345*
	(0.950)	(3.480)	(1.620)	(0.520)	(2.360)	(2.330)	(1.200)	(1.210)	−(0.580)	(0.770)	(2.800)	(1.750)
Private & NGO	0.128*	0.208***	0.165**	−0.119	0.108	0.212	0.361	0.357**	−0.024	−0.068	0.106**	0.205
	(1.790)	(3.590)	(2.040)	−(0.770)	(1.500)	(1.010)	(1.420)	(2.430)	−(0.130)	−(0.660)	(1.980)	(1.550)
Self-emp.(others)	0.072	0.281***	0.151	0.212	0.152	0.068	0.111	0.434**	0.075	0.104	0.136	0.16
	(0.680)	(3.760)	(1.440)	(1.430)	(1.050)	(0.350)	(0.410)	(2.380)	(0.430)	(1.090)	(1.390)	(0.960)

(continues to next page)

Table 4-1 Estimated Coefficients for Unconditional Quantile Regression Model, 2001 *(continued)*

	2001											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Self-emp. (alone)	0.075	0.211***	0.119**	−0.031	0.055	0.212	0.299	0.29**	0.039	−0.028	0.06	0.089
	(1.050)	(4.380)	(2.180)	−(0.340)	(1.000)	(1.640)	(1.220)	(2.060)	(0.260)	−(0.470)	(1.410)	(1.110)
HH duties	−0.012	0.045	−0.063	−0.083	−0.133*	−0.084	0.029	−0.256	−0.269	−0.101	−0.096	−0.122**
	−(0.100)	(0.650)	−(0.870)	−(0.490)	−(1.740)	−(1.160)	(0.090)	−(1.280)	−(1.260)	−(0.750)	−(1.440)	−(2.240)
Unemployed	0.09	0.192**	−0.012	−0.061	−0.036	0.071	0.34	0.371**	−0.055	−0.049	−0.008	0.04
	(0.830)	(2.830)	−(0.180)	−(0.550)	−(0.520)	(0.440)	(1.330)	(2.310)	−(0.300)	−(0.500)	−(0.130)	(0.310)
Main source of income (Omitted= Income from agricultural HH business)												
No Income	−0.518*	−0.185	−0.114	−1.164**	−0.333**	0.243	−0.601	−0.186	−0.309	−0.916**	−0.333**	0.169
	−(1.730)	−(1.420)	−(0.480)	−(2.400)	−(2.970)	(0.410)	−(1.270)	−(0.590)	−(1.320)	−(2.410)	−(3.300)	(0.380)
Cash & in kind from employment	0.062	0.006	−0.014	−0.036	−0.068	0.006	0.165	−0.175	0.031	−0.041	−0.027	0.062
	(0.720)	(0.100)	−(0.210)	−(0.220)	−(1.170)	(0.040)	(0.620)	−(0.940)	(0.150)	−(0.340)	−(0.550)	(0.590)
Non-agricultural HH business	0.106	0.019	0.093*	0.03	0.089**	0.156*	0.249	−0.161	0.102	0.03	0.07*	0.135**
	(1.210)	(0.410)	(1.950)	(0.410)	(2.260)	(1.910)	(0.930)	−(0.890)	(0.530)	(0.440)	(1.880)	(2.110)
Agr. & nonagric. Cooperatives	−0.17	−0.008	−0.017	0.316*	−0.042	−0.12	0.566*	−0.543**	0.139	0.305*	−0.02	−0.085
	−(0.540)	−(0.070)	−(0.110)	(1.790)	−(0.220)	−(0.800)	(1.810)	−(2.680)	(0.570)	(1.860)	−(0.110)	−(0.720)
Transfer & assistance	0.06	0.058	0.149	0.155**	−0.027	−0.17**	0.289	0.102	0.44	0.165**	−0.02	−0.138**
	(0.490)	(0.820)	(1.390)	(2.300)	−(0.420)	−(2.320)	(1.020)	(0.440)	(1.480)	(2.690)	−(0.350)	−(2.440)
Other	0.135	−0.119	−0.134	0.168	−0.121	0.228	0.272	−0.222	−0.085	0.124	−0.114	−0.007
	(1.230)	−(1.110)	−(1.180)	(1.040)	−(0.950)	(0.780)	(0.910)	−(0.800)	−(0.350)	(1.170)	−(1.320)	−(0.040)
Source of lighting (Omitted= Kerosene)												
Electricity	0.105**	0.188***	0.314***	−0.115	0.126	0.267	−0.052	0.079	0.07	−0.021	0.149**	0.455***
	(2.190)	(4.730)	(4.320)	−(0.690)	(1.170)	(1.320)	−(0.590)	(0.890)	(0.880)	−(0.380)	(3.400)	(4.340)
Firewood	−0.566*	−0.124	0.123	0.079	−0.07	0.045	−0.648	−0.2	−0.006	0.088	−0.107**	0.073
	−(1.870)	−(1.280)	(0.750)	(0.840)	−(1.250)	(0.500)	−(1.540)	−(0.960)	−(0.020)	(0.970)	−(2.140)	(0.920)
No of sleeping rooms	0.059	−0.014	−0.013	0.157**	0.076*	0.033	0.142	−0.044	0.076	0.13**	0.037	0.016
	(1.040)	−(0.400)	−(0.180)	(2.420)	(1.780)	(0.390)	(1.520)	−(0.530)	(0.620)	(2.290)	(0.980)	(0.240)
Dwelling roof (metal & concrete)	0.269**	0.163***	0.021	0.259***	0.228***	0.301***	−0.187*	−0.299**	−1.095**	0.218***	0.264***	0.225***
	(3.290)	(4.830)	(0.290)	(5.230)	(6.230)	(3.950)	−(1.830)	−(2.100)	−(2.150)	(4.070)	(7.860)	(3.830)

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Table 4-1 Estimated Coefficients for Unconditional Quantile Regression Model, 2001 *(continued)*

	2001											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Area of land	0.202* (1.77)	0.103 (1.02)	0.276 (1.08)	0.088 (1.18)	0.076* (1.85)	0.185* (1.78)	0.285 (0.39)	0.119 (1.16)	0.700 (0.350)	0.097 (1.40)	0.091** (2.11)	0.190* (1.89)
Well	0.193* (1.880)	–0.116 –(0.710)	–0.042 –(0.360)	0.398*** (4.470)	0.054 (0.820)	0.164 (1.250)	0.142 (1.340)	0.861*** (5.760)	–0.545** –(2.210)	0.394*** (5.040)	0.082 (1.280)	0.003 (0.030)
Livestock	0.074 (1.030)	0.085* (1.940)	0.124 (1.360)	–0.043 –(0.690)	0.008 (0.250)	–0.038 –(0.650)	0.171 (1.640)	0.03 (0.240)	0.789* (1.740)	–0.064 –(1.090)	0.013 (0.420)	0.006 (0.140)
Radio	0.379*** (5.670)	0.233*** (6.430)	0.03 (0.500)	0.155** (2.240)	0.101** (2.930)	0.154** (2.560)	0.166 (1.510)	0.17* (1.970)	0.129 (1.230)	0.178** (2.820)	0.112** (3.460)	0.125** (2.600)
Computer	0.118 (1.290)	0.279 (1.620)	0.331 (1.530)	0.292*** (5.390)	–0.149 –(1.160)	–0.275* –(1.660)	0.045 (0.460)	0.159 (0.840)	0.509 (1.090)	0.254*** (5.050)	–0.056 –(0.440)	–0.236* –(1.910)
Bicycle	0.075 (1.640)	0.074** (2.410)	0.217** (2.830)	0.21** (2.750)	0.076** (2.170)	0.083 (1.330)	0.063 (0.720)	–0.02 –(0.210)	0.065 (0.490)	0.19** (2.820)	0.074** (2.330)	0.086* (1.750)
Tel (land line)	0.02 (0.360)	0.276*** (4.610)	1.056*** (5.630)	–0.081 –(0.510)	–0.157 –(1.160)	1.33** (2.900)	0.175** (2.300)	0.468*** (4.540)	0.888*** (3.710)	–0.1 –(1.290)	0.065 (1.290)	1.137*** (7.080)
Geographic Zone (Omitted=Lake)												
Coastal	0.19** (3.010)	–0.043 –(1.180)	–0.119** –(2.350)	0.232** (3.380)	0.002 (0.040)	–0.189** –(2.090)				0.237*** (3.890)	–0.024 –(0.580)	–0.166** –(2.440)
North. Highland	0.149** (2.290)	–0.021 –(0.370)	–0.156* –(1.680)	0.167* (1.700)	0.004 (0.070)	–0.314** –(3.440)				0.188** (2.110)	–0.007 –(0.140)	–0.257*** –(3.670)
Central	0.146* (1.770)	–0.012 –(0.260)	–0.09 –(1.040)	–0.023 –(0.220)	–0.257*** –(6.060)	–0.382*** –(5.290)				–0.005 –(0.050)	–0.245*** –(5.920)	–0.262*** –(4.380)
South. Highland	0.253*** (3.820)	0.077 (1.330)	–0.051 –(0.360)	0.147** (2.190)	–0.042 –(0.930)	–0.057 –(0.610)				0.164** (2.690)	–0.019 –(0.450)	–0.05 –(0.670)
South	0.083 (1.000)	0.091** (2.490)	–0.146** –(2.350)	–0.007 –(0.080)	–0.127** –(2.580)	0.025 (0.250)				–0.014 –(0.170)	–0.09** –(2.060)	–0.005 –(0.070)

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Table 4-1 Estimated Coefficients for Unconditional Quantile Regression Model, 2001 *(continued)*

	2001											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Constant	8.062***	9.413***	10.39***	8.591***	9.472***	10.277***	8.501***	9.927***	11.507***	8.55***	9.462***	10.225***
	(47.700)	(115.970)	(94.960)	(57.220)	(125.810)	(57.610)	(22.720)	(32.690)	(18.760)	(66.110)	(132.080)	(78.810)
No of Obs.	14,550	14,550	14,550	7,622	7,622	7,622	11,067	11,067	11,067	21,005	21,005	21,005
Adjust_R2	0.135	0.274	0.17	0.104	0.189	0.133	0.148	0.271	0.233	0.103	0.216	0.148

Source: Household Budget Surveys (HBS) for 2001. * Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.
Numbers in parentheses are Student-t.

Table 4-2 Estimated Coefficients for Unconditional Quantile Regression Model, 2007

	2007											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
HH size	−0.069***	−0.043***	−0.07***	−0.06***	−0.049***	−0.055***	−0.113***	−0.07***	−0.09***	−0.046***	−0.039***	−0.055***
	−(4.740)	−(6.180)	−(9.560)	−(4.210)	−(8.710)	−(7.110)	−(5.090)	−(7.740)	−(6.440)	−(3.870)	−(5.550)	−(8.040)
pch14	−0.716***	−0.772***	−1.158***	−0.648***	−0.629***	−0.915***	−0.503**	−0.731***	−1.119***	−0.675***	−0.655***	−1.131***
	−(5.700)	−(13.370)	−(12.280)	−(5.070)	−(9.090)	−(8.280)	−(3.160)	−(8.140)	−(6.390)	−(6.200)	−(10.010)	−(11.550)
peld65	0.555	−0.169	−0.843***	−0.36	−0.149	0.451**	0.58	−0.375	−0.981**	−0.259	−0.055	0.324
	(1.460)	−(1.190)	−(4.370)	−(1.630)	−(1.330)	(2.040)	(1.310)	−(1.390)	−(3.410)	−(1.300)	−(0.510)	(1.560)
Male head	0.051	−0.011	0.081	−0.12	−0.035	0.043	0.155	0.072	−0.06	−0.106	−0.023	0.067
	(0.570)	−(0.340)	(1.590)	−(1.460)	−(0.840)	(0.610)	(1.300)	(1.500)	−(0.680)	−(1.560)	−(0.670)	(1.120)
Head over 65	−0.191	−0.041	0.173**	0.154	0.066	−0.095	−0.285	0.028	0.058	0.179	0.048	−0.035
	−(0.930)	−(0.600)	(2.260)	(1.100)	(0.950)	−(1.100)	−(1.160)	(0.270)	(0.470)	(1.410)	(0.700)	−(0.430)
Marital status (Omitted=married)												
Never Married	−0.163	0.116**	0.519***	0.065	0.015	0.368**	−0.052	0.171**	0.315**	−0.075	0.052	0.529***
	−(1.240)	(2.510)	(6.160)	(0.520)	(0.220)	(2.600)	−(0.480)	(3.270)	(2.870)	−(0.740)	(1.030)	(4.800)
Divorced	−0.006	0.058	0.281***	0.05	0.017	0.08	−0.485**	0.149*	0.345**	0.038	−0.002	0.19**
	−(0.040)	(1.080)	(3.600)	(0.430)	(0.250)	(0.830)	−(2.070)	(1.950)	(2.490)	(0.400)	−(0.040)	(2.260)
Widowed	0.017	0.076*	0.165**	−0.009	−0.014	0.091	0.111	0.243***	0.132	0.016	0.004	0.137*
	(0.150)	(1.690)	(2.640)	−(0.080)	−(0.260)	(1.140)	(0.690)	(3.490)	(1.050)	(0.180)	(0.090)	(1.940)
Max Education	0.033**	0.02***	0.05***	0.028**	0.014**	0.015*	0.045***	0.03***	0.091***	0.026**	0.014**	0.017**
	(3.050)	(4.760)	(6.740)	(2.620)	(3.070)	(1.860)	(3.940)	(4.420)	(6.980)	(2.760)	(3.420)	(2.460)
Experience	−0.002	0	0.002	−0.001	−0.001	−0.003	0.006	0.002	0.009**	−0.002	−0.001	−0.004**
	−(0.750)	−(0.390)	(0.800)	−(0.350)	−(0.500)	−(1.520)	(1.320)	(1.060)	(2.630)	−(0.880)	−(0.770)	−(2.480)
Sector of Employment (Omitted= Farming & Fishing)												
Government	0.249*	0.244***	0.096	−0.112	0.146*	0.586**	−0.185	0.255**	0.075	−0.069	0.193**	0.338**
	(1.940)	(4.060)	(0.990)	−(1.090)	(1.870)	(2.460)	−(0.780)	(2.200)	(0.400)	−(0.850)	(3.430)	(2.370)
Private & NGO	0.235**	0.109**	0.117*	0.05	0.114	−0.037	−0.112	0.181*	0.015	0.031	0.115**	0.108
	(1.970)	(2.370)	(1.820)	(0.560)	(1.530)	−(0.390)	−(0.520)	(1.750)	(0.120)	(0.460)	(2.370)	(1.340)

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Table 4-2 Estimated Coefficients for Unconditional Quantile Regression Model, 2007 *(continued)*

	2007											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Self-emp.(Others)	0.17	0.046	0.268**	0.095	0.18*	0.287	0.011	0.286**	0.132	0.075	0.139**	0.321**
	(1.450)	(0.830)	(2.480)	(1.600)	(1.820)	(1.370)	(0.060)	(2.370)	(0.800)	(1.310)	(2.130)	(2.170)
Self-emp. (Alone)	0.252**	0.045	0.037	–0.018	0.045	0.175**	0.014	0.138	–0.007	–0.03	0.069*	0.086
	(2.770)	(1.100)	(0.800)	–(0.190)	(0.960)	(2.340)	(0.070)	(1.350)	–(0.060)	–(0.390)	(1.890)	(1.470)
HH duties	–0.251	–0.119	–0.001	0.075	–0.135	–0.029	–0.22	0.01	–0.137	–0.024	–0.065	0.124
	–(0.810)	–(1.420)	–(0.010)	(0.210)	–(0.840)	–(0.190)	–(0.670)	(0.090)	–(1.020)	–(0.080)	–(0.480)	(0.820)
Unemployed	–0.158	–0.039	–0.016	–0.233*	–0.084	–0.024	–0.216	0.051	–0.017	–0.188*	–0.016	–0.026
	–(1.000)	–(0.700)	–(0.250)	–(1.800)	–(1.510)	–(0.360)	–(0.950)	(0.480)	–(0.120)	–(1.660)	–(0.280)	–(0.440)
Main source of income (Omitted= Income from nonagricultural HH business)												
No Income	0.021	–0.202**	–0.401***	–0.726*	–0.239**	–0.259**	–0.009	–0.436***	–0.508***	–0.431	–0.158*	–0.267**
	(0.070)	–(2.290)	–(3.640)	–(1.660)	–(2.020)	–(2.130)	–(0.040)	–(3.990)	–(4.080)	–(1.420)	–(1.720)	–(2.500)
Cash & in kind	–0.208**	–0.123**	–0.155**	0.027	–0.074	–0.216**	0.094	–0.079	–0.01	–0.082	–0.099**	–0.184**
employment	–(2.520)	–(3.320)	–(2.960)	(0.300)	–(1.400)	–(2.380)	(0.820)	–(1.560)	–(0.130)	–(1.180)	–(2.430)	–(2.560)
Agricultural HH business	–0.175*	–0.079**	0.093	–0.128**	–0.133***	–0.118**	0.014	–0.013	–0.028	–0.113**	–0.093**	–0.079*
	–(1.810)	–(2.000)	(1.510)	–(2.140)	–(4.060)	–(2.250)	(0.080)	–(0.110)	–(0.150)	–(2.160)	–(3.110)	–(1.780)
Agr. & nonagric. Coop.	0.281**	–0.035	0.18	–0.124	–0.347**	–0.442***	0.387	–0.043	0.828	–0.091	–0.328*	–0.374***
	(2.060)	–(0.130)	(0.580)	–(0.390)	–(1.980)	–(4.540)	(1.340)	–(0.170)	(1.270)	–(0.300)	–(1.840)	–(4.040)
Transfer & assistance	–0.081	0.031	0.216**	0.123	–0.008	–0.048	–0.253	–0.155*	0.18	0.007	0.005	0.152
	–(0.660)	(0.630)	(2.740)	(1.130)	–(0.120)	–(0.400)	–(1.170)	–(1.770)	(1.250)	(0.090)	(0.100)	(1.520)
Other	–0.006	–0.114	–0.156	–0.533	–0.297**	–0.11	–0.194	–0.197**	–0.223**	–0.272	–0.205**	–0.011
	–(0.040)	–(1.590)	–(1.390)	–(1.500)	–(2.060)	–(0.490)	–(1.000)	–(2.520)	–(2.340)	–(1.170)	–(2.240)	–(0.060)
Source of lighting (Omitted= Kerosene)												
Electricity	0.07	0.172***	0.306***	–0.115	0.163**	0.796**	0.256***	0.202***	0.101	–0.044	0.109**	0.61***
	(1.520)	(5.700)	(6.710)	–(1.490)	(2.580)	(2.990)	(3.840)	(5.230)	(1.370)	–(1.220)	(3.320)	(5.670)
Firewood	–0.262	0.209**	0.588***	0.081	–0.038	0.238**	–0.093	–0.029	–0.155	0.069	–0.013	0.344***
	–(1.500)	(3.260)	(3.860)	(0.760)	–(0.750)	(2.670)	–(0.380)	–(0.310)	–(1.610)	(0.670)	–(0.230)	(4.310)

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Table 4-2 Estimated Coefficients for Unconditional Quantile Regression Model, 2007 *(continued)*

	2007											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Dwelling Roof	0.424***	0.066*	–0.025	0.17***	0.073**	0.095**	0.025	0.06	0.176	0.157***	0.089**	0.061*
	(3.700)	(1.750)	–(0.670)	(3.510)	(2.570)	(2.370)	(0.120)	(0.480)	(1.240)	(3.540)	(3.390)	(1.780)
livestock	0.271***	0.096**	0.097	0.181**	0.125***	0.014	0.027	0.078	0.359	0.209***	0.126***	0.063*
	(3.530)	(2.490)	(1.570)	(3.440)	(4.450)	(0.330)	(0.200)	(0.680)	(0.980)	(4.470)	(4.810)	(1.740)
Area of land	0.001	0.004***	0.004**	0.076*	0.078**	0.207***	0.447	0.387	0.437**	0.004	0.005	0.006
	(0.137)	(9.450)	(2.530)	(1.79)	(2.53)	(12.51)	(0.400)	(0.580)	(2.780)	(1.480)	(1.590)	(0.060)
well	0.242**	0.134*	0.291**	0.031	0.143**	0.389**	0.052	–0.072	0.41	0.063	0.138**	0.439**
	(1.970)	(1.730)	(2.060)	(0.200)	(2.000)	(2.680)	(0.310)	–(0.510)	(0.920)	(0.520)	(2.120)	(3.370)
cell	0.264***	0.292***	0.232***	0.14**	0.297***	0.397***	0.205**	0.173***	0.165**	0.147**	0.318***	0.439***
	(4.290)	(10.260)	(6.690)	(2.640)	(7.410)	(5.070)	(2.210)	(4.100)	(3.470)	(3.460)	(9.770)	(7.410)
bicycle	0.239***	0.118***	0.038	0.103*	0.106***	0.104**	0.228**	0.14**	–0.021	0.144**	0.116***	0.108**
	(4.220)	(4.080)	(0.900)	(1.850)	(3.780)	(2.290)	(2.260)	(2.440)	–(0.250)	(3.090)	(4.810)	(2.910)
radio	0.255***	0.063**	0.024	0.273***	0.128***	0.092**	0.294**	0.022	–0.055	0.248***	0.138***	0.098**
	(3.530)	(2.320)	(0.710)	(4.270)	(4.420)	(2.320)	(3.190)	(0.560)	–(0.910)	(4.480)	(5.360)	(3.040)
computer	–0.143**	0.121**	1.422***	–0.378**	–0.262*	1.447**	–0.06	0.183**	1.493***	–0.093	0.022	1.843***
	–(2.160)	(2.350)	(5.890)	–(2.410)	–(1.920)	(2.800)	–(0.860)	(2.900)	(5.760)	–(1.170)	(0.360)	(4.640)
Geographic Zone (Omitted=Coastal)												
North. Highland	–0.141	–0.061	0.006	–0.201**	–0.15**	0.135				–0.221**	–0.132**	0.109
	–(1.380)	–(1.510)	(0.090)	–(2.240)	–(2.700)	(1.150)				–(3.040)	–(2.870)	(1.170)
Lake	–0.265***	0.023	0.124**	–0.176**	–0.201***	–0.045				–0.195**	–0.183***	0.052
	–(3.670)	(0.680)	(2.460)	–(2.640)	–(5.090)	–(0.720)				–(3.320)	–(4.780)	(1.030)
Central	–0.192*	–0.153**	–0.059	–0.184**	–0.287***	–0.074				–0.193**	–0.253***	–0.047
	–(1.950)	–(2.720)	–(0.820)	–(2.090)	–(6.040)	–(1.030)				–(2.600)	–(6.060)	–(0.800)
South. Highland	0.123*	–0.023	0.041	–0.029	–0.072*	0.196**				–0.06	–0.07*	0.208**
	(1.740)	–(0.570)	(0.670)	–(0.470)	–(1.670)	(2.570)				–(1.080)	–(1.810)	(3.430)
South	–0.644***	–0.198***	0.001	–0.273**	–0.282***	–0.121				–0.284***	–0.283***	–0.085
	–(4.990)	–(5.000)	(0.010)	–(3.100)	–(5.980)	–(1.510)				–(3.740)	–(6.770)	–(1.300)

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Table 4-2 Estimated Coefficients for Unconditional Quantile Regression Model, 2007 *(continued)*

	2007											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Constant	9.003***	10.235***	11.016***	9.486***	10.319***	11.121***	9.109***	10.081***	10.671***	9.497***	10.238***	11.156***
	(42.880)	(125.080)	(83.240)	(57.970)	(121.230)	(79.790)	(27.210)	(55.630)	(52.580)	(66.780)	(133.310)	(91.430)
No of Obs.	7,119	7,119	7,119	3, 345	3, 346	3, 347	3,456	3,456	3, 456	7,008	7,008	7,008
Adjust_R2	0.177	0.423	0.292	0.207	0.116	(0.236)	0.184	0.287	0.226	0.109	0.248	0.196

Source: Household Budget Surveys (HBS) for 2007. * Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.
Numbers in parentheses are Student-t.

Table 4-3 Estimated Coefficients for Unconditional Quantile Regression Model, 2011/12

	2011/12											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
HH size	−0.087***	−0.057***	−0.061***	−0.022**	−0.026***	−0.025**	−0.086***	−0.064***	−0.059***	−0.032***	−0.029***	−0.022**
	−(5.150)	−(7.650)	−(6.170)	−(3.470)	−(5.030)	−(2.440)	−(4.980)	−(5.510)	−(4.550)	−(4.250)	−(5.590)	−(2.020)
pch14	−0.172	−0.651***	−1.01***	−0.458***	−0.721***	−0.935***	−0.279**	−0.732***	−0.804***	−0.434***	−0.674***	−1.082***
	−(1.430)	−(9.600)	−(9.900)	−(6.140)	−(12.250)	−(9.190)	−(2.560)	−(9.200)	−(5.620)	−(5.790)	−(13.030)	−(12.160)
peld65	−0.387	−0.131	−0.557**	−0.085	−0.004	0.42**	0.049	−0.269	−0.618**	−0.072	0.047	0.053
	−(0.970)	−(0.830)	−(2.520)	−(0.770)	−(0.040)	(2.210)	(0.130)	−(1.100)	−(2.090)	−(0.590)	(0.520)	(0.310)
Male	0.086	0.059	0.185**	−0.114**	−0.012	−0.021	0.136**	0.091**	0.175**	−0.073	0.037	−0.02
	(1.090)	(1.290)	(3.190)	−(2.330)	−(0.280)	−(0.390)	(2.000)	(2.080)	(2.400)	−(1.600)	(1.060)	−(0.420)
old	0.188	0.057	0.13	0.031	0.044	−0.046	−0.173	0.133	0.262**	0.086	0.046	0.079
	(0.990)	(0.800)	(1.370)	(0.460)	(0.760)	−(0.540)	−(0.950)	(1.440)	(2.040)	(1.100)	(0.870)	(1.030)
Marital status (Omitted=married)												
Never Married	−0.05	0.114**	0.72***	−0.096	−0.015	0.534***	−0.008	0.129**	0.657***	−0.069	−0.009	0.545***
	−(0.410)	(1.980)	(7.030)	−(1.000)	−(0.270)	(3.890)	−(0.150)	(2.340)	(5.830)	−(0.980)	−(0.170)	(4.800)
Divorced	−0.095	0.112*	0.276**	−0.127	−0.007	0.2**	0.062	0.068	0.195*	−0.187*	0.017	0.185**
	−(0.760)	(1.770)	(2.900)	−(1.370)	−(0.120)	(2.090)	(0.670)	(1.050)	(1.830)	−(1.920)	(0.330)	(2.100)
Widowed	0.226**	−0.021	0.118*	−0.015	0.073	0.101	−0.159*	0.057	0.17*	−0.014	0.074	0.069
	(2.180)	−(0.410)	(1.730)	−(0.260)	(1.340)	(1.630)	−(1.690)	(0.910)	(1.910)	−(0.250)	(1.600)	(1.240)
maxedu	0	0.015**	0.029***	0.001	0.016***	0.03***	0.022**	0.026***	0.039***	−0.001	0.013***	0.025***
	(0.030)	(3.110)	(3.750)	(0.240)	(3.940)	(4.290)	(3.060)	(4.830)	(3.840)	−(0.140)	(3.790)	(3.800)
hdexp	−0.003	0	0.001	0	−0.001	−0.002	0.003	−0.002	0	−0.002	−0.001	−0.002
	−(1.150)	−(0.250)	(0.380)	(0.200)	−(0.830)	−(0.940)	(1.180)	−(1.000)	−(0.110)	−(1.070)	−(1.420)	−(1.310)
Migration Status (Omitted= non migrant)												
Recent Migrant	−0.151*	0.089*	0.244**	−0.07	−0.047	0.291**	−0.146*	0.061	0.207	−0.089	−0.01	0.235**
(below 5 yrs)	−(1.960)	(1.700)	(2.600)	−(0.800)	−(0.640)	(2.280)	−(1.910)	(1.030)	(1.590)	−(1.280)	−(0.190)	(2.270)
btw 5 & 15 yrs	−0.065	0.102**	0.156**	0.038	0.017	0.212	−0.082	0.031	0.117	−0.023	0.036	0.312**
	−(1.050)	(2.180)	(2.230)	(0.560)	(0.270)	(1.620)	−(1.250)	(0.620)	(1.220)	−(0.380)	(0.810)	(2.760)
Above 15 yrs	0.078	0.057	0.086	0.076	−0.05	0.066	−0.083	0.026	0.044	0.085**	−0.015	0.118*
	(1.410)	(1.400)	(1.470)	(1.580)	−(1.160)	(1.010)	−(1.430)	(0.600)	(0.590)	(2.040)	−(0.440)	(1.940)
Total migrants	0.056**	0.015	0.003	0.024*	0.017	−0.009	0.014	0.003	0.025	0.033**	0.02**	0.001
HH members	(3.180)	(1.270)	(0.140)	(1.960)q	(1.560)	−(0.650)	(0.630)	(0.220)	(0.860)	(2.750)	(2.250)	(0.060)
Sector of Employment (Omitted=Self Employed alone)												
Government	0.159*	0.11**	0.31**	0.12**	0.206**	0.483**	−0.025	0.074	0.299	0.171***	0.146**	0.38**
	(1.840)	(2.140)	(2.340)	(2.340)	(3.320)	(2.980)	−(0.390)	(1.010)	(1.410)	(3.750)	(2.910)	(3.140)
Private & NGO	0.092*	0.077*	0.322***	0.037	0.013	0.214	−0.026	0.065	0.165	0.093*	0.063	0.212*
	(1.690)	(1.840)	(4.020)	(0.440)	(0.190)	(1.410)	−(0.450)	(1.360)	(1.570)	(1.780)	(1.440)	(1.920)
Self-emp.	−0.09	0.076*	0.21**	0.043	0.001	0.273**	−0.082	0.115**	0.114	0.022	−0.009	0.215**
(Others)	−(1.180)	(1.820)	(3.010)	(0.770)	(0.010)	(2.130)	−(1.010)	(2.180)	(1.120)	(0.450)	−(0.220)	(2.330)
HH duties	0.024	0.027	0.079	0.162*	0.031	0.092	−0.054	0.049	0.099	0.156**	0.049	0.158
	(0.300)	(0.540)	(1.060)	(1.730)	(0.400)	(0.710)	−(0.690)	(0.880)	(1.070)	(2.410)	(0.890)	(1.430)

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Table 4-3 Estimated Coefficients for Unconditional Quantile Regression Model ... *(continued)*

	2011/12											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Unemployed	0.049	−0.057	−0.029	0.07*	−0.032	−0.063	0.05	0.003	−0.04	0.048	−0.012	−0.114**
	(0.580)	−(1.400)	−(0.520)	(1.680)	−(0.880)	−(1.310)	(0.550)	(0.050)	−(0.450)	(1.090)	−(0.400)	−(2.910)
Main source of income (Omitted=Cash & inkind from employment)												
Nonagr. HH businesses (manuf.)	0.08	0.002	0.165*	0.125*	0.179**	0.315**	−0.087	−0.041	0.095	0.186**	0.196**	0.117
	(0.910)	(0.030)	(1.710)	(1.810)	(2.750)	(2.690)	−(0.750)	−(0.520)	(0.910)	(2.700)	(3.260)	(1.390)
Nonagr. HH businesses (sales)	0.13**	0.086**	0.305***	0.131**	0.168**	0.293**	−0.02	0.048	0.2*	0.138**	0.153***	0.318***
	(2.230)	(2.140)	(3.810)	(2.310)	(3.090)	(2.860)	−(0.310)	(1.000)	(1.830)	(2.680)	(3.680)	(3.740)
Nonagr. HH business (services)	0.133*	−0.072	0.256**	−0.011	0.021	0.046	−0.061	−0.072	0.209*	0.04	0.052	0.121
	(1.950)	−(1.440)	(2.260)	−(0.120)	(0.320)	(0.470)	−(0.620)	−(1.240)	(1.950)	(0.510)	(0.990)	(1.380)
Agric. HH business	−0.06	−0.047	0.102	0.075	0.05	0.093	−0.175	−0.234**	−0.261	0.09*	0.037	0.047
	−(0.490)	−(0.790)	(1.210)	(1.540)	(1.280)	(1.490)	−(0.890)	−(2.480)	−(1.540)	(1.860)	(1.090)	(0.840)
Transfer & assistance	0.09	−0.05	0.087	−0.026	0.001	0.134**	−0.152**	−0.052	0.095	0.023	0.008	0.091
	(1.140)	−(1.170)	(1.320)	−(0.460)	(0.030)	(2.050)	−(2.170)	−(1.010)	(0.830)	(0.460)	(0.250)	(1.510)
Other	−0.208*	−0.085*	0.17**	−0.148	0.034	0.24*	−0.096	−0.051	0.235*	−0.188	−0.037	0.095
	−(1.810)	−(1.940)	(2.010)	−(1.120)	(0.500)	(1.790)	−(1.080)	−(0.860)	(1.790)	−(1.610)	−(0.720)	(1.160)
Source of lighting (Omitted= Kerosene)												
Electricity	0.219***	0.224***	0.22***	0.003	0.076	0.463**	0.248***	0.198***	0.103**	0.014	0.129***	0.491***
	(5.180)	(7.250)	(4.980)	(0.060)	(1.580)	(3.390)	(4.390)	(5.280)	(1.970)	(0.390)	(4.250)	(6.510)
Firewood	0.045	−0.023	0.155**	−0.055	−0.035	0.052	0.063	0.051	0.044	−0.047	−0.018	0.065
	(0.410)	−(0.570)	(2.300)	−(1.550)	−(1.310)	(1.160)	(0.650)	(0.940)	(0.460)	−(1.240)	−(0.720)	(1.550)
Main source of drinking water (Omitted= Public sources & well)												
Piped water inside dwelling	0.09*	0.076**	0.206**	−0.083	0.009	0.24*	0.005	0.064	0.242**	−0.053	0.046	0.188**
	(1.810)	(2.420)	(3.200)	−(0.790)	(0.150)	(1.850)	(0.120)	(1.540)	(2.390)	−(0.840)	(1.320)	(2.510)
Piped water outside dwel.	0.148**	0.025	0.018	0.041	0.059	0.054	0.043	0.018	−0.007	0.056	0.007	−0.035
	(2.630)	(0.690)	(0.350)	(0.640)	(0.680)	(0.320)	(1.000)	(0.450)	−(0.110)	(1.250)	(0.140)	−(0.420)
Dwelling roof	−0.02	0.113**	0	0.082**	0.107***	0.025	0.051	0.005	0.203	0.063*	0.11***	0.016
	−(0.140)	(2.350)	(0.000)	(2.580)	(4.350)	(0.680)	(0.250)	(0.060)	(1.410)	(1.780)	(4.780)	(0.450)
Area of Land	0	0.268**	0.170***	0.122	0.177**	0.475***	0.534	0.670	0.262**	0.179*	0.187	0.633**
	(0.030)	(2.11)	(4.14)	(1.29)	(2.28)	(4.03)	(2.14)	(1.34)	(2.14)	(1.70)	(1.62)	(2.08)
livestock	0.161**	0.048	0.077	−0.049	−0.006	−0.052	0.107*	0.081	0.221	0.026	0.021	−0.023
	(2.790)	(1.370)	(1.400)	−(1.410)	−(0.240)	−(1.360)	(1.670)	(1.520)	(1.630)	(0.750)	(1.050)	−(0.670)
Radio	0.155**	0.072**	0.004	0.042	0.029	0.029	0.112**	0.025	0.024	0.055*	0.047**	−0.007
	(2.960)	(2.810)	(0.100)	(1.360)	(1.200)	(0.740)	(2.460)	(0.810)	(0.500)	(1.760)	(2.170)	−(0.190)
computer	−0.145**	0.243***	1.543***	0.046	−0.097	0.388	0.069	0.36***	0.871***	−0.036	−0.069	0.907***
	−(3.040)	(6.770)	(9.690)	(0.680)	−(0.590)	(1.040)	(1.510)	(6.890)	(5.340)	−(0.800)	−(1.030)	(4.260)

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Table 4-3 Estimated Coefficients for Unconditional Quantile Regression Model ... *(continued)*

	2011/12											
	Urban			Rural			Metropolitan			Nonmetropolitan		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Bicycle	0.061	0.057*	0.077	0.084**	0.063**	−0.003	0.173**	0.113**	0.413**	0.074**	0.064**	0.031
	(1.000)	(1.720)	(1.400)	(2.710)	(2.450)	−(0.070)	(2.780)	(2.040)	(2.930)	(2.290)	(2.830)	(0.780)
Cell	0.24**	0.217***	0.124**	0.265***	0.189***	0.234***	0.293**	0.169***	0.085	0.255***	0.193***	0.167***
	(3.170)	(7.430)	(3.100)	(7.580)	(7.490)	(6.360)	(3.420)	(4.350)	(1.600)	(7.140)	(8.420)	(4.840)
Geographic Zone (Omitted=Coastal)												
North.	−0.08	−0.078	0.002	−0.029	0.043	−0.033	0***	0***	0***	−0.019	0.014	−0.003
Highland	−(1.510)	−(1.520)	(0.030)	−(0.540)	(0.930)	−(0.410)	(0.000)	(0.000)	(0.000)	−(0.420)	(0.350)	−(0.040)
Lake	−0.029	−0.214***	−0.098*	−0.039	−0.053	−0.046	0***	0***	0***	−0.035	−0.101**	−0.074
	−(0.610)	−(5.600)	−(1.730)	−(0.900)	−(1.360)	−(0.570)	(0.000)	(0.000)	(0.000)	−(0.930)	−(3.040)	−(1.000)
Central	−0.33***	−0.226***	−0.007	−0.004	−0.032	−0.127	0***	0***	0***	−0.017	−0.072*	−0.117
	−(4.050)	−(4.890)	−(0.080)	−(0.070)	−(0.750)	−(1.550)	(0.000)	(0.000)	(0.000)	−(0.370)	−(1.950)	−(1.620)
South.	−0.064	−0.227***	−0.082	−0.085	−0.112**	−0.007	0***	0***	0***	−0.09**	−0.125***	0.008
Highland	−(1.060)	−(5.180)	−(1.270)	−(1.620)	−(2.600)	−(0.080)	(0.000)	(0.000)	(0.000)	−(2.010)	−(3.560)	(0.100)
South	−0.92***	−0.456***	−0.219***	−0.099*	−0.148**	−0.137	0***	0***	0***	−0.225***	−0.225***	−0.243**
	−(6.430)	−(9.770)	−(3.560)	−(1.690)	−(3.180)	−(1.610)	(0.000)	(0.000)	(0.000)	−(3.620)	−(5.810)	−(3.430)
Constant	10.227***	10.85***	11.356***	10.086***	10.711***	11.297***	10.226***	11.038***	11.138***	10.108***	10.698***	11.493***
	(47.590)	(106.730)	(76.610)	(100.850)	(126.300)	(84.020)	(40.930)	(83.670)	(48.850)	(97.390)	(145.000)	(94.200)
No of Obs.	6,039	6,039	6,039	4,120	4,120	4,120	3,011	3,011	3,011	7, 148	7, 149	7, 150
Adjust_R2	0.268	0.354	0.258	0.105	0.188	0.141	0.195	0.322	0.228	0.107	0.223	0.185

Source: Household Budget Surveys (HBS) for 2011/12. * Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Numbers in parentheses are Student-t.

Table 4-4 Quantile Decomposition of Urban-Rural Real Monthly per Capita Consumption

	2001			2007			2011/12		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Observed Gap	0.327	0.390	0.452	0.243	0.385	0.470	0.257	0.427	0.641
	(0.016)	(0.010)	(0.020)	(0.026)	(0.015)	(0.025)	(0.017)	(0.014)	(0.025)
Endowment effects attributable to									
HH characteristics	0.074	0.104	0.135	0.103	0.105	0.164	0.191	0.158	0.193
	(0.006)	(0.005)	(0.008)	(0.012)	(0.007)	(0.012)	(0.015)	(0.011)	(0.021)
Head educ. & exp.	0.055	0.047	0.058	0.089	0.054	0.115	0.017	0.041	0.073
	(0.007)	(0.005)	(0.009)	(0.014)	(0.007)	(0.013)	(0.011)	(0.008)	(0.016)
Head other characteristics	0.063	0.125	0.119	0.118	0.062	0.068	0.002	0.051	0.151
	(0.015)	(0.010)	(0.018)	(0.025)	(0.013)	(0.023)	(0.016)	(0.012)	(0.024)
Asset Ownership	0.189	0.104	−0.031	0.162	0.094	0.065	0.000	0.081	0.003
	(0.021)	(0.013)	(0.025)	(0.033)	(0.017)	(0.030)	(0.024)	(0.018)	(0.036)
Source of Income	0.041	0.002	0.012	0.032	0.006	−0.083	0.027	0.020	0.003
	(0.015)	(0.009)	(0.018)	(0.025)	(0.013)	(0.023)	(0.016)	(0.012)	(0.023)
Access to basic services	0.072	0.075	0.107	0.032	0.050	0.079	0.124	0.116	0.098
	(0.009)	(0.005)	(0.010)	(0.013)	(0.007)	(0.012)	(0.014)	(0.010)	(0.020)
Geographic region	0.042	−0.010	−0.021	0.064	0.015	−0.014	0.034	0.075	0.025
	(0.006)	(0.004)	(0.007)	(0.010)	(0.005)	(0.008)	(0.011)	(0.008)	(0.014)
Total endowment	0.535	0.448	0.379	0.600	0.384	0.393	0.394	0.543	0.545
	(0.021)	(0.014)	(0.025)	(0.033)	(0.017)	(0.030)	(0.025)	(0.019)	(0.037)
Returns effects attributable to									
HH characteristics	0.088	−0.184	−0.065	0.101	−0.033	−0.247	−0.187	−0.142	−0.166
	(0.071)	(0.044)	(0.089)	(0.110)	(0.061)	(0.107)	(0.071)	(0.054)	(0.102)
Head educ. & exp.	0.095	0.035	−0.034	0.081	0.038	0.340	−0.135	0.013	0.090
	(0.027)	(0.016)	(0.034)	(0.129)	(0.070)	(0.120)	(0.083)	(0.064)	(0.119)
Head other characteristics	0.010	0.015	−0.021	−0.009	0.004	0.034	0.033	0.019	0.031
	(0.016)	(0.010)	(0.020)	(0.028)	(0.015)	(0.027)	(0.019)	(0.015)	(0.028)
Asset Ownership	0.131	0.090	0.027	0.153	−0.101	−0.158	0.131	0.083	0.094
	(0.030)	(0.019)	(0.037)	(0.056)	(0.030)	(0.054)	(0.049)	(0.037)	(0.071)
Source of Income	0.015	−0.003	0.001	−0.045	0.033	0.153	−0.045	−0.082	−0.005
	(0.014)	(0.009)	(0.018)	(0.051)	(0.028)	(0.050)	(0.046)	(0.036)	(0.066)
Access to basic services	−0.049	−0.003	0.007	−0.019	0.017	0.014	0.044	0.010	0.020
	(0.007)	(0.004)	(0.008)	(0.009)	(0.005)	(0.008)	(0.015)	(0.011)	(0.021)
Geographic region	0.036	0.055	0.038	−0.045	0.121	0.047	−0.127	−0.150	−0.026
	(0.020)	(0.013)	(0.026)	(0.051)	(0.028)	(0.050)	(0.036)	(0.028)	(0.050)
Constant	−0.534	−0.064	0.121	−0.472	−0.078	−0.106	0.148	0.136	0.058
	(0.093)	(0.058)	(0.117)	(0.182)	(0.100)	(0.176)	(0.131)	(0.100)	(0.187)
Total returns	−0.208	−0.058	0.073	−0.357	0.001	0.077	−0.138	−0.115	0.096
	(0.025)	(0.016)	(0.030)	(0.039)	(0.020)	(0.037)	(0.029)	(0.021)	(0.041)

Source: Household Budget Surveys (HBS) for 2011/12. Numbers in parentheses are Standard deviations.

Table 4-5 Quantile Decomposition of Metropolitan-Nonmetropolitan Real Monthly p.c Consumption

	2001			2007			2011/12		
	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile	10th pctile	50th pctile	90th pctile
Observed Gap	0.478	0.480	0.529	0.420	0.450	0.533	0.661	0.677	0.767
	(0.026)	(0.026)	(0.040)	(0.025)	(0.016)	(0.030)	(0.017)	(0.015)	(0.028)
Endowment effects attributable to									
HH characteristics	0.058	0.118	0.198	0.211	0.197	0.286	0.199	0.211	0.248
	(0.017)	(0.018)	(0.026)	(0.019)	(0.012)	(0.022)	(0.027)	(0.022)	(0.041)
Head educ. & exp.	0.061	0.094	0.077	0.093	0.070	0.197	0.051	0.092	0.122
	(0.024)	(0.023)	(0.036)	(0.019)	(0.011)	(0.023)	(0.015)	(0.012)	(0.024)
Head other characteristics	0.228	0.230	0.014	–0.040	0.118	0.030	–0.052	0.044	0.127
	(0.085)	(0.080)	(0.125)	(0.048)	(0.029)	(0.058)	(0.028)	(0.022)	(0.044)
Asset Ownership	–0.138	–0.204	–0.877	0.001	0.002	–0.329	–0.020	–0.027	–0.226
	(0.129)	(0.122)	(0.190)	(0.099)	(0.059)	(0.164)	(0.058)	(0.047)	(0.092)
Source of Income	0.095	–0.104	0.020	0.013	–0.031	–0.002	0.078	0.100	0.129
	(0.092)	(0.087)	(0.135)	(0.057)	(0.034)	(0.069)	(0.043)	(0.035)	(0.069)
Access to basic services	–0.002	0.049	0.038	0.118	0.092	0.050	0.143	0.116	0.073
	(0.029)	(0.027)	(0.042)	(0.021)	(0.012)	(0.025)	(0.020)	(0.016)	(0.031)
Geographic region									
Total endowment	0.302	0.185	–0.531	0.396	0.448	0.232	0.398	0.535	0.473
	(0.158)	(0.150)	(0.232)	(0.104)	(0.062)	(0.168)	(0.066)	(0.053)	(0.104)
Returns effects attributable to									
HH characteristics	0.199	–0.219	–0.188	–0.125	–0.190	–0.392	–0.175	–0.253	0.038
	(0.130)	(0.121)	(0.190)	(0.106)	(0.063)	(0.125)	(0.077)	(0.061)	(0.120)
Head educ. & exp.	0.072	0.101	–0.007	0.377	0.192	0.873	0.297	0.057	0.143
	(0.045)	(0.041)	(0.064)	(0.121)	(0.072)	(0.143)	(0.091)	(0.072)	(0.140)
Head other characteristics	0.085	0.064	0.008	–0.079	0.057	–0.024	–0.095	0.031	0.010
	(0.042)	(0.039)	(0.061)	(0.036)	(0.021)	(0.042)	(0.023)	(0.018)	(0.035)
Asset Ownership	–0.108	–0.140	–0.133	–0.015	–0.100	0.377	0.180	0.002	0.540
	(0.115)	(0.109)	(0.169)	(0.118)	(0.070)	(0.181)	(0.097)	(0.078)	(0.153)
Source of Income	0.085	–0.081	0.021	0.088	0.041	0.052	–0.173	–0.157	–0.136
	(0.070)	(0.066)	(0.103)	(0.068)	(0.041)	(0.082)	(0.058)	(0.046)	(0.090)
Access to basic services	–0.054	–0.011	–0.027	0.009	0.005	–0.061	0.054	0.025	–0.040
	(0.011)	(0.011)	(0.017)	(0.010)	(0.006)	(0.011)	(0.018)	(0.014)	(0.028)
Geographic region	–0.075	0.041	0.085	0.152	0.150	–0.044	0.055	0.092	0.071
	(0.009)	(0.006)	(0.012)	(0.029)	(0.017)	(0.032)	(0.021)	(0.016)	(0.031)
Constant	–0.031	0.537	1.290	–0.383	–0.153	–0.481	0.119	0.345	–0.334
	(0.292)	(0.273)	(0.426)	(0.195)	(0.116)	(0.232)	(0.176)	(0.141)	(0.276)
Total returns	0.175	0.295	1.060	0.024	0.002	0.301	0.263	0.143	0.294
	(0.160)	(0.151)	(0.234)	(0.105)	(0.063)	(0.170)	(0.067)	(0.054)	(0.107)

Source: Household Budget Surveys (HBS) for 2011/12. Numbers in parentheses are Standard deviations.

Appendix 5: Inequality of Opportunity: The Parametric Decomposition

Method of Decomposition

The approach to estimate the degree of opportunity inequality associated with the distribution of both consumption and income is based on the framework of Bourguignon *et al*. (2007). The method is based on the separation of the determinants of household's outcome (consumption or income), y_i, into a set of circumstances variables, denoted by the vector C_i; efforts variables, denoted by the vector E_i and unobserved factors, represented by v_i. The outcomes function can be specified as:

$$y_i = f(C_i, E_i, v_i) \qquad i: 1.....N \tag{1}$$

The circumstances variables are economically exogenous since they are outside the individual's control but effort factors may be endogenous to circumstances as an individual's actions may be influenced by its gender, parental background etc.

Equality of opportunity occurs, in the Roemer's (1998) sense, when outcomes are independently distributed from circumstances. This independence implies that circumstances have no direct causal effect on outcomes and no causal impact on efforts. The degree of opportunity inequality can therefore be determined by the extent to which the conditional distribution of outcomes on circumstances, $F(y|C)$, differs from $F(y)$.

Inequality of opportunity can be estimated as the difference between the observed total inequality in the distribution of consumption or income and inequality that would prevail if there were no differences in circumstances. Let $\tilde{F}(\tilde{y})$ be the counterfactual distribution of outcomes when circumstances are identical for all individuals. The opportunity share of inequality can be defined as:

$$\Theta_P^r = 1 - \frac{I\left(\tilde{F}(\tilde{y})\right)}{I\left(F(y)\right)} \tag{2}$$

The first step for computing Θ_P consists on estimating a specific model of (1), which can be expressed in the following log-linear form:

$$\ln(y_i) = C_i\alpha + E_i\beta + v_i \tag{3}$$

$$E_i = AC_i + \varepsilon_i$$

where α and β are two vectors of coefficients, A is a matrix of coefficients specifying the effects of the circumstance variables on effort and ε_i is an error term. Model (3) can be expressed in reduced from as:

$$\ln(y_i) = C_i\delta + \eta_i \tag{4}$$

where $\delta = \alpha + \beta + A$ and $\eta_i = \varepsilon_i \beta$.

Inequality of opportunity can be measured using equation (2) where the counterfactual distribution is obtained by replacing y_i with its estimated value, from equation (4), and which can be expressed as: $\tilde{y}_i = exp\left(\vec{C}\hat{\delta} + \hat{\eta}_i\right)$. In this decomposition, the variation in $\tilde{y}_i$ can be interpreted as the influence of effort because circumstances are set to be equal for all households, and inequality of opportunity is measured as a residual.

Inequality of opportunity can also be measured directly by eliminating the contribution of effort to outcomes, using the *smoothed* distribution, obtained from the predicted values of outcomes based on circumstances in equation (4) while ignoring the remaining variation in the residuals:

$$\tilde{z}_i = exp(C_i\hat{\delta}) \tag{5}$$

The share of inequality of opportunity can thus be measured by:

$$\Theta_P^d = \frac{I\left(\tilde{F}(\tilde{z})\right)}{I\left(F(y)\right)} \tag{6}$$

The subscripts *d* and *r*, in Θ_P, denote respectively that inequality of opportunity is estimated directly or residually by eliminating the contribution of effort or circumstances to outcomes. The direct and residual methods can yield different figures of opportunity inequality and the only inequality measure for which the two methods give the same results

is the mean log deviation *(Theil_L),* which has a path-independent decomposition when the arithmetic mean is used as the reference income or consumption (Foster and Shneyerov, 2000). By using the mean log deviation inequality index the residual and direct methods give the same opportunity inequality measures.

The parametric approach allows the estimation of the partial effects of one or some circumstance variables on outcomes, while controlling for the others, by simulating distributions such as:

$$\tilde{y}_i^j = exp\left(\bar{C}^j\hat{\delta}^j + C^{h\neq j}\hat{\delta}^{h\neq j} + \hat{\eta}_i\right)$$

where $\tilde{F}\left(\tilde{y}^j\right)$ is the counterfactual outcomes distribution obtained by keeping circumstance C^j constant.

The inequality share specific to circumstance *j* can be computed residually by:

$$\Theta_p^j = 1 - \frac{I\left(\tilde{F}\left(\tilde{y}^j\right)\right)}{I\left(F(y)\right)}$$

Data

The analysis uses data from the National Panel Surveys (NPS) of 2008, 2010 and 2012. The surveys were conducted on nationally representative samples of households, and methodology and data were selected to ensure comparability. They include information on household characteristics; household consumption and income, individuals education, and employment status; and parents' education and vital status. In addition, all survey waves include a community module that collects detailed information on the access to basic services, the presence of local investment projects, infrastructure conditions and family characteristics in the commune where the households are located.

Inequality of opportunity is derived from two outcomes: consumption and income. Household's consumption is measured as real monthly per capita consumption of food and non-durables and excludes expenses on housing and durable goods. Household income is measured as real monthly per capita income from all sources including cash and in-kind wages, income from agricultural and nonagricultural household businesses, crop sales, rental of properties, remittances, transfers and pensions.

The circumstance variables used in the analysis include father's and mother's education and their residence and vital status, the gender, age and region of birth of the head. Parental education is coded into six categories (none, did not finish primary school, completed primary, did not finish secondary, completed secondary, above secondary). Parents' residence and vital status are captured through dummies indicating whether the father and/or mother live with the household and dummies indicating whether the father and/or mother died before the household head attains the age of 15 years old. The region of birth includes the 26 regions of the survey. It would have been interesting to limit the place of birth to urban and rural sectors, but this information is not available in the survey. In order to check the possibility for biased results due to the large categories in the place of birth, we estimated opportunity inequality we estimated opportunity inequality grouping these variables into five main zones and obtained quite close results to those displayed here.

We explore also the effects of community characteristics on inequality and compare its impact to that of family circumstances. The community characteristics include a set of variables capturing the access to basic services in the community of residence of the household. It would have been more consistent to use this type of information for the community of birth, but this information is unfortunately too difficult to obtain. The community characteristics include distance to: head regional or district headquarters, government and private primary schools, government and private secondary schools, health centers, and markets, all recoded into four categories (within the village, outside at less than 5 km, outside between 5 and 10 km, and outside more than 10 km). The community characteristics include also variables on the presence of investment projects for construction and maintenance of schools, water irrigation provision and infrastructure development (including roads, health centers, markets etc.) all recoded into four categories (no projects, projects of less than 1M TZS, projects between 1M and 10 M TZS, and projects over 10 M TZS). They also include the number of

household that permanently migrated out of the village during the last 12 months to capture some of the family issues inside the village, the main sources of drinking water in the village, the main source of lighting as well as the type of toilet facilities.[76]

As with most samples, NPS surveys include missing observations that need to be treated with caution. The variables reporting on family background include quite a few missing values by individuals who sometimes cannot recall their parent's education correctly. While the percentage of missing observations barely exceeds 11 percent in each wave, dropping all households with missing data on these variables would disregard information available on the other variables, and would likely introduce bias because missing values are not completely random.

Dealing with missing values generated by nonresponse is a well-known problem in survey-based research (Dardanoni and Peracchi, 2011), more so in the biomedical literature than in economics. We follow the procedure suggested by Royston and White (2011) known as Multiple Imputations Chained Equations (implemented in STATA with the ICE command), in which multiple imputations of missing data are generated as new data sets, stacked, and then used in estimation.

This method is built on the so-called "missing at random" assumption, which means that "any systematic difference between the missing values and the observed values can be explained by differences in observed data". This is a less stringent assumption than complete randomness, which is unlikely to fit the NPS data. For example, missing values of parental education are more likely to occur for less well-off and less educated households, which is non-random and explainable by observed values. Clearly, why an observation has missing values matters for how it is "filled in", and the bias from a particular method may be worse than using the complete case data. The literature does not offer clear guidance on how to judge the size of this bias. Fortunately, the size of the estimates of inequality of opportunity change little when imputed values are added (compared to complete case estimates) and the main conclusions are consistent to the different methods of treating missing values.

Computing the opportunity share of earnings inequality for the entire country is important to the design of equal-opportunity policies, but it fails to capture the differential intensity of opportunity inequality across areas and population groups. Because heterogeneity in population composition across the urban and rural areas may distort the aggregate picture of inequality of opportunity, opportunity inequality indices are also computed for urban and rural subgroups.

Table 5-1 presents descriptive statistics for selected circumstance variables used in the analysis. Consumption and income are higher in urban areas and are expanding over time, except a slight drop in income observed in the last survey. Father's and mother's education are significantly higher in urban areas. While the number of households with parents having completed primary education is expanding more in the rural areas, those with secondary school (or higher) graduates parents are expanding more in urban sectors.

The community characteristics variables indicate successful strategy for the promotion of primary education and to a lesser extent secondary education apparent through the expansion of access to government and even private schools particularly in the rural zones. However, the efforts to facilitate access to health, water and electricity seem to be still slow. There seems also to be important initiatives to improve the infrastructure and facilitate access to schools, health centers and markets particularly in rural sectors. While the big investment projects (of over 10M) for building the infrastructure are expanding over time, those for schools construction and maintenance seem to be declining.

The estimation results, by ordinary least squares (OLS), of equation (4) are presented in tables 5-2 and 5-3. Because of space limitations, we limit the presentation to the most significant variables in the regression results.

[76] We also estimate the model including information on the education and occupation of the head of the village but the variables were not significant.

Table 5-1 Descriptive Statistics for Selected Variables

	2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Mean Monthly per capita Consumption (TZS)	32441.32	67535.60	40234.73	37093.01	73478.12	46534.07	49009.12	105132.30	63848.41
	(21692.13)	(56158.32)	(35760.44)	(27126.53)	(59192.25)	(41327.21)	(38044.27)	(86516.96)	(60462.32)
Mean Monthly per capita Income (TZS)	35242.65	93205.14	48114.42	52930.64	112552.00	68407.42	45461.34	92789.33	58184.85
	(80406.97)	(155219.10)	(104674.40)	(125887.90)	(159763.80)	(137978.50)	(89862.78)	(161241.40)	(114870.90)
Father Education (%)									
Did not go to School	66.79	39.47	61.07	61.71	35.59	55.01	61.18	32.16	53.72
Did not finish Primary School	18.49	21.06	19.03	20.71	25.74	22.00	18.67	20.59	19.10
Finished Primary School	13.15	27.83	16.23	15.07	29.60	18.79	18.14	34.42	22.29
Did not finish Secondary School	0.70	2.72	1.12	0.66	1.99	1.00	0.29	1.97	0.71
Finished Secondary School	0.70	5.26	1.65	1.44	4.99	2.35	1.20	6.31	2.64
Higher than Secondary School	0.17	3.67	0.90	0.42	2.09	0.85	0.52	4.55	1.54
Mother Education (%)									
Did not go to School	82.72	58.42	77.45	79.46	52.50	72.68	77.78	51.81	70.82
Did not finish Primary School	8.09	13.47	9.26	9.18	16.29	10.97	9.14	12.10	9.89
Finished Primary School	8.94	23.39	12.07	10.65	26.29	14.58	12.27	31.04	17.27
Did not finish Secondary School	0.13	1.49	0.42	0.17	1.37	0.47	0.24	0.88	0.40
Finished Secondary School	0.12	2.28	0.59	0.48	3.18	1.16	0.44	3.10	1.24
Higher than Secondary School	0.00	0.94	0.20	0.05	0.37	0.13	0.13	1.08	0.38
Main Drinking water source (%)									
Piped water	1.04	15.86	4.33	1.39	7.93	3.09	2.20	15.76	5.81
Standpipe/tap & vendor	21.00	55.94	28.76	22.76	63.13	33.24	24.14	58.48	33.16
Well water	35.45	19.77	31.97	39.06	20.02	34.11	37.76	19.52	33.00
River & rainwater & other	42.51	8.43	34.94	36.79	8.92	29.56	35.90	6.23	28.03
Electricity (%)									
No access to Electricity	97.13	56.39	88.08	94.23	56.02	84.31	91.23	48.08	79.71
Public, Solar & other	2.87	43.61	11.92	5.77	43.98	15.69	8.77	51.92	20.29
Government primary schools (%)									
No facility	0.83	5.03	1.74	4.37	5.61	4.67	0.00	1.25	0.31
Within the village	94.78	66.47	88.65	91.90	65.00	85.41	96.97	74.12	91.26
Outside village less 5km	2.94	27.39	8.24	3.61	28.20	9.53	2.60	24.63	8.11
Out. village btw 5 & 10km	0.32	1.12	0.50	0.03	1.02	0.27	0.00	0.00	0.00
Out. village more 10km	1.12	0.00	0.88	0.09	0.17	0.11	0.44	0.00	0.32
Private primary schools (%)									
No facility	28.86	18.44	26.58	15.15	16.25	15.41	2.83	7.39	3.95
Within the village	62.44	62.60	62.48	81.31	64.94	77.36	91.69	77.70	88.21
Outside village less 5km	3.44	18.96	6.83	2.56	17.62	6.19	1.72	14.41	4.90
Out. village btw 5 & 10km	0.42	0.00	0.32	0.85	1.19	0.93	1.04	0.00	0.78
Out. village more 10km	4.84	0.00	3.78	0.14	0.00	0.10	2.72	0.50	2.16

(continues to next page)

Table 5-1 Descriptive Statistics for Selected Variables *(continued)*

	2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Government secondary schools (%)									
No facility	4.10	20.37	7.62	4.78	9.99	6.03	0.20	4.44	1.26
Within the village	39.24	25.33	36.23	64.68	51.21	61.43	66.15	51.97	62.64
Outside village less 5km	18.35	43.72	23.84	10.57	35.81	16.65	9.76	39.48	17.15
Out. village btw 5 & 10km	23.81	8.95	20.59	11.55	2.92	9.47	13.73	3.43	11.20
Out. village more 10km	14.49	1.64	11.71	8.42	0.07	6.41	10.15	0.67	7.76
Private secondary schools (%)									
No facility	55.43	40.87	7.62	51.27	23.54	44.59	21.75	30.13	23.93
Within the village	4.32	17.40	36.23	8.01	19.25	10.72	6.35	21.79	10.18
Outside village less 5km	3.66	26.80	23.84	5.48	30.88	11.60	7.39	28.58	12.66
Out. village btw 5 & 10km	11.23	9.22	20.59	8.67	8.74	8.69	8.92	10.30	9.22
Out. village more 10km	25.35	5.71	11.71	26.57	17.60	24.41	55.60	9.20	44.00
Health Centers (%)									
No facility	2.09	7.34	3.23	4.32	6.21	4.78	1.18	0.63	1.04
Within the village	53.60	54.55	53.81	59.69	45.58	56.29	60.73	61.38	61.03
Outside village less 5km	16.03	34.67	20.06	14.17	44.99	21.60	15.94	31.62	19.81
Out. village btw 5 & 10km	19.45	2.06	15.69	17.52	3.15	14.06	15.01	4.94	12.44
Out. village more 10km	8.83	1.37	7.22	4.30	0.07	3.28	7.14	1.42	5.68
Investment for schools construction & renovation (%)									
No inv project	14.42	41.49	20.42	24.45	46.03	29.65	36.53	69.50	44.69
inv project less than 1M	7.00	14.55	8.67	9.94	6.21	9.04	8.00	6.75	7.74
inv project btw 1 & 10M	34.00	16.28	30.07	29.73	17.15	26.70	25.31	12.51	22.13
inv project more 10M	44.58	27.68	40.83	35.88	30.61	34.61	30.17	11.23	25.43
Investment for infrastructure building (%)									
No inv project	43.55	70.72	49.58	49.74	72.70	55.27	48.81	75.96	55.58
inv project less than 1M	12.63	13.02	12.71	9.56	10.89	9.88	9.11	6.39	8.53
inv project btw 1 & 10M	19.93	5.12	16.64	9.25	5.52	8.35	11.48	9.62	10.97
inv project more 10M	23.89	11.15	21.06	31.45	10.89	26.50	30.59	8.04	24.93

Source: NPS surveys for 2008, 2010 and 2012. Numbers in parentheses are standard deviations. Results are weighted by appropriate sampling weights to reflect the characteristics of the Tanzanian population.

Table 5–2 Regression of Consumption on Circumstances

	2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Female Head	−0.034	−0.128**	−0.048*	−0.086**	−0.134**	−0.098***	−0.059*	0.022	−0.036
	−(1.080)	−(2.730)	−(1.780)	−(2.760)	−(3.020)	−(3.770)	−(1.900)	(0.580)	−(1.420)
Age head	0.003**	−0.002	0.003**	0	−0.003	0	0.002*	−0.001	0.001
	(2.730)	−(1.180)	(2.340)	(0.260)	−(1.370)	−(0.320)	(1.820)	−(0.870)	(1.550)
Father Education (Omitted: Did not go to School)									
Under Primary School	0.071*	−0.039	0.07*	0.118**	0.002	0.105**	0.043	0.073	0.065**
	(1.680)	−(0.530)	(1.910)	(3.170)	(0.030)	(3.130)	(1.160)	(1.340)	(2.070)
Finished Primary School	0.069	0.133**	0.115**	0.149**	0.042	0.139**	0.105**	0.045	0.092**
	(1.220)	(2.040)	(2.490)	(3.200)	(0.580)	(3.280)	(2.370)	(0.810)	(2.600)
Under Secondary School	−0.222	0.349**	0.175	0.355**	0.244	0.351**	0.339**	0.178*	0.319**
	−(1.230)	(2.940)	(1.350)	(2.910)	(1.610)	(3.530)	(2.290)	(1.680)	(3.420)
Finished Secondary School	0.16	0.198*	0.23**	0.298**	0.236**	0.315***	0.302**	0.26**	0.296***
	(0.960)	(1.800)	(2.690)	(2.720)	(2.460)	(4.360)	(3.340)	(2.870)	(4.210)
Higher than Second. School	0.13	0.136	0.192*	0.382**	0.339**	0.448***	0.52***	0.26**	0.381***
	(0.950)	(1.320)	(1.920)	(1.970)	(2.260)	(3.820)	(4.390)	(2.570)	(4.810)
Mother Education (Omitted: Did not go to School)									
Under Primary School	0.043	0.008	0.041	0.041	0.125*	0.066	0.171***	0.012	0.137**
	(0.780)	(0.100)	(0.900)	(0.770)	(1.910)	(1.630)	(3.550)	(0.190)	(3.520)
Finished Primary School	0.181**	0.078	0.165**	0.079	0.144**	0.11**	0.147**	0.131**	0.164***
	(2.830)	(1.160)	(3.280)	(1.450)	(2.130)	(2.420)	(2.710)	(2.360)	(4.210)
Under Secondary School	1.224**	−0.027	0.287	−0.039	0.376**	0.155	0.231	0.191	0.235*
	(2.330)	−(0.200)	(1.490)	−(0.160)	(2.050)	(1.010)	(1.080)	(1.210)	(1.820)
Finished Secondary School	0.377	0.517***	0.571***	0.295	0.238*	0.28**	0.071	0.141	0.154*
	(1.050)	(4.060)	(3.940)	(1.530)	(1.850)	(2.520)	(0.410)	(1.400)	(1.730)
Higher than Second. School	0.011	0.585**	0.662**	0.727**	0.686**	0.616**	0.448*	0.459**	0.437**
	(0.050)	(3.550)	(3.070)	(2.690)	(3.270)	(2.880)	(1.780)	(2.210)	(2.750)
Place of Birth (Omitted=Dar es Salaam)									
Dodoma	−0.389**	−0.223*	−0.374***	−0.343	−0.124	−0.239**	−0.772***	−0.186**	−0.421***
	−(2.650)	−(1.870)	−(4.390)	−(1.270)	−(1.100)	−(2.680)	−(4.540)	−(1.980)	−(4.930)
Arusha	0.041	0.099	0.021	−0.035	0.243**	0.075	−0.36**	0.007	−0.082
	(0.240)	(0.690)	(0.200)	−(0.130)	(2.220)	(0.860)	−(2.120)	(0.060)	−(0.940)
Kilimanjaro	0.02	0.18*	−0.05	−0.075	0.256**	0.072	−0.458**	−0.02	−0.164**
	(0.120)	(1.770)	−(0.550)	−(0.280)	(2.800)	(0.900)	−(2.800)	−(0.260)	−(2.350)
Tanga	−0.059	0.06	−0.045	−0.201	−0.073	−0.133*	−0.296*	−0.189**	−0.095
	−(0.390)	(0.530)	−(0.550)	−(0.750)	−(0.770)	−(1.680)	−(1.890)	−(2.010)	−(1.390)
Morogoro	−0.268*	−0.183*	−0.251**	−0.12	−0.064	−0.056	−0.36**	−0.07	−0.115*
	−(1.770)	−(1.850)	−(3.150)	−(0.450)	−(0.710)	−(0.690)	−(2.270)	−(0.950)	−(1.760)
Pwani	0.143	0.116	0.076	0.145	0.127	0.155*	−0.281	−0.091	−0.062
	(0.870)	(1.090)	(0.840)	(0.530)	(1.180)	(1.680)	−(1.650)	−(1.170)	−(0.880)
Lindi	−0.359**	−0.008	−0.284**	−0.244	0.079	−0.101	−0.586***	−0.217**	−0.31***
	−(2.350)	−(0.070)	−(3.170)	−(0.920)	(0.790)	−(1.250)	−(3.770)	−(1.990)	−(4.540)

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Table 5–2 Regression of Consumption on Circumstances *(continued)*

	·2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Mtwara	−0.164	−0.137	−0.213**	−0.364	0.103	−0.195**	−0.568***	−0.105	−0.289***
	−(1.160)	−(1.320)	−(2.820)	−(1.390)	(1.110)	−(2.490)	−(3.630)	−(1.150)	−(4.510)
Ruvuma	−0.366**	0.117	−0.342***	−0.44*	0.115	−0.271**	−0.769***	−0.218**	−0.427***
	−(2.420)	(1.060)	−(4.130)	−(1.660)	(0.950)	−(3.150)	−(4.850)	−(2.300)	−(6.150)
Iriniga	−0.111	−0.018	−0.119	−0.123	−0.055	−0.093	−0.45**	−0.113	−0.166**
	−(0.740)	−(0.160)	−(1.400)	−(0.470)	−(0.570)	−(1.140)	−(2.820)	−(1.300)	−(2.410)
Mbeya	−0.071	−0.096	−0.104	−0.147	0.136	−0.052	−0.368**	0.067	−0.041
	−(0.510)	−(0.810)	−(1.330)	−(0.560)	(1.010)	−(0.670)	−(2.380)	(0.590)	−(0.600)
Singida	−0.252	−0.334**	−0.253**	−0.266	−0.047	−0.167*	−0.512**	−0.101	−0.227**
	−(1.580)	−(2.250)	−(2.590)	−(1.000)	−(0.370)	−(1.880)	−(3.170)	−(0.710)	−(2.790)
Tabora	−0.379**	−0.193	−0.329***	−0.166	−0.211	−0.172*	−0.58***	−0.257**	−0.32***
	−(2.550)	−(1.280)	−(3.710)	−(0.620)	−(1.300)	−(1.830)	−(3.820)	−(2.890)	−(4.890)
Rukwa	−0.425**	−0.431**	−0.52***	−0.568**	−0.222*	−0.447***	−0.807***	−0.371**	−0.481***
	−(2.750)	−(3.060)	−(5.740)	−(2.130)	−(1.670)	−(4.980)	−(4.990)	−(2.180)	−(6.090)
Kigoma	−0.571***	−0.186	−0.534***	−0.516*	−0.36**	−0.44***	−0.716***	−0.261**	−0.409***
	−(3.710)	−(1.200)	−(6.220)	−(1.940)	−(2.660)	−(5.150)	−(4.620)	−(3.000)	−(5.950)
Shinyanga	−0.203	0.004	−0.222**	−0.209	−0.012	−0.134*	−0.39**	−0.079	−0.155**
	−(1.370)	(0.030)	−(2.640)	−(0.800)	−(0.100)	−(1.670)	−(2.580)	−(0.850)	−(2.470)
Kagera	−0.017	−0.046	−0.048	−0.072	−0.089	−0.049	−0.441**	−0.058	−0.162**
	−(0.110)	−(0.400)	−(0.600)	−(0.270)	−(0.740)	−(0.590)	−(2.780)	−(0.530)	−(2.310)
Mwanza	−0.294*	0.029	−0.27**	−0.315	−0.164	−0.236**	−0.508**	−0.306**	−0.312***
	−(1.900)	(0.260)	−(3.040)	−(1.200)	−(1.020)	−(2.800)	−(3.320)	−(3.400)	−(5.190)
Mara	−0.381**	0.199	−0.265**	−0.46*	0.081	−0.236**	−0.765***	−0.204**	−0.447***
	−(2.400)	(1.510)	−(2.810)	−(1.680)	(0.590)	−(2.340)	−(4.530)	−(2.000)	−(5.360)
Manyara	−0.209	0.357	−0.176*	−0.283	0.31	−0.141	−0.505**	0.051	−0.192*
	−(1.290)	(1.330)	−(1.710)	−(1.040)	(1.380)	−(1.370)	−(2.840)	(0.350)	−(1.940)
Kaskazini Unguja	−0.359**	−0.577***	−0.512***	−0.247	0.142	−0.221*	−0.697***	−0.632***	−0.525***
	−(2.430)	−(4.540)	−(5.970)	−(0.920)	(0.370)	−(1.940)	−(4.320)	−(4.210)	−(6.460)
Kusini Unguja	−0.331*	−0.235	−0.44***	−0.104	−0.019	−0.203*	−0.685***	−0.571***	−0.504***
	−(1.960)	−(1.170)	−(3.830)	−(0.380)	−(0.070)	−(1.930)	−(3.810)	−(3.630)	−(5.440)
Mjini/Magharibi	−0.339*	−0.523***	−0.55***	−0.306	−0.362**	−0.402***	−0.758***	−0.312**	−0.455***
	−(1.810)	−(4.630)	−(5.840)	−(1.100)	−(1.970)	−(3.830)	−(4.380)	−(2.720)	−(4.680)
Kaskazini Pemba	−0.707***	−0.458**	−0.721***	−0.155	−0.148	−0.225**	−0.69***	−0.318**	−0.41***
	−(4.720)	−(2.950)	−(7.170)	−(0.580)	−(0.740)	−(2.430)	−(4.330)	−(2.290)	−(5.430)
Kusini Pemba	−0.511**	−0.659***	−0.653***	−0.353	−0.527***	−0.444***	−0.881***	−0.527***	−0.609***
	−(3.310)	−(4.970)	−(7.080)	−(1.310)	−(3.990)	−(4.860)	−(5.280)	−(4.180)	−(7.360)
Father does not live with HH	0.047	−0.021	0.029	0.032	−0.013	0.019	−0.022	0.035	−0.007
	(1.350)	−(0.420)	(0.990)	(1.020)	−(0.270)	(0.720)	−(0.620)	(0.770)	−(0.250)
Mother does not live with HH	0.006	0.03	0.02	−0.08**	0.023	−0.06**	0.023	−0.026	0.009
	(0.170)	(0.620)	(0.680)	−(2.570)	(0.450)	−(2.260)	(0.790)	−(0.580)	(0.380)

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Table 5–2 Regression of Consumption on Circumstances *(continued)*

	·2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Mother died before age 15 yrs of head	0.005 (0.090)	0.005 (0.060)	0.01 (0.210)	–0.044 –(0.930)	–0.061 –(0.860)	–0.058 –(1.440)	–0.031 –(0.560)	0.014 (0.220)	–0.026 –(0.560)
Father died before age 15 yrs of head	0.015 (0.380)	–0.074 –(1.360)	0.011 (0.320)	0.018 (0.480)	0.13** (2.400)	0.05 (1.530)	–0.005 –(0.120)	0.068 (1.480)	0.017 (0.540)
No of min observations	2063	1202	3265	2583	1263	3846	3159	1731	4886
Number of imputations 10									

Source: NPS 2008, 2010, 2012.

Note: The dependent variable is the logarithm of real monthly per capita consumption. Numbers in parentheses are bootstrapped student-t based on 100 replications.

* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Table 5–3 Regression of Income on Circumstances

	2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Female Head	−0.271**	−0.228*	−0.463**	−0.276**	−0.245**	−0.318*	−0.218**	−0.198**	−0.207**
	−(2.680)	−(1.850)	−(3.120)	−(3.230)	−(2.410)	−(1.930)	−(3.160)	−(2.240)	−(2.130)
Age head	−0.013**	−0.015**	−0.003	−0.009**	−0.01**	−0.005	−0.006**	−0.009**	0.002
	−(3.440)	−(3.280)	−(0.410)	−(2.630)	−(2.770)	−(0.420)	−(2.380)	−(3.060)	(0.410)
Father Education (Omitted: Did not go to School)									
Under Primary School	0.336**	0.33**	0.167	0.226**	0.213*	0.237	0.218**	0.224**	0.115
	(3.090)	(2.520)	(0.790)	(2.090)	(1.740)	(0.900)	(2.400)	(2.040)	(0.830)
Finished Primary School	0.518***	0.418**	0.58**	0.44**	0.502***	0.276	0.118	0.074	0.174
	(3.890)	(2.470)	(2.820)	(3.420)	(3.900)	(0.830)	(1.200)	(0.640)	(1.240)
Under Secondary School	0.237	−0.55	0.374	0.763*	0.686	0.752	0.466	0.592	0.438
	(0.780)	−(1.150)	(1.190)	(1.960)	(1.480)	(1.170)	(1.200)	(0.840)	(0.960)
Finished Secondary School	0.399	0.596	0.414	0.535**	0.463	0.743*	0.451**	0.463	0.66**
	(1.500)	(0.970)	(1.340)	(2.370)	(1.310)	(1.730)	(2.710)	(1.490)	(3.210)
Above Secondary School	0.707**	0.747*	0.708*	0.818**	1.156**	0.529	0.537**	0.478	0.631**
	(2.270)	(1.930)	(1.940)	(2.630)	(2.140)	(1.220)	(2.680)	(1.040)	(2.980)
Mother Education (Omitted: Did not go to School)									
Under Primary School	0.202	0.384**	−0.203	0.136	0.12	0.1	0.105	0.145	0.014
	(1.490)	(2.210)	−(1.060)	(1.120)	(0.760)	(0.540)	(0.940)	(1.070)	(0.090)
Finished Primary School	0.131	0.234	−0.015	0.061	0.058	0.065	0.106	0.134	0.067
	(0.800)	(1.040)	−(0.070)	(0.480)	(0.400)	(0.280)	(0.980)	(0.960)	(0.480)
Under Secondary School	−0.334	2.24**	−0.911	0.804	0.424	1.118*	0.749**	1.339**	0.075
	−(0.510)	(2.480)	−(1.420)	(1.660)	(0.540)	(1.780)	(2.070)	(3.270)	(0.170)
Finished Secondary School	0.449	−0.331	0.267	0.108	−0.13	0.036	−0.118	−0.246	0.012
	(1.600)	−(0.360)	(0.980)	(0.420)	−(0.290)	(0.120)	−(0.490)	−(0.430)	(0.050)
Above Secondary School	−0.16	−0.819	−0.186	0.546	0.332	0.902*	0.095	−0.68	0.34
	−(0.160)	−(0.450)	−(0.280)	(1.500)	(0.500)	(1.680)	(0.320)	−(1.310)	(1.080)
Place of Birth (Omitted=Dar es Salaam)									
Dodoma	−0.468	−1.059**	−0.28	−0.285	−0.74*	−0.646**	−0.391**	−0.68*	−0.193
	−(1.410)	−(2.670)	−(0.670)	−(1.130)	−(1.940)	−(2.310)	−(2.140)	−(1.910)	−(0.850)
Arusha	−0.507	−1.255**	0.323	−0.208	−0.866**	−0.017	−0.144	−0.591	0.449*
	−(1.460)	−(2.790)	(0.810)	−(0.840)	−(2.370)	−(0.050)	−(0.710)	−(1.630)	(1.870)
Kilimanjaro	−0.273	−0.668	0.212	−0.294	−0.911**	−0.003	−0.662***	−1.222**	−0.182
	−(0.900)	−(1.630)	(0.650)	−(1.410)	−(2.370)	−(0.020)	−(3.770)	−(3.360)	−(0.970)
Tanga	−0.272	−0.931**	0.003	−0.405*	−1.049**	−0.24	−0.235	−0.239	−0.727***
	−(0.850)	−(2.170)	(0.010)	−(1.810)	−(2.940)	−(0.840)	−(1.480)	−(0.700)	−(3.560)
Morogoro	0.022	−0.459	−0.123	−0.2	−0.775**	−0.03	−0.147	−0.353	−0.212
	(0.070)	−(1.190)	−(0.390)	−(0.960)	−(2.120)	−(0.140)	−(0.880)	−(1.010)	−(1.190)
Pwani	0.185	−0.541	0.385	−0.066	−0.589	−0.054	0.187	0.35	−0.313
	(0.540)	−(1.180)	(1.110)	−(0.280)	−(1.600)	−(0.220)	(1.050)	(0.890)	−(1.630)
Lindi	−0.092	−1.088**	0.382	0.213	−0.369	0.624**	−0.227	−0.484	−0.294
	−(0.310)	−(2.850)	(1.090)	(1.030)	−(1.090)	(2.150)	−(1.330)	−(1.400)	−(1.440)

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Table 5–3 Regression of Income on Circumstances *(continued)*

	2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Mtwara	−0.263	−0.811**	−0.025	−0.238	−0.845**	0.215	−0.329*	−0.673**	−0.325
	−(0.920)	−(2.390)	−(0.060)	−(1.180)	−(2.670)	(0.930)	−(1.960)	−(1.990)	−(1.270)
Ruvuma	−0.717**	−1.295**	0.102	−0.461**	−1.152**	0.387	−0.174	−0.431	−0.119
	−(2.030)	−(3.380)	(0.170)	−(2.030)	−(3.320)	(1.520)	−(1.000)	−(1.240)	−(0.540)
Iriniga	−0.032	−0.505	−0.032	−0.315	−0.853**	−0.172	0.128	−0.084	−0.078
	−(0.110)	−(1.450)	−(0.080)	−(1.430)	−(2.500)	−(0.590)	(0.770)	−(0.240)	−(0.450)
Mbeya	−0.478	−1.131**	0.049	−0.151	−0.651**	0.284	−0.044	−0.142	−0.245
	−(1.570)	−(3.200)	(0.100)	−(0.730)	−(2.010)	(0.990)	−(0.270)	−(0.430)	−(1.070)
Singida	−0.971**	−1.686***	−0.471	−0.108	−0.472	−0.529	−0.265	−0.572	0.125
	−(2.560)	−(3.560)	−(1.010)	−(0.450)	−(1.330)	−(1.070)	−(1.030)	−(1.370)	(0.430)
Tabora	−0.547	−1.169**	−0.341	0.003	−0.65**	0.579*	−0.271	−0.321	−0.731**
	−(1.640)	−(3.010)	−(0.770)	(0.010)	−(1.970)	(1.860)	−(1.410)	−(0.980)	−(2.110)
Rukwa	−0.966**	−1.33**	−0.75*	−0.494*	−1.127**	0.092	−0.372	−0.61	−0.358
	−(2.790)	−(3.100)	−(1.660)	−(1.870)	−(3.080)	(0.190)	−(1.600)	−(1.600)	−(0.980)
Kigoma	−0.55*	−1.03**	−0.081	−0.164	−0.456	−0.473	−0.33**	−0.637*	−0.164
	−(1.840)	−(2.620)	−(0.210)	−(0.720)	−(1.380)	−(1.460)	−(2.000)	−(1.860)	−(0.780)
Shinyanga	−0.151	−0.698*	0.544	0.129	−0.276	−0.12	−0.12	−0.345	0.009
	−(0.500)	−(1.930)	(1.470)	(0.650)	−(0.910)	−(0.370)	−(0.790)	−(1.070)	(0.040)
Kagera	−0.862**	−1.513***	0.04	−0.431	−0.637**	−1.38	−0.425**	−0.695**	−0.441*
	−(2.780)	−(3.810)	(0.100)	−(1.230)	−(1.970)	−(1.230)	−(2.750)	−(2.130)	−(1.670)
Mwanza	−0.507	−1.166**	0.549	0.251	−0.141	−0.219	−0.082	−0.323	−0.358*
	−(1.550)	−(2.910)	(1.380)	(1.210)	−(0.450)	−(0.680)	−(0.580)	−(0.990)	−(1.740)
Mara	−0.727**	−1.431**	0.291	−0.718**	−1.638***	−0.068	−0.451**	−0.782**	−0.149
	−(2.070)	−(3.080)	(0.750)	−(2.450)	−(3.600)	−(0.230)	−(2.200)	−(2.050)	−(0.670)
Manyara	−1.118**	−1.845***	1.249	−0.724**	−1.218**	−0.273	−0.307	−0.636*	−0.297
	−(3.140)	−(4.350)	(1.400)	−(2.330)	−(3.030)	−(0.450)	−(1.510)	−(1.750)	−(1.020)
Kaskazini Unguja	−0.805**	−1.226**	−0.406	0.403	−0.157	0.993	−0.716**	−1.295**	−0.29
	−(2.060)	−(2.570)	−(1.010)	(1.070)	−(0.390)	(1.190)	−(3.200)	−(3.350)	−(0.940)
Kusini Unguja	0.071	0.138	−0.687	0.329	−0.069	1.079	−0.64**	−1.121**	−0.742**
	(0.200)	(0.290)	−(1.270)	(1.030)	−(0.170)	(1.340)	−(2.170)	−(2.530)	−(1.970)
Mjini/Magharibi	−0.447	−0.574	−0.477	−0.03	−0.704	0.146	−0.357*	−1.084**	−0.242
	−(1.420)	−(1.200)	−(1.390)	−(0.080)	−(1.450)	(0.250)	−(1.820)	−(2.490)	−(1.120)
Kaskazini Pemba	−0.629*	−0.801	−0.702*	0.146	−0.27	−0.166	−0.602**	−1.178**	−0.303
	−(1.740)	−(1.620)	−(1.820)	(0.450)	−(0.650)	−(0.360)	−(2.810)	−(2.900)	−(1.110)
Kusini Pemba	−0.741**	−1.104**	−0.407	−0.762**	−1.204**	−0.937	−1.361***	−2.175***	−0.493**
	−(2.070)	−(2.310)	−(0.910)	−(2.290)	−(3.070)	−(1.420)	−(5.530)	−(4.840)	−(2.400)
Father does not live with HH	0.159	0.224*	0.001	0.09	0.147	0.099	−0.002	−0.013	−0.078
	(1.600)	(1.870)	(0.010)	(1.100)	(1.470)	(0.660)	−(0.030)	−(0.150)	−(0.760)
Mother does not live with HH	0.135	0.086	0.287**	−0.051	−0.135	0.202	0.013	0.04	−0.093
	(1.340)	(0.720)	(1.980)	−(0.580)	−(1.470)	(0.960)	(0.180)	(0.470)	−(0.960)

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Table 5–3 Regression of Income on Circumstances *(continued)*

	2008			2010			2012		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Mother died before age 15 yrs of head	0.079 (0.460)	0.005 (0.030)	0.371 (1.340)	–0.059 –(0.440)	–0.109 –(0.690)	0.064 (0.260)	–0.004 –(0.030)	0.15 (0.870)	–0.253* –(1.720)
Father died before age 15 yrs of head	–0.243* –(1.850)	–0.393** –(2.450)	–0.463** –(2.160)	–0.05 –(0.440)	0.005 (0.040)	–0.19 –(0.910)	–0.142 –(1.450)	–0.21* –(1.680)	0.072 (0.620)
Constant	9.889*** (26.760)	10.329*** (22.760)	10.392*** (19.880)	10.887*** (40.520)	11.409*** (30.570)	10.484*** (11.310)	10.32*** (48.360)	10.793*** (27.090)	10.146*** (36.440)
No of min observations	1872	1109	2981	2385	1203	3588	2964	1658	4707
Number of imputations 10									

Source: NPS 2008, 2010, 2012.

Note: The dependent variable is the logarithm of real monthly per capita income. Numbers in parentheses are bootstrapped student-t based on 100 replications.

* Significant at the 10 percent level; ** significant at the 5 percent level; *** significant at the 1 percent level.

Appendix 6: Demography

The Demographically Based Forecasting Model for per Capita Income

This Appendix builds on the work of Lindh and Malmberg (2007), who have developed a demographically based forecasting model for GDP. The model includes a number of demographic variables and allows for some systematic country heterogeneity as well as for time-specific effects. Denoting *y* the level of real GDP per capita, e_0 life expectancy at birth, and *a* each age group's share in the population, the regression equation has been specified as:

$$y_{it} = \alpha ln e_{0it} + \sum_{k=0-14}^{65+} (\beta_k + \gamma_k ln e_{0it}) ln a_{kit} + \eta_i + \nu_t + \varepsilon_{it} \qquad (1)$$

The interaction terms allow for changing age-share coefficients contingent on how far the demographic transition has progressed. The η_i and ν_t account for country- and time-specific effects. The subdivision into age groups is as follows: children 0–14 years old, young adults 15–29 years old, mature adults 30–49 years old, middle-aged adults 50–64 years old, and old dependents 65 years and older.

Following Kelley and Schmidt (1995), life expectancy is included to capture human capital effects. Increases in life expectancy and years of schooling are mutually reinforcing (longer life span encourages greater investment in education, and the other way around), and in many countries the relationship between them is nearly linear.[77] Controlling for country-specific effects allows for some country heterogeneity, especially for that which could be accounted for by omitted variables remaining constant over the estimation period. Controlling for time-specificity allows for influences in time which are common to all countries, such as the world business cycle, world market price fluctuations, etc.[78] Equation (1) was first estimated as a panel on a sample of 108 countries with sufficiently long time series (minimum 20 years) for annual purchasing power parity GDP, the dependent variable.

The fact that the variables are trended raises questions of spurious regression. Lindh and Malmberg (2007) show that the age variables can probably be treated as if co-integrated with GDP. Even if this were not true, the panel context makes spurious results less likely. However, the crucial argument is that the forecasting performance of the model out-of-sample is quite good on average and yields very reasonable long-term predictions for growth rates. Spurious regression parameters would not perform that well. Furthermore, the impact of demographic variables depends on several factors, such as policies that are conducive (or not) to the increase of employment and labor force participation as the supply of potential workers increases, and some favorable or less favorable circumstances, which might be related, for example, to geography or the prevalence of diseases.

To the extent that such circumstances are inherent and constant disadvantages, this will be picked up by country-specific intercepts in the regressions, but when these factors are episodic and changing over time we would expect them to turn up in the form of systematic underperformance or over-performance relative to the model we estimate. Having estimated equation (1) using the whole sample of 108 countries we next subdivided it into two: over-performers (countries with a higher average growth rate than the one predicted by the model) and underperformers. Table 6-1 reports estimation results for the full sample (column (1)) as well as for the two subsamples (columns (2) and (3)). The results of the full sample were used to produce the forecasts for Tanzania presented in this report.

[77] Technological change and other trends are also accounted for by this variable, at least to some extent.

[78] However, there will always be more complex heterogeneity, such as differences in technology and preferences that vary over time and across countries. The estimation result must therefore be interpreted as valid for an average country conditional on the controls. In the sample individual countries will be distributed around the average model with deviations that may be more or less important. To take an obvious example, the genocide in Rwanda causes large deviations from the average model. To the extent that this has affected life expectancy and age structure, it is accounted for in the model, but the disturbance to production of that kind of event is much larger than the demographic repercussions can account for. Events like the tsunami in the Indian Ocean will also cause deviations from the average model.

For the full sample of 108 countries, column (1) in Table 6-1 shows that most coefficients are different from zero at conventional significance levels. Furthermore, the coefficient pattern indicates that with increasing life expectancy, the positive correlations of the younger active age groups will tend to become smaller or even negative.

The difference in actual and predicted growth rate between 1987 and 2009 was then calculated and two subsamples were created. Over-performing (under-performing) countries were defined as having a higher (lower) average growth rate than the one predicted by the model. This left 54 countries in each subsample. Table 6-2 shows the countries that belong to each group.

Equation (1) was then estimated for each sub-sample. The results are shown in the last two columns of Table 6-1 (columns (2) and (3)). Overall, the pattern and magnitude of the coefficients is similar in both subsamples and do not greatly differ from the full sample regression. Moreover, comparing the predicted GDP paths for Tanzania the resulting models are not that different.

Table 6–1 Demographically Based Forecasting Model for Real GDP per Capita

	(1) Full sample	(2) Over-performers	(3) Under-performers
Life expectancy (le)	−1.480	3.203	−7.224***
	(1.779)	(2.304)	(2.306)
Population shares [males 65+]			
0–14	5.302**	1.572	13.86***
	(2.220)	(2.966)	(2.830)
15–29	11.53***	8.650***	17.74***
	(1.634)	(2.146)	(2.040)
30–49	8.928***	3.881**	16.41***
	(1.478)	(1.964)	(1.838)
50–64	−7.719***	−7.247***	−6.183***
	(0.862)	(1.136)	(1.100)
females 65+	−0.742	−2.393***	−2.159***
	(0.511)	(0.614)	(0.835)
Interactions (le * pop shares)			
le * 0–14	−1.360***	−0.603	−3.309***
	(0.507)	(0.676)	(0.650)
le * 15–29	−2.675***	−1.955***	−4.088***
	(0.376)	(0.493)	(0.470)
le * 30–49	−1.900***	−0.712	−3.612***
	(0.343)	(0.460)	(0.427)
le * 50–64	1.948***	1.792***	1.643***
	(0.205)	(0.270)	(0.261)
le * females 65+	0.213*	0.549***	0.551***
	(0.123)	(0.147)	(0.201)
Observations	6,027	3,009	3,018
R-squared	0.730	0.785	0.792
Number of countries	108	54	54

Source: Own estimation using data from the Penn World Tables 7.0 (GDP per capita) and the World Population Prospects 2012 Revision (life expectancy at birth and population shares). All variables (life expectancy, population shares and GDP are in natural logarithms). Estimations include time and individual fixed effects. The omitted category is shown in brackets. Standard errors in parentheses. Asterisks denote the significance level (double sided): 10%, **: 5%, ***: 1%

Table 6–2 List of Countries in the Sample

Over-performing	Under-performing
Angola	Algeria
Argentina	Austria
Australia	Barbados
Bangladesh	Benin
Belgium	Brazil
Bolivia	Burundi
Botswana	Cameroon
Burkina Faso	Canada
Cape Verde	Central African Republic
Chad	Colombia
Chile	Comoros
China	Congo, Dem. Rep.
Cyprus	Congo, Republic of
Denmark	Costa Rica
Dominican Republic	Ecuador
Egypt	El Salvador
Ethiopia	Fiji
Gambia, The	Finland
Ghana	France
Guatemala	Gabon
Guinea-Bissau	Greece
India	Guinea
Indonesia	Haiti
Ireland	Honduras
Israel	Hong Kong
Lesotho	Iceland
Luxembourg	Iran
Malawi	Italy
Malaysia	Ivory Coast
Mali	Jamaica
Mauritania	Japan
Mauritius	Jordan
Mozambique	Kenya
Namibia	Korea, Republic of
Nepal	Madagascar
Niger	Mexico
Nigeria	Morocco
Norway	Netherlands
Pakistan	New Zealand
Philippines	Nicaragua
Rwanda	Panama
Senegal	Paraguay
Singapore	Peru
South Africa	Portugal
Sri Lanka	Romania
Sweden	Sierra Leone
Tanzania	Spain
Thailand	Switzerland
Trinidad & Tobago	Syria
Uganda	Togo
United Kingdom	Tunisia
United States	Turkey
Uruguay	Venezuela
Zambia	Zimbabwe

Table 6–3 Correlates of Fertility, Women Aged 15–49 Years, 2010

	Total children born
Current age [40–49]	
15–19	–5.608***
	(0.0982)
20–24	–4.621***
	(0.0828)
25–29	–3.386***
	(0.0756)
30–34	–2.261***
	(0.0770)
35–39	–1.056***
	(0.0866)
Education [none]	
Some primary	–0.212***
	(0.0702)
Primary or more	–0.230***
	(0.0576)
Age 1st intercourse	–0.192***
	(0.00656)
Marital status [never married]	
Ever married	0.680***
	(0.0417)
Unmet need for contraception	0.803***
	(0.0503)
Earns cash	–0.177***
	(0.0391)
Wealth quintile [poorest]	
Poor	–0.0410
	(0.0584)
Middle	–0.0245
	(0.0601)
Richer	–0.198***
	(0.0643)
Richest	–0.469***
	(0.0745)
Rural residence	0.181***
	(0.0530)
Region [Dar es Salaam]	
Dodoma	0.439***
	(0.153)
Arusha	0.325***
	(0.112)
Kilimajaro	0.278***
	(0.104)
Tanga	0.481***
	(0.151)
Morogoro	0.240**
	(0.107)
Pwani	0.235**
	(0.113)
Lindi	–0.267
	(0.169)
Mtawara	–0.690***
	(0.155)
Ruvuma	0.125
	(0.116)
Iringa	0.266**
	(0.116)
Mbeya	0.625***
	(0.115)
Singida	0.573***
	(0.136)
Tabora	0.500***
	(0.129)
Rukwa	1.082***
	(0.129)
Kigoma	0.915***
	(0.104)
Shinyanga	0.807***
	(0.106)
Kagera	0.725***
	(0.127)
Mwanza	0.562***
	(0.0986)
Mara	0.912***
	(0.156)
Manyara	0.655***
	(0.123)
Zanzibar North	0.646***
	(0.114)
Zanzibar South	0.427***
	(0.127)
Town West	0.881***
	(0.103)
Pemba North	1.185***
	(0.113)
Pemba South	1.308***
	(0.124)

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Table 6–3 Correlates of Fertility, Women Aged 15–49 Years, 2010 *(continued)*

	Total children born
Constant	8.397*** (0.186)
Mean births / prob.	2.989041 (.0292352)
Observations	9672
R–squared	0.701

Source: Demographic and Health Survey (DHS) 2010.

Note: Dependent variable is total children ever born to a woman aged 15–49 years.

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