Institutions, Pro-poor Growth and Inequality in Kenya[1]

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Abstract

We study the poverty-economic growth nexus in Kenya using the Ravallion-Datt-Shapley approach to decompose changes in poverty into growth and redistribution components; and link institutional factors to poverty and inequality. Pro-poor growth indices and growth incidence curves are used to assess whether economic growth between 1994 and 2006 was pro-poor. We find that changes in mean income, rather than redistribution accounted for the largest variation in poverty; and establish that economic growth in Kenya is not always accompanied by poverty reduction. In particular, growth was pro-poor over 1997–2006 but less so over 1994–1997; and there are instances where growth seems to have been pro-rich. Furthermore, we find that access to fuel, water, and educational attainment have the largest positive impacts on levels and growth in well-being and are key drivers of inequality. Institutional endowment as well as access to institutional services has important implications for pro-poor growth in Kenya.

Key words: Poverty, pro-poor growth, inequality, institutions, regression based decomposition, Shapley value.

JEL: D31, I30, I32, 017, 043

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1. Introduction

1.1 Background

Immediately after independence in 1963, the Kenyan government adopted a strategy of promoting growth based on an implicit assumption that a "trickle down" process would take place to spread the benefits of growth from some of the more dynamic sectors to the rest of the economy and thus alleviate poverty. The trickle down did not work as by the mid-1970s, unemployment and income disparities were more apparent than they had been in 1963. The failure of economic growth to solve the problems continued to be observed in the 1980s and 1990s. This necessitated shifting resources towards rural and labour-intensive production activities and the provision of social services by the government. It is estimated that growth in Kenya fell from 7.2% in 1966 to 2.1% in 1991-2000. Analogously poverty incidence had increased by almost 10% points between 1994 and 2000. This national increase in the headcount index was reflected in the regional growth in poverty across Kenya. Inequality in many dimensions (both non monetary and monetary) increased at the same time predisposing the country to conflict particularly between competing communities struggling to survive on natural resources. With the change of Government in 2003 and the implementation of economic recovery strategy, the economy started to recover, growing at about 7.1% by the end of 2007.The poverty incidence for the country dropped from 56% in 2001 to 46% in 2006, coinciding with an economic recovery period that saw growth rising from about 3% to 6.1% between 2000 and 2006.

Though these trends seem to suggest that Kenya experienced growth accompanied by poverty reduction, it is important to note that as the poverty incidence fell, the number of poor persons increased, suggesting a paradox as to whether or not growth has helped to alleviate poverty. Furthermore, though there has been considerable economic growth in the last decade compared to the 1990s, many socio economic outcomes/impact indicators (such as child mortality and nutritional status) have not shown corresponding/ commensurate improvements over the period.

Although growth is a prerequisite to poverty reduction, evidence suggests that poverty could hamper sustained growth. It is estimated that a 10 percentage point drop in poverty levels, other things being equal, can increase economic growth by one per cent. In turn, a 10 percentage point increase in poverty levels will lower the growth rate by one per cent and reduce investment by up to eight per cent of GDP (Perry et al. 2006). This is so because the poor are in no position to engage in many of the profitable activities that stimulate investment and growth, thus creating a vicious circle in which low growth results in high poverty and high poverty, in turn, results in low growth.

Poverty and inequality can generate forms of collective behaviour that impede economic growth: social protest and institutional forms that make it difficult for opposing interests to negotiate this protest. Such protests could spill over into violence which in turn creates uncertainties about the enforceability of contracts, increase transaction and operation costs for businesses, and, cause diversion of public spending from more productive growth oriented investments to controlling violence[2] (Acemoglu et al. 2004). Even when social tensions do not result in violence, perceptions of inequitable effects from policy reform can increase resistance and undermine a government's ability to introduce the very reforms needed for economic growth (Coudouel, Dani and Paternostro 2006). High levels of poverty and inequality therefore imply the need for a new vision and direction of social development. There is need for reintegration of those excluded from the enjoyment of the benefits of economic growth- without which development will not be sustainable. To deal with government failures and contribute to the development of private investment, good institutions are required (Rodrik, 2005). Institutions favor the development of private investment by increasing returns to investments through reduced investment costs. Institutions could also affect the level of an economy's competitiveness by their favorable effect on technological adoptions and innovations (Acemoglu et al. 2002; Acemoglu and Robinson, 2006). For instance, democratic institutions are likely to assure private investors lower investment costs which would otherwise result from distortionary policies. Evidence also suggests a strong link between financial institutions and economic growth (King and Levine, 1993; Levine 1997, 1998).

Efforts to address poverty and inequality in Kenya have centered on economic growth and economic empowerment of the people. Rapid growth of the economy is not only regarded as a key solution for poverty, but also to unemployment, poor health, economic exploitation and inequality. For this reason the governments' stated economic policy objectives tended to place emphasis on the promotion of rapid economic growth, equality in the sharing of economic growth benefits and the reduction of extreme imbalances and inequalities in the economy.. Policy interventions have not done enough to ensure sustained growth rates of the economy. The growth momentum of the early 2000s has been restrained by a number of factors including the 2007-2008 post election violence and the global financial crisis, which partly led to high prices of fuel and food prices. Adoption of economic stimulus package has brought modest recovery between 2008 and 2009. The challenge that remains is sustainability of this growth and to ensure

[2] Good examples are the *Mungiki, Taliban* and other militia groups and the social unrest that followed the 2007 general elections in Kenya. See also Kimenyi and Romero (2008) and Kimenyi and Ndung'u, (2005) for an exposition of how de facto political power has manifested itself in Kenya.

that it is pro-poor. Institutions can play a critical role in facilitating and ensuring sustainable rates of economic growth.

1.2 Motivation of the Study

Kenya is faced with the twin challenge of reversing the trend of increasing poverty while at the same time adopting a pro-poor growth framework that allows the poor to gain disproportionately from economic growth, thereby reducing inequality. While it is important to go beyond economic growth as a means of poverty reduction, the issue that arises is the extent to which economic growth can be expected to decrease extreme poverty in the absence of changes in the degree of income inequality. Ali and Thorbecke (2000) find that poverty responds more to income distribution than to growth, while other studies suggest that the income-growth elasticity of poverty is a decreasing function of income. It is also widely recognized that the effectiveness of growth in translating into poverty reduction is strongly linked to inequality (Mckay and Perge, 2009). Where large parts of the population lack assets, domestic consumer markets remain limited, thereby reducing the scope for business creation and growth. Unequal distribution of wealth can also be accompanied by economic inefficiencies. One example is credit distribution under conditions of asset inequality. When economic institutions lead to the exclusion of poorer groups from credit or insurance markets, both investment and growth are curtailed (World Bank 2008).

Though there is a wealth of studies on the poverty-growth nexus, there is a dearth of literature on this nexus in Kenya. To fight poverty, it is important to understand the responsiveness of poverty to both growth and redistribution of benefits from growth. Anecdotal evidence suggests that the poor in developing countries share both in the gains from rising aggregate affluence and in the losses from aggregate contraction. For Kenya, the pertinent question is how much the poor share in growth? Is growth in Kenya pro-poor? How are growth, poverty and redistribution related? To what extent does economic growth reduce poverty? To what extent does inequality (redistribution) affect poverty? Have institutions affected poverty and distribution in Kenya? What are the key policy issues for enhancing economic growth, redistribution and poverty reduction? Though recent theories and evidence suggest some answers, deeper microeconomic empirical work is needed to disentangle the complex relationship between poverty, inequality and growth and the factors conditioning the link in Kenya. Only then can we have a firm basis for identifying the specific policies and programs needed to complement and possibly modify growth-oriented policies to ensure inclusive growth. This study seeks to fill this research gap. Specifically, the study seeks to: (i) analyze the linkage between inequality, poverty and economic growth in Kenya (ii). assess the extent to which growth in Kenya has been pro-poor; (iii) explore the link between institutions, poverty and inequality and (iv), based on research

findings, propose policy recommendations for addressing poverty, inequality and also for enhancing growth.

The rest of the paper is organized as follows: the next section present the literature review. Section 3 presents the methodology, while section 4 presents and data and descriptive statistics. Section 5 presents the results, while section 6 concludes the paper.

2 Literature Review

Introduction

There is a large and growing literature on the growth-poverty and inequality nexus in developing countries. Some studies have focused on the impact of growth measured through changes in GDP on poverty. Others have looked at the impact of changes in mean incomes/consumption expenditures on poverty. Studies that have used both measures have shown that the growth elasticity of poverty will depend on the measure of growth adopted. A number of studies have also analyzed the trade-off between growth and inequality, while others have sought to find out how pro-poor growth in developing countries is. The new institutional economics approach has brought forth emergence of studies exploring the relationship between institutions and economic growth. We present a brief survey of some relevant literature below.

Link between Growth, Poverty and Inequality

Ferreira et al. (2009) found considerable variation in the poverty-reducing effectiveness of growth across sectors and across space, but a relatively small role in overall poverty reduction for Brazil between 1985 and 2004. Fosu (2009) found that in sub-Saharan Africa, the impact of GDP growth on poverty reduction is a decreasing function of initial inequality. (Fosu, 2008) concluded that a more equitable income distribution would enhance the rate at which growth is transformed to poverty reduction. Ravallion (2001) and Bigsten and Shimeles (2007), argue that initial inequalities determine how much the poor share in aggregate growth or contraction. Ravallion, (2005) found poverty to be inversely correlated with relative inequality, but that the relationship depends on how inequality is measured. Ferreira et al. (2008) document negative correlations between both poverty and inequality indices, on the one hand, and mean income per capita on the other and note that inequality tends to reduce the growth elasticity of poverty reduction. Similar results had been found in an earlier study for Ethiopia (see Bigsten et al. 2002). Bigsten et al. (2003) found that potential poverty-reduction due to the increase in real per capita income was to some extent counteracted by worsening income distribution. Adams (2004) argued that though economic growth reduces poverty, the actual extent of poverty reduction depends on how economic growth is measured. Baye (2006) found that growth components

dominated the redistribution components in explaining poverty at the national and regional levels. This finding is consistent with earlier findings by Datt and Ravallion, (1992). Holzmann and Weisbrod (2007) use decomposition analysis to show that find that while in 1970 more than half of the world's extreme poor people lived in East Asia, in the late 2000s, two thirds of the extreme poor and half of the world's poor live in Sub-Saharan Africa. Arndt et al. (2006) used generalized entropy class of inequality decomposition in Mozambique show that inequality between provinces and regions diminished over time as income grew. Odedokun and Round (2004) found that high inequality reduces growth and that the channels through which inequality affect growth included reduction in secondary and tertiary education investment, reduced political stability, and increased fertility rate.

Pro-poor Growth Literature

Growth is pro-poor if it is accompanied by pro-poor distributional change. Veterans of pro-poor growth, Ravallion and Chen (2003) have proposed the growth incidence curves (GIC) approach for tracking progress on pro-poor growth and for determining whether growth in expenditure or income in a country over a specified period has been pro-poor. Anchored theoretically around the Watts index, the GIC is effectively a distribution-sensitive measure of income growth over time. This methodology has been applied in many contexts to analyze how pro-poor growth is starting with Ravallion and Chen's application to China. Son (2004) developed an alternative approach: the poverty growth curve (PGC) based on Atkinson's theorem linking the generalized Lorenz curve and changes in poverty. She applied the methodology to Thailand and to international cross-country data to illustrate that this approach to can provide conclusive results about the pro-poorness of growth in a majority of cases.

Studies on pro-poor growth include Dollar and Kraay (2002) who recommend that standard growth-enhancing policies should be at the center of any poverty reduction strategy. Kraay (2004) found that changes in poverty could be attributed mostly to growth in average incomes and to poverty reducing patterns of growth in relative incomes. His results point at the need to ensure that policies and institutions that promote broad-based growth should be central to the pro-poor growth agenda. Holzmann and Weisbrod (2007) use growth incidence curves to explain a strong global income convergence accompanied by a drastic decline of global inequality and poverty. Demombynes and Hoogenveen (2007) using the GIC for Tanzania found that growth for the country was pro-poor in absolute terms and that growth improved consumption for the rich and poor alike, although the mean growth rates were quite modest. Arndt et al. (2006) in a study of Mozambique found that the pattern of growth during the period benefited the poor considerably. Mbaku (2006, 2007) and Kimenyi (2007) found a strong link between institutions and pro-poor growth in African countries. Le (2008) found that there has been negative association between poverty rate and subsequent GDP growth rate.

Institutions, Growth and Inequality

Institutions are the rules of the game in a society or, the humanly devised constraints that shape human interaction (North, 1990). They structure political, social and economic incentives in human exchange. Differences in economic growth have been attributed to differences in institutions following North and Thomas (1973). Literature suggests that institutions are endogenous: poverty in a given society is closely related to the quality of economic institutions. The literature further argues that differences in economic institutions are the major source of cross-country differences in economic growth and prosperity. This is through influencing investments in physical and human capital and technology, and the organization of production. Economic institutions not only determine the aggregate economic growth potential of the economy, but also the allocation of resources to their most efficient uses and the distribution of resources in the future (i.e., the distribution of wealth, of physical capital or human capital) (Acemoglu et al. 2004; Glaeser et al. 2004). Institutional economics is of the view that inefficient resource allocation and the low-growth path of any economy are linked "to their inability to transform institutional structures in response to new technological and market opportunities" (Aryeetey 2009). Bourguignon (2004) however argues that there are many channels through which economic growth may modify the distribution of income and welfare. In the process of development, economic growth modifies the distribution of resources across sectors, relative prices, factor rewards (labor, physical capital, human capital, land, etc.); and the factor endowments of agents. These changes are likely to directly impact on the distribution of income, regardless of whether there are good economic institutions or not.

There is growing literature on the link between different form of institutions and growth. Exercise of political power has been shown to lead to economic inefficiencies and even poverty because there are commitment problems inherent in the use of political power. Political institutions also determine the constraints on and the incentives of the key actors (These include political power (Aryeetey 2009; Kimenyi and Romero 2008; Kimenyi and Ndung'u, 2005; Acemoglu et al. 2004; Glaeser et al. 2004; Bourguignon 2004; Aron 2000; Alesina and Perotti 1996; Rodrik 1998). Other institutions include: quality of formal institutions; measures of social capital; measures of social characteristics, including ethnic, cultural, historical, and religious categories; (Aryeety, 2009; Acemoglu et al. 2004; Glaeser et al. 2004; Aron, 2000, 1990; Ali, 2005). Others analyze the impact of economic freedom as an institution on growth (Benson 1998; Ali and Crain 2002, Cole, 2003; Mbaku 2003; Kreft and Sobel 2005; Easterly 2006; Weede 2006; Kimenyi, 2007).

There is dearth of literature on institutions and their effect on inequality and vice-versa. Studies include Salazar and Villa 2010; Cerveratti et al., 2008; Siddiqui and Ahmed, 2008; Easaw et al. 2006; Mamoon, 2006; Acemogu et al. 2001, 2002 and 2005; Carmignani 2004; Chong and

Gradstein, 2004. The studies suggest that quality institutions have a positive and significant effect on growth and that the effect is more vigorous for long-term growth than short-term. They also find that the influence on property rights and economic institutions crucially depend on how equal the society is.

Overview of Literature

The literature seems to concur that to tackle poverty, it is important to understand the contribution of poverty growth and redistribution to changes in poverty. Initial conditions in the country under study have been argued to be important determinants of the responsiveness of poverty to change in growth and re-distribution. Studies on the trade-off between growth and inequality have argued that initial levels of inequality are important in shaping the overall responsiveness of poverty to changes in mean incomes and re-distribution. Pro-poor growth literature suggests that growth may not always be good for the poor. Other studies have shown the importance of institutions for growth and distribution of the benefit from growth. This paper contributes to the literature by analyzing the growth-poverty-redistribution nexus and attendant issues including institutional impact and pro-poorness of growth in Kenya.

3 Methodology

3.0 Introduction

This section outlines the framework and methodology for achieving the study objectives. To achieve objective 1, we decompose changes in poverty into growth and distribution components. A number of dynamic decomposition procedures have been developed and used to examine how economic growth contributes to a reduction in poverty over time, and to assess the extent to which the impact of growth is reinforced by changes in income inequality (Shorrocks, 1999). The most widely applied decomposition framework is the Datt and Ravallion (1992) approach. Newer approaches have however emerged to take into account inexactness (unexplained or residual component) in the Datt and Ravallion methodology. These include the Kakwani's (1997) axiomatic approach and Shorrocks' (1999) Shapley value decomposition framework. This paper uses the Datt and Ravallion, and the Shapley decomposition approaches. To achieve objective 2, pro-poor growth indices and growth incidence curves are used. This project further explores the impact of institutions on poverty and income distribution. Available literature however concur that it is extremely difficult to explore the causal link between institution and economic growth. The difficulty is attributed to conceptual problems with the measurement of institutions and limitations of econometric methods (Acemoglu et al. 2004, Glaeser et al. 2004, Bourguignon 2004). We explore the link between institutions, poverty, growth and distribution of income using the regression based decomposition approach. The OLS regression results help

us to investigate the link between poverty and institutions, while the decomposition results help us to link inequality and institutions.

3.1 Datt and Ravallion (1992) Decomposition Approach

This approach decomposes a given change in aggregate poverty between two dates, (n and 0) into a growth component, a redistribution component and a residual. To illustrate this approach, if we let t_0 to be the initial year of the period, t_n to be the final year of the period, and r the reference year at which the welfare distribution and mean welfare are held fixed for the growth and redistribution components respectively, then the change in poverty can be decomposed as:

$$Pt_n - Pt_0 = G(t_0, t_n; r) + D(t_0, t_n; r) + R(t_0, t_n; r) \quad \ldots\ldots (1)$$

The first term is the change in poverty between two time periods (n and 0). G(.) is the growth component of the change in poverty, D(.) is the redistribution component and R(.) is the residual. The growth component, G(.), gives the impact on poverty of the change in the mean income while holding income distribution constant.

$$G(t_0, t_n; r) \equiv P(z / \mu_{tn}, L_r) - P(z / \mu_{t0}, L_r) \quad \ldots\ldots (2)$$

where z is the poverty line, μ is the mean income or expenditure, L is the Lorenz curve, and the other parameters are as defined earlier. In other words, this is the change in poverty that would have occurred if everyone had experienced the same rate of growth as at the mean and therefore maintained their positions relative to one another.

The redistribution component, D(.), gives the change in poverty due to a change in the Lorenz curve while holding the mean welfare constant. Analogous to the growth component, this component can be expressed as:

$$D(t_0, t_n; r) \equiv P(z / \mu_r, L_{tn}) - P(z / \mu_r, L_{t0}) \quad \ldots\ldots (3)$$

In other words, this is the change in poverty that would have occurred if the observed change in redistribution had occurred without any growth.

The residual R(.) measures the effect of interaction between growth and redistribution terms on poverty. This represents the effect of simultaneous changes in mean income and distribution on poverty that is not accounted for by the other two components. It is the part that cannot be

exclusively attributed to growth or redistribution. When the residual term is large in size, the interpretation of the other components may be questionable

This approach and modified versions has been widely applied in the literature (see for instance, Ravallion and Chen, (1997); Ali (1997); Adams (2004); Baye (2006); McKay and Perge (2009). One issue with the Datt and Ravallion (1992) approach is that the decomposition is not exact. Datt and Ravallion (1992), also acknowledge that while this decomposition can be informative in describing past trends, like most decompositions, it cannot tell us whether alternative processes with say, different population shifts, would have been more beneficial for poverty reduction nor does it say anything about the feasibility of alternatives.

3.2 The Shapley Value Decomposition Approach

Shorrocks (1999) notes that though there are many decomposition techniques applied to poverty and inequality, most practitioners employ decomposable poverty measures based on the FGT (1984) family of indices. Such measures have the advantage of enabling the overall level of poverty to be allocated among subgroups of the population. Shorrocks however identifies four main problems associated with earlier decomposition procedures. First, the contribution to income/poverty assigned to a specific factor is not always interpretable in an intuitively meaningful way and in other cases, the interpretation commonly given to a component may not be strictly accurate. Second, conventional procedures often place constraints on the kinds of poverty and inequality indices which can be used. Only certain forms of indices yield a set of contributions that sum up to the amount of poverty or inequality that requires explanation. Others, such as the Gini coefficient introduce a vaguely defined residual or "interaction" term in order to maintain the decomposition identity. Third, subgroup decompositions can handle situations in which the population is partitioned on the basis of a single attribute, but have difficulty identifying the relevant contributions in multi-variate decompositions. Four, individual applications are viewed as different problems requiring different solutions.

In the light of these limitations and noting that no attempt has been made to integrate the various decomposition techniques within a common overall framework, Shorrocks (1999) offers a procedure that yields an exact additive decomposition of an aggregate indicator (such as poverty or inequality) into all possible *c*ontributions. The greatest attraction of the Shapley procedure is that it overcomes all four of the categories of problems associated with earlier decomposition techniques and thus offers a unified framework for handling any type of decomposition exercise (Shorrocks, 1999).

Shapley value can be thought of as a measure of the utility of players in a game and is best illustrated with games of chance. The decomposition is inspired by the classic co-operative game theory problem of dividing a pie fairly, the Shapley solution assigns to each player her marginal

contribution averaged over all possible coalitions of agents (Kolenikov and Shorrocks, 2003). Assuming a co-operative game, suppose we start out with a set *N* (of *n* players) and a value function: $v: P(N) \to \Re$ that goes from subsets of players to reals, with two properties: (i) $v(\phi) = 0$ and (ii) $v(s \cup T) \geq v(S) + v(T)$, where S and T are disjoint subsets of N. The two properties tell us that if *S* is a coalition of players which agree to cooperate, then *v*(*S*) describes the total expected gain from this cooperation, independent of what the actors outside of *S* do. Property (ii) expresses the fact that collaboration can only help but never hurt.

The Shapley value is one way to distribute the total gains to the players, assuming that they all collaborate. The amount (value) that actor *i* gets if the gain function *v* is being used is:

$$\phi_i(v) = \sum_{S \subseteq N \setminus \{i\}} \frac{|s|!(n-|S|-1)!}{n!}(v(S \cup \{i\}) - v(S)) \quad \text{.. (4)}$$

where *n* is the total number of players and $(v(S \cup \{i\}) - v(S))$ is the marginal contribution of each actor to the coalition and is equal to the expected payoff for each actor.

To apply the Shapley value to the decomposition of changes in poverty into growth and redistribution, Shorrocks (1999) starts from the Datt and Ravallion (1992) decomposition and shows that given a fixed poverty line, the poverty level at time t(t=t, t+n) may be expressed as a function $P(\mu_t, L_t)$ of mean income, μ_t and the Lorenz curve L_t. The change in poverty can be expressed as:

$$\Delta P_\alpha = P_\alpha(\mu_{t+n}, L_{t+n}, z) - P_\alpha(\mu_t, L_t, z) \quad \text{.. (5)}$$

Which can be decomposed into growth and redistribution effects denoted as:

$$G = P(\mu_{t+n}, L_t, z) - P(\mu_t, L_t, z) \quad \text{... (6)}$$

$$R = P(\mu_{t+n}, L_{t+n}, z) - P(\mu_{t+n}, L_t, z) \quad \text{... (7)}$$

Kolenikov and Shorrocks, (2003) argue that the problem with equation (6) is that it indicates the marginal effect of the change in mean income with the distribution held constant at the initial configuration while (7) computes the marginal impact of redistribution holding mean income constant at the final level. They suggest that one can equally well generate a decomposition with the ceteris paribus conditions interchanged, and since there is no logical reason for preferring one configuration over the other, symmetry arguments suggest that the two effects should be averaged to yield the income and redistribution effects as in equations (8) and (9):

$$G = \frac{1}{2}\left[P(\mu_{t+n}, L_t, z) - P(\mu_t, L_t, z)\right] + \frac{1}{2}\left[P(\mu_{t+n}, L_{t+n}, z) - P(\mu_t, L_{t+n}, z)\right] \ldots\ldots\ldots\ldots\ldots (8)$$

$$R = \frac{1}{2}\left[P(\mu_t, L_{t+n}, z) - P(\mu_t, L_t, z)\right] + \frac{1}{2}\left[P(\mu_{t+n}, L_{t+n}, z) - P(\mu_{t+n}, L_{t+n}, z)\right] \ldots\ldots\ldots\ldots\ldots (9)$$

Equations (8) and (9) are the contributions associated with the level and distribution of income (respectively) in a two-way Shapley decomposition of the change in poverty.

3.3 Regression based Inequality Decomposition

To capture the impact of institutional factors on inequality, we employ regression based decomposition methods. The first step is to estimate the determinants of income/consumption expenditure using a standard income regression (Naschold, 2009):

$$\ln Y = \alpha + X\beta + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

where lnY is the N-vector of the logarithm of household income/ expenditure per adult equivalent, α is the intercept, X is a matrix of k household characteristics, such as household demographics, assets and education. In our case, X will also capture a vector of village level institutions. ε is the normally distributed error term.

Following an analogy to Shorrocks' (1982) inequality decomposition by income source, the estimates from the regressions can be used to construct factor inequality weights for each variable in the regression (Fields, 2003). The relative factor inequality weight of X_k is given by:

$$S_k(\ln Y) = \frac{\hat{\beta}_k \, cov(X_k, \ln Y)}{\sigma^2(\ln Y)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (11)$$

The relative factor inequality weight indicates the percentage change in income inequality due to X_k. The factor inequality weight corresponding to the error term of the regression, ε, identifies the proportion of inequality unexplained by the variables included in income regression. The weights are computed by multiplying their respective $\hat{\beta}_k$ from equation (10), by the coefficient obtained by an OLS regression of the respective X_k on log income (Ravallion and Chen, 1999).

To gauge the proportion of explained inequality that is due to factor *k* we can calculate the percentage contribution or P 'weights', P_k, which are simply the factor inequality weight divided by the R squared of the regression (Fields, 2003), i.e.:

$$P_k(\ln Y) = \frac{S_k(\ln Y)}{R^2(\ln Y)} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (12)$$

Where $S_k(\ln Y)$ is the share of the log-variance of income that is attributable to the k^{th} explanatory factor and $R^2(\ln Y)$ is the fraction of the log-variance that is explained by all of the X's taken together.

Relative factor inequality weights for a subset of variables can be combined into a single group factor inequality weight, S_g, as shown in equation (13).

$$S_g(\ln Y) = \sum_{k \in g} S_k(\ln Y) = \frac{c\,\text{ov}(\sum_{k \in g} \hat{\beta}_k X_k, \ln Y)}{\sigma^2(\ln Y)} \quad \text{.. (13)}$$

Subgroups can be added to equation (10) by including subgroup specific dummy variables resulting in equation (14).

$$\ln Y = \alpha + X\beta + D\delta + \varepsilon \quad \text{.. (14)}$$

Total inequality can thus be expressed as the sum of inequality due to household characteristics X, inequality due to differences in returns to sub-groups D, and unexplained residual inequality. Other variables can be incorporated into equation (10) in a similar manner.

3.4 Measuring Pro-poor Growth

A related question that this study seeks to answer is the extent to which growth can be said to have been 'pro-poor'. In other words, how have the gains from aggregate economic growth (or the losses from contraction) been distributed across households according to their initial incomes or expenditures (Ravallion and Chen, 2003)? A direct approach of measuring pro-poorness of growth is to look at growth rates for the poor by either calculating the growth rate in the mean of the poorest quintile or using the growth incidence curves (GIC) or using pro-poor growth indices. GIC show how the growth rate for a given quantile varies across quantiles ranked by income (Ravallion and Chen, 2003).

Following Ravallion and Chen (2003), the growth incidence curve can be defined as:

$$g_t(p) = \frac{L_t'(p)}{L_{t-1}'(p)}(\gamma_t + 1) - 1 \quad \text{.. (18)}$$

Where $g_t(p)$ traces out the GIC, $L_t'(p)$ is the slope of the Lorenz curve, $\gamma_t = (\mu_t / \mu_{t-1}) - 1$ is the growth rate in the mean (μ), *t-1* and *t* are two dates for which growth rate in income is being

compared. If the Lorenz curve does not change, then $g_t(p) = \gamma_t$ for all p . Also $g_t(p) > \gamma_t$ if and only if $\gamma_t(p)/\mu_t$ is increasing over time. If $g_t(p)$ is a decreasing (increasing) function for all *p*, then inequality falls (rises) over time for all inequality measures satisfying the Pigou–Dalton transfer principle.

To measure pro-poor growth Ravallion and Chen, differentiate the Watts index[3] with respect to time to get:

$$-\frac{dW_t}{d_t} = \int_0^{H_t} \frac{d \log y_t(p)}{dt} dp = \int_0^{H_t} g_t(p) dp \quad \text{.......................................} (19)$$

This equation tells us that the area under the GIC up to the headcount index gives (minus one times) the change in the Watts index. From equation (19), the measure of the rate of pro-poor growth is the actual growth rate multiplied by the ratio of the actual change in the Watts index to the change that would have been observed with the same growth rate but no change in inequality, i.e. $\int_0^{H_t} g_t(p) dp / H_t$.

In addition to the Ravallion and Chen pro-poor growth indices, we compute the Kakwani and Pernia (2000) and the Kakwani and Son (2003) pro-poor growth indices. Kakwani and Pernia defined growth as pro-poor when the poor receive the benefits of growth proportionally more than the non-poor. Using the poverty decomposition proposed by Kakwani (2000), they developed a pro-poor growth index (PPGI) which shows the ratio of the elasticities for total poverty reduction and poverty reduction in the case of distribution-neutral growth. This ratio will be greater than one when a growth scenario is pro-poor. The PPGI (φ) can be formally written as:

$$\varphi = \left(\frac{\delta}{\delta_g} \right) \quad \text{...} (20)$$

Where δ is the total poverty elasticity of growth and δ_g is the growth elasticity of poverty (holding inequality constant). The PPGI will be greater than 1 when the inequality effect is negative, meaning that the poor benefit proportionately more than the non poor. When

[3] Note that the Watts index can be written in the quantile function as: $W_t = \int_0^{H_t} \log[z/y_t(p)] dp$. Where z is the poverty line, H_t is the usual headcount index. This index is preferred over the usual headcount index because a measure of pro-poor growth must satisfy a number of axiom: focus, monotonicity, transfer, additive decomposability and sub-group consistency (Ravallion and Chen 2003). The pro-poor growth index is computed as the change in Watts index divided by the headcount for the index of the first distribution, both with poverty line z.

$(0 < \varphi < 1)$, growth is not strictly pro-poor, even though it still reduces the poverty. If $(\varphi < 0)$, economic growth leads to an increase in poverty (Kakwani and Pernia, 2000). Growth is pro-poor (anti-poor) if the change in inequality that accompanies with growth reduces (increases) the total poverty. Thus, the growth is pro-poor (anti-poor) if the total elasticity of poverty is greater (less) than the growth elasticity of poverty.

The PPGI is criticized on account of not taking into account the level of the actual growth rate. To overcome this shortcoming, Kakwani and Son (2003) and Kakwani, Khandker and Son (2004) proposed the Poverty Equivalent Growth Rate (PEGR), defined as the growth rate that will result in the same level of poverty reduction as the present growth rate if the growth process had not been accompanied by any change in inequality. The PEGR is the Kakwani and Pernia (2000) PPGI multiplied by the growth rate of mean income**.** If we let ψ to be the growth rate of the mean income, then we can define the PEGR (g^*) as:

$$g^* = \left(\frac{\delta}{\delta_g}\right)\Psi \quad \ldots\ldots (21)$$

Growth will be pro-poor (anti-poor) if g^* is greater (less) than Ψ. If g^* lies between 0 and Ψ, the growth is accompanied by an increasing inequality but poverty still reduces.

Unlike the PPGI, the PEGR addresses both the magnitude of growth and the benefits of growth the poor receive. Moreover, the PEGR satisfies the basic monotonicity condition such that the proportional reduction in poverty is a monotonically increasing function of the PEGR. The PPGI and the PEGR indices differ in that pro-poor growth is defined in both relative and absolute terms in the former, and is defined only in relative terms in the latter (relative in the sense that the rate of pro-poor growth implies a reduction of relative inequality).

4 Data and Descriptive statistics

4.1 Data types and sources

The study utilizes household level survey data for three periods: 1994, 1997 and 2005/6. This data is sourced from two welfare monitoring surveys: WMS II, 1994 and WMS III, 1997 and the 2005/2006 Kenya Integrated Household Budget Survey (KIHBS) data. The three datasets were collected by the Kenya National Bureau of Statistics and the Planning Unit of the Ministry of Planning and National Development. The three surveys were conducted using the National Sample and Evaluation Programme (NASSEP) frame. The NASSEP frame is based on a two stage stratified cluster design for the whole country. First enumeration areas using the national census records were selected with probability proportional to size of expected clusters in the enumeration area. The number of expected clusters was obtained by dividing each primary sampling unit into 100 households. Then clusters were selected randomly and all the households enumerated. From each cluster, 10 households were drawn at random. The Welfare Monitoring

Survey II (WMS II) covered a total of 10,857 households drawn from 1,107 clusters of the National Sample Survey and Evaluation Programme (NASSEP IV). WMS II was launched in June/July 1994 and covered 47 districts. The Welfare Monitoring Survey III (WMS III) covered a sample size of 11,800 households drawn from 1,107 clusters of the National Sample Survey and Evaluation Programme (NASSEP IV). WMS III was launched in April and continued up to October 1997 and covered 46 districts. For KIHBS, data was collected from a sample of 13,430 households drawn from 1,430 clusters from 70 districts. The three surveys collected information on different modules, including socioeconomic characteristics, household expenditures, agricultural holding and output, livestock holding, household enterprises, transfers and other incomes among other modules of interest. Unlike the first two surveys, the KIHBS included a community survey which is a source of rich institutional level data.

The three surveys are comparable in several respects. First the derivation of the consumption food basket and non food items and the reference period, is based on the 7 day recall period for food items and standard three months for infrequent durable goods. These however differed slightly in the method of selection whereby the welfare monitoring surveys selected food items that were consumed nationally by at least 25 per cent of the population, while KIHBS selected those items that were consumed by households lying between 30 and 55 per cent in the distribution of total food expenditure separately for urban and rural households. Although KIHBS had more consumption food items, all the surveys used 2,250 kilocalories per adult equivalent as the recommended daily energy allowance in deriving the respective food poverty lines. In terms of spatial and temporal differences in prices, all three surveys used the Paasche price index approach to make necessary spatial and temporal adjustments. However, the WMS I and II household expenditure data applied a price deflator constructed in the same way i.e. reference region was Nairobi, while KIHBS used a time invariant price index referenced to national median prices to adjust each household's nominal consumption aggregate. The surveys however differ in some ways: WMS II covered all districts, unlike WMSIII that left out North Eastern Province and parts of Northern Kenya; the two WMS excluded rent for rural households whereas in KIHBS, rent was imputed for all households. In WMS series, only two main urban areas were recognized notably Nairobi and Mombasa with all others combined, while in KIHBS, in addition to Nairobi and Mombasa, Kisumu, Nyeri, Nakuru and all other urban areas combined were included in the analysis.

4.2 Descriptive Statistics

The unit of analysis in this study is based communities (clusters) rather than households. Sample statistics for selected variables at the cluster level from the three datasets are presented in Table 1. Some variables suggest positive changes in welfare indicators over the survey period. For instance, there seem to have been a change in the distribution of education attainment over the period with a higher proportion of heads attaining higher levels of education in 2006 compared

to 1994. This change most likely reflects gains from education subsidies in Kenya and endeavours to achieve the MDG goals related to education. With free primary education and subsidized secondary education, school enrollment and completion rates have improved. For instance, KNBS (2008a) indicate that primary school GER rose from 107.2% in 2005 to 108.9% in 2007.

Except for total land holdings, asset indicators seem to suggest improved welfare over the years. For instance, compared to 1994, fewer households used latrines (more flush toilets), kerosene (more electricity) and unsafe drinking water (safer sources) in 2005/6. The latter probably implies that the government and civil society efforts in providing clean water especially through sinking boreholes and wells are bearing fruits. The proportion of heads engaged in business or in employment has been low but increased marginally over the same period. Traditionally people have relied on agriculture and formal employment as the main source of livelihood but with unpredictable climatic conditions and rising unemployment, many are turning to self employment especially through establishing their own small, medium and micro enterprises. Average land holding declined, probably reflecting fragmentation of land due to population growth.

Table 1: Descriptive Statistics

Variable	1994		1997		2006	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Sex	0.73	0.20	0.73	0.19	0.73	0.20
No education	0.40	0.29	0.37	0.27	0.33	0.29
Primary education	0.39	0.25	0.41	0.23	0.37	0.23
Post primary education	0.27	0.24	0.28	0.21	0.37	0.24
Head employed/in business	0.43	0.34	0.47	0.33	0.49	0.33
Total land holding (acres)	3.97	31.03	3.56	12.47	2.23	13.74
Piped water	0.27	0.40	0.31	0.39	0.36	0.38
Time spent to get water	53.64	72.23	51.11	41.61	48.41	36.01
Kerosene used for lighting	0.84	0.29	0.87	0.25	0.77	0.30
Household has pit latrine	0.71	0.45	0.75	0.43	0.70	0.46
Rural area residents	0.87	0.34	0.85	0.35	0.81	0.39
Total monthly expenditure	1682.20	1675.00	2203.59	1820.36	2837.45	2371.90
Number of clusters	1062		985		1229	

Appendix Table A1 presents the sample statistic for per capita distribution of institutional factors for 1997. The data used here could only be accessed at the district level and is therefore highly aggregated and should be interpreted with caution. District level population was used to express institutions in per capita terms. The data captures three groups of institutional variables: presence

of markets, (proxied by the number of constituencies and cooperatives in a district); land tenure systems (captured by distribution of publicly owned natural resources – land, forests and water); and availability of health facilities (captured by number of dispensaries). The data shows that the mean number of active cooperative societies per capita was as low as 0.23 but with a maximum of above 2. This means at the community level, cooperative societies hardly exist which denies the members of the community the benefits that accrue from cooperative movements. Distribution of public natural resources shows low endowment, but very high variability. This suggests inequality in the distribution of public resources in Kenya and is likely to have welfare implications. The low endowment of dispensaries suggests difficulties of access to health facilities for most communities.

Appendix Table A2 presents the distribution of institutional factors from the KIHBS community data. From available data, we pick out three categories of variables: market access; security and safety; and land use. On access factors, the mean distance to the nearest tar/asphalt road is about 35 kms. The proportion of tarmac and graded roads in the community is only 23%. The means of these two variables suggest that communities do not have good access roads, which has serious implications for farming communities, especially in the case of perishable products. The mean distance to the nearest social facilities is about 4 km for health facilities and public primary schools (with standard deviation of about 14 kms and 37 kms, respectively). The mean distance to nearest district headquarters is quite long at 49 kms and a standard deviation of 64 kms. The distribution of these facilities suggests remoteness of some communities, making it difficult for households to access social services, especially those that are only available at the district headquarter. Though there has been mushrooming of districts in Kenya, the data implies that in the more remote parts of the country, district headquarters may still be out of reach of many Kenyans. It is important to think about possible ways of decentralizing such services to the lower administrative units such as divisional headquarters.

The survey also included a number of questions related to security and safety. The data suggests that the communities are generally dissatisfied with the police response to crime, as only 12% indicated satisfaction. In Kenya, the police have been accused of either doing nothing to prevent or respond to crime and at times abetting crime. Transparency International surveys done over the years in Kenya have rated the police force as the most corrupt institution in the country, even after their terms and conditions of work have been improved. On community's perception of changes in crime, 42% reported that crime had increased in their community over the last one year period. On safety and security measures, community policing and neighbourhood watch initiatives seem to be most popular at 50%. Thirty one per cent of all communities in the survey made their own private security plans (watchmen, guard dogs and burglar proofing), while 21% of the communities had not taken any steps towards improving their security.

5 Empirical Results

5.0 Introduction

This section presents the empirical results. We first present results for the decomposition of changes in poverty between 1994 and 2006 into growth and distribution components, using the Ravallion and Datt and the Shapley approaches. This is followed by an assessment of the pro-poorness of growth using pro-poor growth indices and the GIC in the second sub-section. The last sub section explores the link between institutions, poverty and inequality. First we explore the impact of institutional factors on poverty, using the OLS results of the regression based decomposition. We then link inequality to institutions using the regression based decomposition results.

5.1 Decomposition of Poverty into Growth and Redistribution Components

The results for the decomposition of poverty into growth and redistribution components using the Datt and Ravallion, and the Shapley approaches are presented in tables 2 to 4. The incidence of poverty rose from 40% in 1994 to about 52% in 1997, a change of 12% points (appendix table A3). In the same period, the change in depth and severity of poverty rose by 2% and 0.5% points respectively (Table 2). The results suggest that growth accounted for about 20% of the total change in the incidence of poverty, while redistribution accounted for about -9%. These results show that the incidence of poverty increased largely as a result of a fall in mean incomes, but changes in redistribution had an insignificant effect of reducing poverty. There was also a higher contribution of growth to variations in the depth (5%) and severity (2%) of poverty, supporting increased poverty due to a fall in mean incomes; compared to reductions due to changes in redistribution (approximately -2 to -3%). Further, we find that the changes in the growth component outweighed the changes in poverty over the period, implying that the increase in poverty would have been worse if changes in redistribution had been adverse. The second last column presents the residual component of changes in poverty. For all three poverty measures, the residual is quite low. This means that the effect of the interaction between growth and redistribution terms on poverty is quite small. In other words, there is little variation in poverty that is not explained by changes in either mean income or distribution.

The increase in poverty between 1994 and 1997 seems quite inconsistent with the growth pattern over the period. There seem to have been sustained growth rate of GDP between 1994 and 1996, rising from 2.3% to 4.1% (African Development Indicators, 2010). Though the rate thereafter recorded a sharp fall to 0.47% in 1997, it is unlikely that this drastic fall led to a 12% and 2% increase in the incidence and depth of poverty respectively. The observed trend in growth and poverty over the period is attributable to a massive recession that hit the country in 1997. This lead to increased poverty and declining growth. Inequality seems to have declined marginally, but overall growth was not pro-poor because the rise in poverty surpassed the improvements in distribution of income.

Table 2: Decomposition of Poverty into Growth and Redistribution Components; 1994-1997

	Growth contribution*		**Redistribution contribution**			Difference in poverty 1997 -1994
	Datt & Ravallion	Shapley	Datt & Ravallion	Shapley	Residual (D&R)	
Incidence	0.233 (0.172)	0.203	-0.055 (-0.116)	-0.085	-0.062 (0.062)	0.117
Depth	0.061 (0.045)	0.053	-0.023) (-0.039)	-0.031	-0.016 (0.016)	0.022
Severity	0.024 (0.015)	0.020	-0.011 (-0.019)	-0.015	-0.009 (0.009)	0.005

*Values in parenthesis are for 1997 as reference period. All empirical analysis in this paper is done using the DASP 2.1 distributive software (Araar, A and Duclos, J. Y, 2009).

Table 3 presents the decomposition results for the period 1997 to 2006. During this period, the incidence of poverty declined by 4.6% points, while the depth of poverty declined by a modest 0.9%. This reduction in poverty was occasioned by declines in the growth component resulting from a growth in mean incomes. As observed for the changes between 1994 and 1997, the redistribution component for the period under review was also negative (except for severity) but rather modest, suggesting a poverty reduction effect. For severity of poverty, increased inequality led to an increase in poverty that outweighed the increase in mean incomes. Overall severity of poverty consequently increased marginally by 0.1% points. The residuals arising from the decomposition for the three poverty measures are quite modest.

Table 3: Decomposition of Poverty into Growth and Redistribution Components; 1997-2006

	Growth contribution*		Redistribution contribution			Difference in poverty 2006 -1997
	Datt & Ravallion	Shapley	Datt & Ravallion	Shapley	Residual (D&R)	
Incidence	-0.013 (-0.014)	-0.014	-0.032 (-0.033)	-0.033	-0.001 (0.001)	-0.046
Depth	-0.004 (-0.004)	-0.004	-0.005 (-0.004)	-0.005	0.001 (-0.001)	-0.009
Severity	-0.002 (-0.001)	-0.002	0.002 (0.003)	0.003	0.0003 (-0.0003)	0.001

*Values in parenthesis are for 2006 as reference period

It is important to note that although the decline in poverty over the period 1997 to 2006 was only 4.6%, the period was characterized by impressive growth in GDP from 0.47% in 1997 to about 6% in 2005/2006. However, the slow response of poverty to growth could be due to fluctuations in the growth rate of incomes. The annual percentage growth rate of GDP dived from 2.3% in 1999 to 0.6% in 2000. There was however remarkable recovery in 2001 (3.78%), but another nose dive to 0.55% in 2002. The growth rate thereafter picked up to gradually rise to a peak of

7.1% in 2007 (African Development Indicators, 2010). It is probable that growth in inequality of distribution of income may also have contributed to the slow responsiveness of poverty to growth.

The decomposition of changes in poverty between 1994 and 2006 are presented in Table 4. The results show that the incidence of poverty increased by about 7% points (from 39% in 1994 to 47% in 2006), while the depth and severity of poverty increased by 1% and 0.6% points respectively. Like for the period 1994 to 1997, the results show that poverty increased mostly due to a fall in mean incomes, though the redistribution component contributed between 1% and 11% to changes in poverty. The paradox alluded to earlier resurfaces in this case. From the changes in the growth rate of GDP discussed above, one would have expected a decline in poverty between 1994 and 2006, other factors held constant. The dive in the growth rate in GDP in 1997 is unlikely to fully account for the increase in poverty between 1994 and 2006 given that there was impressive reduction between 1997 and 2006. As hinted earlier, most probably, though there was a modest improvement in redistribution, variations in distribution of income and other resources most likely account for this scenario.

Table 4: Decomposition of Poverty into Growth and Redistribution Components; 1994-2006

	Growth contribution*		Redistribution contribution			Difference in poverty 2006 -1994
	Datt & Ravallion	Shapley	Datt & Ravallion	Shapley	Residual (D&R)	
Incidence	0.212 (0.153)	0.183	-0.082 (-0.141)	-0.111	-0.059 (-0.059)	0.071
Depth	0.055 (0.031)	0.043	-0.018 (-0.042)	-0.030	-0.024 (0.024)	0.013
Severity	0.022 (0.011)	0.017	-0.005 (-0.016)	-0.011	-0.011 (0.011)	0.006

*Values in parenthesis are for 2006 as reference period

5. 2 Has Growth Been Pro-poor?

We use several pro-poor growth indices to assess the extent to which growth in Kenya has been pro-poor. From the previous section, it seems as though the growth rate of the economy has not always been accompanied by poverty reduction. Even where poverty seems to have responded to growth, the response has been quite low. Table 5 presents pro-poor growth indices based on the Ravallion and Chen (2003), Kakwani and Pernia (2000), and Kakwani, Khandker and Son (2003) approaches. The growth rates in mean income (g) estimated from the data are presented in row 3. A positive growth rates shows that mean incomes increased over the period. A negative growth rate implies that incomes declined. Thus consistent with changes in poverty over the

period, Kenya experienced negative changes in mean incomes between 1994 and 1997, but a modest positive growth between 1997 and 2006[4].

Table 5: Pro-poor Growth Indices: 1994-2006

	1994-1997			1997-2006		
	Incidence	**Depth**	**Severity**	**Incidence**	**Depth**	**Severity**
Growth rate of mean income (g)	-0.320			-0.025		
Ravallion & Chen (2003) index	-0.258			-0.005		
Ravallion & Chen (2003) - g	0.062			0.019		
Kakwani & Pernia (2000) index	0.504	0.229	0.097	-1.773	-0.589	0.890
Poverty equivalent growth- PEGR index	-0.161	-0.073	-0.031	0.044	0.014	-0.022
Poverty equivalent growth -PEGR - g	0.159	0.247	0.290	0.068	-0.039	0.003

Note that (i) the actual GDP growth rates for the period were -2.16% for 1994-1997 and 5.84% for 1997-2006. (ii) The Ravallion & Chen (2003) indices are the same for all poverty measures as the index is not linked to give social order. The indices would only be different if there was first order pro-poor dominance (Duclos, 2009), which is not the case for our distribution.

To assess whether growth was pro-poor, we compare the changes in mean income with the pro-poor growth indices. The larger the indices, the greater will be the proportional reduction in poverty. Growth in mean incomes (g) would be defined as pro-poor if the estimated pro-poor growth index is greater than (g). First, it is important to note that unlike the Kakwani group of indices, the Ravallion and Datt indices predict similar effects of growth irrespective of the poverty measure. Our results show that between 1997 and 2006, except for the Kakwani & Pernia index for incidence and severity of poverty, all other pro-poor growth measures exceeded the mean growth rate (g), suggesting that growth was pro-poor. The low pro-poor indices of PEGR-g for severity of poverty relative to the other measures of poverty show that the ultra poor benefitted less proportionately from the benefits of growth in incomes and poverty reduction in 1997- 2006. The Ravallion and Chen index is less than the growth rate suggesting that growth was pro-rich rather than pro-poor. In other words, the rich benefitted more proportionately than the poor from income growth. The same result is implied by the PEGR estimates for the severity of poverty.

[4] The estimates for the period 1994-2006 are not presented to save on space. However, it is important to note that the mean growth rates and pro-poor indices for the period, though different in magnitude are consistent with those for the 1994-1997 period.

We further plot growth incidence curves to illustrate the extent to which growth in mean incomes has been pro-poor or otherwise. For a given percentile (P), the GIC gives the proportion of change in quantile Q(P) between the two periods. If the growth of average incomes is negative, the curve will be under the zero horizontal line and vice versa. Figure 1 presents the GIC for the period between 1997 and 2006. The curve suggests that growth was pro-poor between the 1st and 9th percentiles. This is consistent with the pro-poor growth indices.

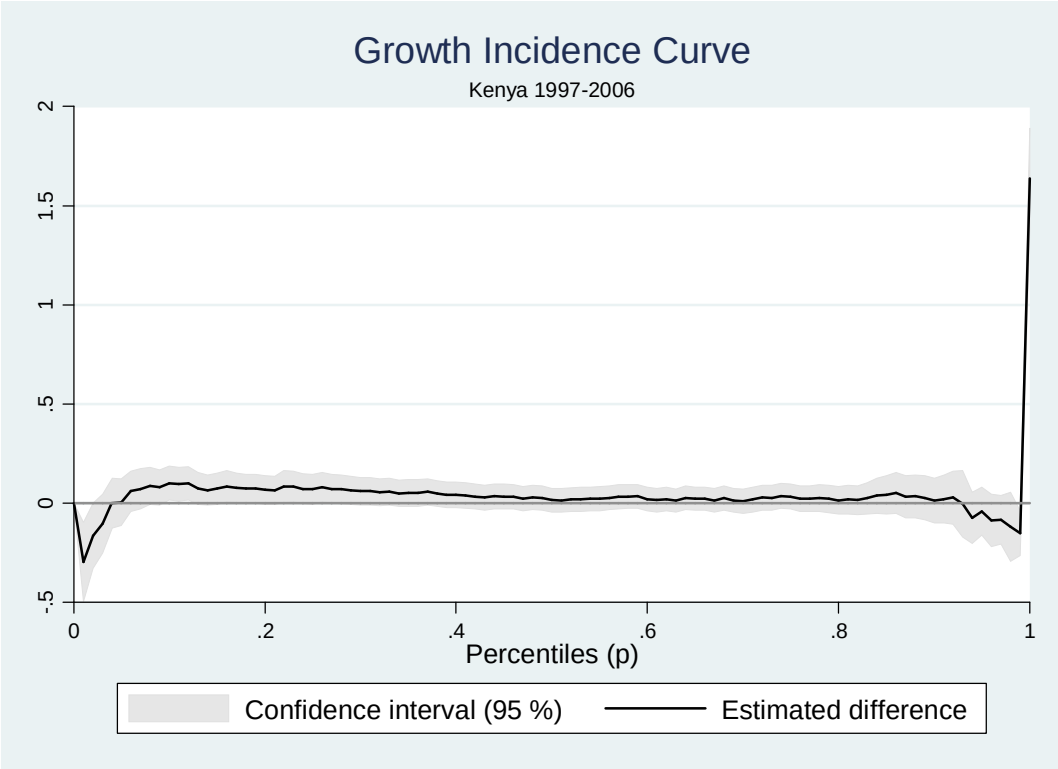

Figure 1: Growth Incidence curve, 1997 to 2006

The growth rate of mean income for 1994-1997 was negative, suggesting that consistent with changes in poverty rates over that time period, there was a decline in the growth rates of income. The question that arises then is how this negative growth could have impacted on the poor. A positive pro-poor index in a case of a negative growth rate of mean income implies that changes in inequality may have led to reduction in poverty irrespective of negative growth rates. This seems to have been the case for this time period according to the Ravallion and Chen; Kakwani and Pernia, and also the PEGR growth estimates. The results further suggest that the ultra poor benefitted less proportionately to this reduction of poverty arising from changes in inequality.

Figure 2 presents the GIC between 1994 and 1997. Consistent with the pro-poor growth indices, the curve suggests two things: first, growth over the period declined; and second, changes in mean income may not have been pro-poor. The same trend was observed between 1994 and 2006 (Figure 3).

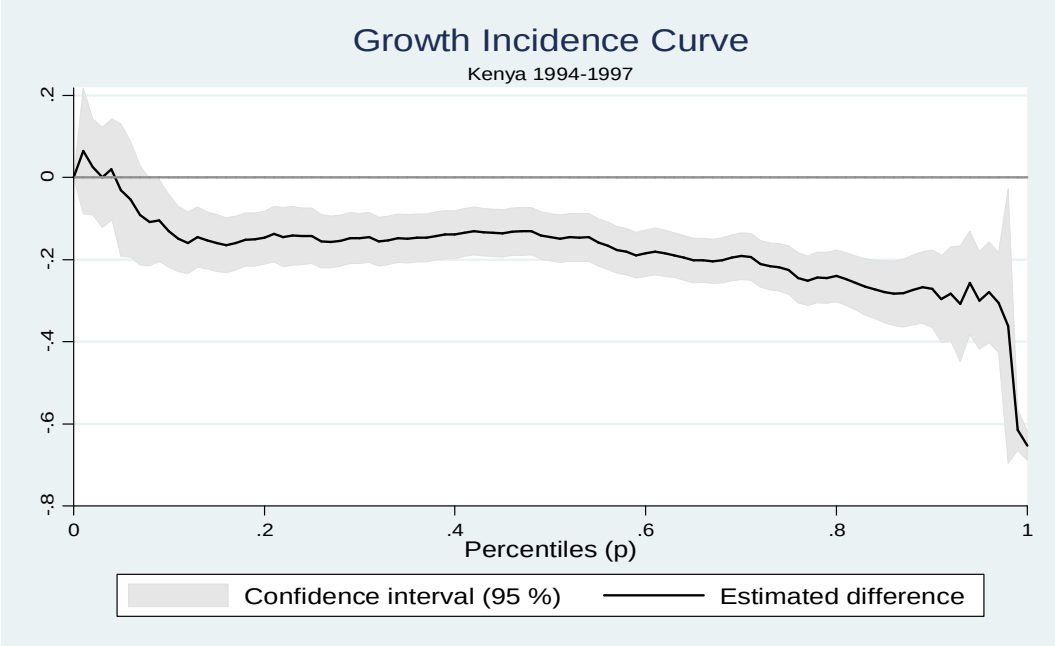

Figure 2: Growth Incidence curve, 1994 to 1997

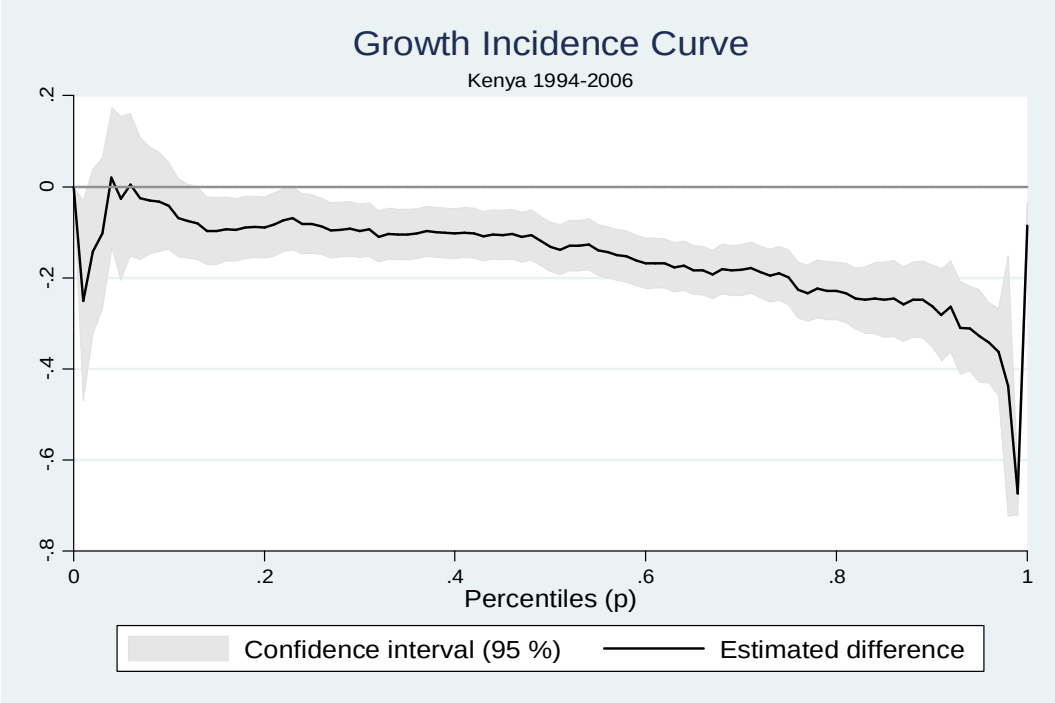

Figure 3: Growth Incidence curve, 1994 to 2006

5.3 Institutions, Poverty and Inequality

5.3.1 Impact of Institutional factors on Poverty

To explore the impact of institutional and other variables on well-being, we use the OLS regression model estimates from the regression based decomposition framework. We present determinants of poverty by area of residence for 1997 and 2006. To save on space, we do not present any results for 1994 in this section as we do not have any institutional variables for the period.

The results for 1997 are presented in Table 6. The F values for all sub-samples are significantly different from zero at all conventional levels of significance, implying that the models fit the data better than the intercept only model. The R^2 indicates that the variables explain between 23% and 60% of the total variation in adult equivalent monthly expenditures. The male sex dummy has a positive significant impact, supporting results for 2006 which showed that male headed households are less poor than female headed households. The results for education are also

consistent with results for 2006. Relative to no education, attainment of higher levels of education increases well-being at an increasing rate.

Institutional endowment is captured by several factors, all measured in per capita terms: number of active cooperatives, number of constituencies, number of townships and number of health centers. Land tenure institutions are captured by free land holding and total land under water. The per capita number of active cooperatives is associated with higher household well-being. Cooperative societies are important for mobilization of resources for development, more so in rural areas. We do not uncover significant impacts of number of constituencies and townships, though they are both associated with higher welfare. Number of health centers is an important and significant determinant of welfare; supporting evidence that access to basic social services is important for household welfare (Kabubo-Mariara et al. 2009). Per capita free hold land held by individuals has a positive significant effect on monthly expenditures for the rural areas and overall sub-sample. This suggests a poverty reduction role of land tenure security. Total area under water exerts a negative impact on household monthly expenditure except for urban areas, implying that communities with a lot of water experience higher levels of poverty than their counterparts with less water. This could be explained by the fact that such communities may have a lot of waste water (e.g. flood plains) which adversely affects productivity and welfare.

The results for 2006 are presented in Table 7. The F test results suggest that the model fits the data better than an intercept only model for rural, urban and full samples. The independent variables explain between 41% and 58% of the total variation in monthly adult equivalent household expenditure.

The results show that male sex dummy has a positive significant effect of well-being, with the largest impact observed in urban areas. This supports previous literature in Kenya, which has shown that female headed households are poorer than their male counterparts (Kabubo-Mariara, Ndeng'e and Mwabu 2009; Mwabu et al., 2000). Relative to no education, attainment of both primary and post primary education is associated with higher well-being. Furthermore, the welfare improving impact of education increases as the level of education attainment increases. The impact for post primary education is stronger in urban than in rural areas. Education attainment opens up opportunities for alternative income earning/generation activities such as paid and self employment. Higher education attainment is also associated with increased returns to labour through higher productivity for those in wage employment and through better managerial practices for those in self employment.

Table 6: Regression results: Dependent Variable is Log Monthly Household Expenditure per adult Equivalent-1997

Variable[Ψ]	Rural	Urban	Full sample
Sex	-0.1197	0.5383***	-0.0531
	[0.078]	[0.173]	[0.072]
Primary education	0.3430***	-0.2484	0.3976***
	[0.076]	[0.248]	[0.070]
Post primary education	0.9484***	0.3463	1.0792***
	[0.089]	[0.248]	[0.074]
Time spent to get water	-0.0298***	-0.0246	-0.0368***
	[0.011]	[0.032]	[0.010]
Piped water	0.1963***	0.2020*	0.2762***
	[0.046]	[0.103]	[0.040]
Kerosene for lighting	-0.2231**	-0.5205***	-0.5235***
	[0.106]	[0.073]	[0.058]
Institutional factors			
Number of active cooperatives	0.1623***	0.5646***	0.2192***
	[0.054]	[0.189]	[0.051]
Number of constituencies	1.4662	5.2787	2.3061
	[3.782]	[11.521]	[3.510]
Number of towns	0.0575	0.0198	0.0583
	[0.074]	[0.129]	[0.065]
Number of health centers	2.5780*	0.3039	2.4103*
	[1.358]	[3.143]	[1.250]
Total free hold land, in km^2	0.0465***	0.0035	0.0377***
	[0.015]	[0.046]	[0.014]
Total area under water, in km^2	-0.0820***	0.0408	-0.0733***
	[0.023]	[0.117]	[0.022]
Constant	7.3147***	7.6873***	7.5278***
	[0.133]	[0.281]	[0.099]
F(12, --)	20.24***	22.35***	101.45***
No. of Observations	793	195	988
R-squared	0.237	0.596	0.555

Note: Ψ-All institutional variables are measured at district level and expressed into per capita terms.
***, **, * Significant at 1% 5% and 10% respectively. Standard errors in parenthesis.

Table 7: Regression results: Dependent Variable is Log Monthly Household Expenditure per adult Equivalent- 2006

Variables	Rural	Urban	Full sample
Sex	0.1555**	0.2322**	0.1550***
	[0.068]	[0.103]	[0.057]
Primary education	0.2642***	0.0534	0.2185***
	[0.063]	[0.123]	[0.055]
Post primary education	0.5075***	0.5411***	0.6069***
	[0.067]	[0.107]	[0.055]
Piped water	0.1099**	0.0598	0.0629*
	[0.044]	[0.053]	[0.035]
Time spent to get water	-0.0019**	-0.0046	-0.0024***
	[0.001]	[0.003]	[0.001]
Distance to tar/asphalt road	-0.0004	-0.0003	-0.0006**
	[0.000]	[0.000]	[0.000]
Road in good condition	0.0694**	0.1108***	0.1053***
	[0.035]	[0.038]	[0.027]
Distance to nearest dist head quarters	-0.0009***	0.0003	-0.0008***
	[0.000]	[0.000]	[0.000]
Distance to nearest daily market	-0.0009*	0.0001	-0.0010**
	[0.000]	[0.002]	[0.000]
Distance to nearest bus stage	-0.0016*	-0.0014	-0.0020***
	[0.001]	[0.001]	[0.001]
Crime increased compared to the previous year	-0.0504**	0.0435	-0.033
	[0.025]	[0.036]	[0.021]
Proportion of land under forest	-0.0022**	0.0021	-0.0018*
	[0.001]	[0.002]	[0.001]
Fuel wood for cooking	-0.8140***	-0.6394***	-0.7099***
	[0.070]	[0.087]	[0.045]
Kerosene for lighting	0.3468***	-0.2964***	0.0988**
	[0.070]	[0.063]	[0.050]
Constant	7.8177***	8.2127***	7.9334***
	[0.100]	[0.139]	[0.074]
F(14, --)	37.41	26.61	113.69
R-squared	0.413	0.511	0.588
No. of Observations	760	372	1,132

***, **, * Significant at 1% 5% and 10% respectively. T values in parenthesis.

Access to piped water has a welfare improving effect, which is significant for the rural and full samples. The coefficients also show that the impact is much higher in rural than in urban areas. On the other hand, time taken to get to the main source of water has a negative significant impact on monthly expenditure in rural areas and in the full sample. The results for the two variables suggest the importance of improving access to water, especially for rural households. In rural areas, households spend a lot of time collecting water and therefore diverting time that would have been invested in more productive activities.

A number of factors are included to capture market access: distance to good roads, the proportion of good roads in the community, and distance to facilities (district head quarter, daily markets and bus stop). The results suggest that market access is a significant determinant of well-being, though the impact of individual variables is small. Distance to district head quarters and daily market have insignificant effects in urban areas, but the impacts are larger and significant in rural areas. This is not surprising given that the mean distance for all these facilities in urban areas is quite modest. The impact of the quality of roads in urban areas is almost 2 times the impact in rural areas. This probably reflects time and productivity losses arising from heavy urban traffic jams and wear and tear of vehicles. In rural areas, residents have to travel long distances to access the nearest all-weather roads and it is difficult, sometimes impossible to transport farm produce to the market, deliver agricultural services and inputs, access social services such as education and health, and even urban centers, where most government administrative offices are located. The results support earlier studies which find that access to basic services and infrastructure is important for household welfare (Kabubo-Mariara et al. 2009; Kebede and Shimeles, 2004). This calls for market access enhancing policies in order to improve welfare.

On safety and security, we test the impact of perceived changes in the level of crime in the community. Perception of increased crime has a significant welfare decreasing impact in rural areas. Increased crime could reduce welfare through several channels: productivity declines due to increased fear and stress; time and money spent to abate crime; and costs associated with remedial actions following criminal attacks. The impact in urban areas is positive and significant.

The proportion of land under forest in a community is included to capture the impact of government trust land on household well-being. We find that this variable has a significant welfare reducing impact. Though one would expect publicly owned land to yield positive returns to local communities, the results may imply that the benefits from the forests are purely non-monetary and may be difficult to capture in a money metric model. Crime and violence threaten the basic welfare of Kenyans through multiple channels, especially when every household has to invest on improving security at household level. The proceeds of that investment could be higher if it was spent on other welfare improving activities. Beyond the direct effects on households, (such as health spending and reduced productivity), crime and violence inflict widespread costs,

generating a climate of fear for all citizens and could have adverse effects on both household incomes and overall economic growth.

The last two factors capture access to cooking and lighting fuel. Use of traditional fuels such as wood and kerosene for cooking and lighting respectively is expected to be mostly for less wealthy households as their richer counterparts would have greater access to cleaner fuels (such as electricity, liquefied petroleum gas, solar energy and bio fuels). The results show that use of wood fuel has a significant negative impact of welfare. Use of kerosene has a positive impact in rural areas, but a negative impact in urban areas. The negative significant impact reflects the cost associated with traditional fuels. A lot of time is wasted collecting fuel wood, diverting time from more productive activities. In addition there are environmental health problems associated with carbon emissions from wood fuel and kerosene. For the rural sample, the positive significant impact of kerosene use probably reflects un-affordability of kerosene by most rural households. Kerosene is very expensive and only relatively less poor households can afford.

5.3.2 Determinants of Growth

We investigate the link between various factors and growth by analyzing the determinants of changes in mean incomes (expenditures) between 1994 and 2006. To carry out this task, we generate a community panel from the three datasets, and compute the growth in mean income. We then investigate the correlates of growth through OLS regression using the pooled data (Table 8), and also a fixed effects panel regression model (Table 9). In generating the community data, we lose the institutional variables which are uncommon in the three surveys. We therefore cannot link institutions to growth in mean incomes. Community characteristics for 1994 are used as explanatory variables. The pooled regression results (Table 8) suggest that growth in mean incomes is an inverse function of time spent to fetch water, but a positive function of access to piped water. We however do not find a significant effect of the latter in urban areas. The results seem to suggest that time to fetch water has a larger impact in urban than in rural areas, while access to piped water is more important in rural areas. It is likely that the issue of time in urban areas affects mostly slum dwellers, whom in some cases face more severe water shortages than rural dwellers. Growth in mean incomes is also inversely correlated to the proportion of households using kerosene, but the impact is insignificant for rural communities. This result supports earlier finding on welfare losses associated with ill environmental health from use of kerosene.

Relative to no education, primary education is associated with improved welfare, though the impact is insignificant for the sub-samples. Post primary education seems to matter twice as much for urban than for rural areas. Like observed with the determinants of poverty, education improves growth in mean incomes at an increasing rate. The 1997 year dummy suggests that

growth declined in 1997 compared to the other two periods. The impact is however insignificant for rural areas. The rural area dummy suggests that rural areas experienced lower growth in expenditures than urban areas, all other factors held constant. Overall, the rural model displays a rather poor fit and has a relatively low R-squared value compared to urban model.

Table 8: OLS Regression Results: Dependent Variable is Growth in Mean Monthly Household Expenditure between 1994 and 2006.

Variables	**Rural**	**Urban**	**Full sample**
Time spent to get water	-0.0054***	-0.1117***	-0.0135***
	[0.002]	[0.021]	[0.003]
Piped water	0.3689***	0.32	0.3255***
	[0.086]	[0.299]	[0.099]
Kerosene for lighting	-0.0536	-2.1917***	-0.9851***
	[0.137]	[0.333]	[0.191]
Age of head	0.0090**	0.0141	0.0171***
	[0.004]	[0.014]	[0.005]
Male sex dummy	0.0805	-0.8848	-0.1683
	[0.126]	[0.564]	[0.170]
Head employed/in business	0.1445	-0.018	0.2266**
	[0.094]	[0.294]	[0.111]
Primary education	0.0966	0.5178	0.3708**
	[0.121]	[0.586]	[0.153]
Post primary education	0.2579*	0.5035	0.4221**
	[0.148]	[0.536]	[0.178]
1997 Dummy	-0.0261	-1.6045***	-0.3250***
	[0.060]	[0.253]	[0.072]
Rural area dummy			-1.1312***
			[0.117]
Constant	-0.1407	4.5008***	1.8734***
	[0.256]	[1.058]	[0.343]
No. of observations	1,480	438	1,918
R-squared	0.039	0.226	0.243
F(9, ---)	5.63	14.32	25.92

***, **, * Significant at 1% 5% and 10% respectively. T values in parenthesis.

In Table 9, we present the fixed effects panel regression results. In this model, we only include time variant variables. The results suggest that the model explain about 31% of the total variation in growth in mean incomes and that the overall model is significant and thus better than an intercept only model. The results are consistent with those of the pooled model. Growth in mean incomes is inversely correlated with time to fetch water and use of kerosene for lighting. Access

to piped water is clearly welfare improving. The results further suggest that growth rates in mean income declined in 1997 relative to the other two survey years. We also find that relative to urban areas, rural areas experienced declining growth rates.

Table 9: Community Panel Regression: Dependent Variable is Growth in Monthly Household Expenditure between 1994 and 2006.

Variable	Coefficient	Robust Std. Err.	t
Time spent to get water	-0.015***	0.004	-3.32
Piped water	0.591***	0.136	4.36
Kerosene for lighting	-0.815***	0.239	-3.41
1997 Dummy	-0.324***	0.083	-3.91
Rural area dummy	-1.487***	0.163	-9.12
Constant	2.734	0.232	11.76
Sigma_u	1.052		
Sigma_e	1.493		
Rho	0.332		
F(5,984)	54.69***		
No. of observations	1918		
Number of groups	985		
R-squared	0.3115		

***, **, * Significant at 1% 5% and 10% respectively. T values in parenthesis.

5.3.3 Institutions and Inequality - Regression based Decomposition results

To assess the impact of institutions on inequality, we compute contributions of the various factors using the Shapley value approach. In addition, we control for the impact of sex and education among other factors[5]. The Shapley value approach allows us to assess the impact of each of the variables to inequality, by estimating the expected marginal contribution of different income sources. We compute the contributions of the various income sources by Gini index, the Coefficient of Variation and the Generalized Entropy index (0.5 and 2).

The decomposition results for 1997 (based on regression results presented in table 6) are presented in Table 10. The results based on the Gini index show that of the various sources, education contributes the largest proportion to inequality at 26%. This is followed by availability of water (16%) and fuel (14%). Institutional factors make a relatively small contribution to

[5] Note that in the regression based decomposition, we construct categories from group of variables rather than use individual variables as in the OLS regression model presented in section 5.3.1. For instance, education combines the 2 categories of education attainment, while market access combines the 5 indicators into 1 category (Ravallion and Chen, 1999).

inequality. The highest contribution of institutional factors is from number of cooperatives and townships, at only 3%. Gender contributes the least to inequality, suggesting that though gender differentials in income may be observed, it is not gender of the head as such that causes the differentials in incomes, but it is more the policies that lead to differential access to various income sources by men and women. The residual contributed 39% of the total observed inequality in 1997. Decomposition using the coefficient of variation and the GE also rank education as the highest contributor to inequality. The contributions of gender to the coefficient of variation and to the GE are negative, but quite small. Gender of the head makes the lowest contribution to inequality irrespective of the measure used. The residual contributed 26% to changes in the coefficient of variation and between 25% and 39% to the Generalized Entropy Index.

Table 10: Total Inequality Decomposition by Estimated Income Sources- Shapley value, 1997

		Coefficient of	Generalized entropy	
Variable	**Gini Index**	**Variation**	**(Theta= 0.5)**	**(Theta= 2)**
Constant	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Sex	0.000 (-0.001)	-0.001 (-0.003)	-0.002 (-0.006)	-0.003 (-0.004)
Education	0.091 (0.256)	0.053 (0.161)	0.093 (0.240)	0.164 (0.186)
Availability of water	0.056 (0.156)	0.031 (0.093)	0.055 (0.142)	0.091 (0.104)
Fuel	0.051 (0.143)	0.035 (0.106)	0.073 (0.188)	0.121 (0.137)
Land tenure	0.006 (0.018)	0.002 (0.007)	0.002 (0.006)	0.005 (0.006)
Number of constituencies	0.002 (0.004)	0.001 (0.002)	0.002 (0.004)	0.002 (0.003)
Market institutions (Cooperatives and townships)	0.012 (0.033)	0.006 (0.018)	0.011 (0.028)	0.018 (0.020)
Health centers	0.001 (0.003)	-0.001 (-0.004)	-0.003 (-0.008)	-0.004 (-0.004)
Residual	0.138 (0.389)	0.081 (0.247)	0.124 (0.320)	0.232 (0.264)
Total Value	0.356 (1.000)	0.330 (1.000)	0.387 (1.000)	0.880 (1.000)

Note: Figures are absolute contribution. Relative contributions in parenthesis

The marginal contributions of the estimated income sources based on the Gini approach for 1997 are presented in appendix Table A5. The results show that at level 1, education, availability of

water and land tenure institutions made the largest marginal contribution to the Gini Index at 0.014, 0.009 and 0.007 respectively. Education retains the highest marginal contribution as other sources of incomes are included, but the contribution dropped to 0.008 when all other possible sources are considered. Water and land tenure also maintained relatively high contributions when all other factors are added. Thus policy focus should have been on equalizing education and supporting poor households through provision of adequate water and strengthening land tenure institutions. Gender of the head had the lowest marginal contribution at only 0.0006, which declined to -0.0002 at level 10. The marginal contribution of the residual declined from 0.022 to 0.009 when all possible sources of inequality were taken into account. The estimated marginal contribution of all other factors also decline with the inclusion of other dimensions of well-being. The marginal contribution of gender of the head and availability of health institutions drops to negative values from level 4. This implies that after some point, with pursuance of different policies and strategies, inequality arising from gender differentials and access to health services is reversed to move towards equality in the distribution of income.

The decomposition results for 2006 are presented in Table 11 (based on regression results presented in table 7). The results based on the Gini decomposition shows that the highest contribution to inequality was from use of fuel and education attainment. Safety and security and land use contributed the least to inequality. Fuel contributed 32% to inequality. This suggests that use of traditional fuels is a major source of inequality. Households using traditional fuels such as wood have to spend time collecting firewood, thereby diverting time from more productive economic activities. In addition, there are health hazards related to use of traditional fuels (wood and kerosene), with household members facing the risk of upper respiratory track diseases. Market access contributed 8% to total inequality. Since the impact is positive, the results imply that remote areas are likely to have lower incomes than more accessible areas. Education contributed only 15% to inequality. Access to water contributed 4% to total inequality. Rich household are likely to have better access to piped water, while poor households will rely on unprotected water sources, which like traditional fuels are associated with health hazards, more so water borne diseases. In addition, collecting water from such sources can be quite time consuming resulting in productivity losses. The residual contributed to 38% of the total inequality.

Table 11: Total Inequality Decomposition by Estimated Income Sources- Shapley value, 2006

Variable	Gini Index	Coefficient of Variation	Generalized entropy	
			(Theta= 0.5)	(Theta= 2)
Constant	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Sex	0.005 (0.016)	0.005 (0.007)	0.001 (0.013)	0.002 (0.010)
Education	0.045 (0.148)	0.081 (0.123)	0.022 (0.194)	0.036 (0.166)
Water	0.013 (0.044)	0.023 (0.036)	0.007 (0.058)	0.010 (0.046)
Market Access	0.025 (0.082)	0.041 (0.062)	0.012 (0.108)	0.018 (0.082)
Security and safety	0.001 (0.002)	-0.001 (-0.002)	0.000 (-0.004)	-0.001 (-0.003)
Land use	0.002 (0.007)	0.001 (0.002)	0.001 (0.006)	0.000 (0.002)
Fuel	0.096 (0.319)	0.232 (0.353)	0.052 (0.451)	0.074 (0.340)
Residual	0.115 (0.380)	0.277 (0.420)	0.061 (0.532)	0.087 (0.404)
Total Value	0.301	0.658	0.115	0.217

Note: Figures are absolute contribution. Relative contributions in parenthesis

Column 3 of Table 11 shows the decompositions results using the coefficient of variation. The results show that the ranking of the contribution of estimated income sources is consistent with the results using the Gini index. In most cases, the absolute contributions are however much higher than in the case of the Gini, while the relative contributions are lower. Another difference observed is that safety and security contributed negatively to inequality. Though the impact is quite small, the negative effect suggests equalizing effect of safety and security. The residual contributed 42% of total inequality measured through the coefficient of variation. The total estimated coefficient of variation is 0.658.

The decomposition results using the generalized entropy index are presented in the last 2 columns of Table 11. In terms of ranking of contributions of different factors to inequality, the results are consistent with those for the Gini Index and also for the coefficient of variation. Though the contributions of different factors when theta =0.5 are much lower than those from the Gini index, for most factors, the absolute contributions from different sources for theta =2 are basically similar to those obtained from the Gini index. The contribution of the residual for theta =2 is higher than for the Gini index and explains 40% of the total inequality. Similar to the results based on the coefficient of variation, the contribution from safety and security is negative. The estimated generalized entropy indices were 0.115 for theta equals to 0.5 and 0.217 for theta

equals to 2. The consistency of the results presented in Table 11 suggests that the policy focus for dealing with inequality is clear. The results give insights on key policy variables at play: access to fuel, education, markets and water. The contribution of the residual is however relatively high, suggesting that it is important to also think of other possible sources of inequality.

To save on space, we only report the marginal contributions of the estimated income sources based on the Gini index. Though the results based on all the three inequality indices are consistent, it is important to recall that in the literature, the Gini index is more widely used because it is considered the inequality index that behaves the best in decomposition analysis. The results for 2006 are presented in the appendix Table A6. The relative marginal contributions from different factors follow the same pattern as the estimated contributions to inequality. Fuel has the highest marginal contribution at about 0.01. This is followed by education (0.004 to 0.008) and market access (0.002 to 0.005). Land use and gender of the household head have the lowest marginal contribution to inequality. The contribution of security and safety drops to negative from level 5. Higher levels imply inclusion of other sources of income/dimensions of well-being. The results show that fuel retains the highest marginal impact, although the contribution drops from 0.014 to 0.009 when all other possible sources are considered.

The marginal contribution of the residual term drops from 0.032 to 0.02 as all other possible sources are included. The trend in contribution from different variables as other variables are successfully included suggest that though individual sector policies and targeting is important for improved redistribution of income, a complementary approach should be adopted because bridging disparities in one variable alone will only have a small marginal impact on inequality.

Appendix Table A4 presents a decomposition of changes in inequality by income sources between 1997 and 2006, based on equation (16). For all measures of inequality, the results suggest that the largest sources of changes in inequality were fuel, water and education, while the least contributors were security, land use and gender. Fuel, market access and gender were associated with increased inequality, while access to water, education and land use patterns had an equalizing effect.

6 Conclusions and Policy Recommendations

6.1 Conclusion

Macroeconomic indicators show that economic growth in Kenya fluctuated, but recorded an upward trend between 1994 and 1996. Growth dropped significantly in 1997. This was followed by a period of impressive recovery up to 2007. During the same period, poverty increased by 13% points between 1994 and 1997, but thereafter declined by about 5% points in 2005/6. Inequality however increased over the period, probably frustrating the impact of growth on poverty reduction. Against this background, this paper investigates the poverty-economic growth nexus in Kenya. Specifically, the paper sought to analyze the linkage between inequality, poverty and economic growth, assess the extent to which growth in Kenya has been pro-poor and to explore the link between institutions, poverty and inequality. The study used the 1994 and 1997 Welfare Monitoring Surveys (WMS) and the 2005/6 Kenya Integrated Household (KIHBS) Survey datasets. Several methodological approaches are used to achieve the objectives of the study. These include the Ravallion and Datt and Shapley decomposition approaches, pro-poor growth indices and growth incidence curves; and regression based decomposition using the Shapley value.

The poverty decomposition results show that changes in poverty between 1994 and 2006 were driven largely by changes in mean income rather than changes in inequality. The results further suggest that economic growth in Kenya is not always accompanied by poverty reduction. The high economic growth rates between 1994 and 2006 were not accompanied by commensurate rates of poverty reduction. Pro-poor growth indices and the growth incidence curves show that growth was pro-poor between 1997 and 2006, but not between 1994 and 1997. The results further suggest that the ultra poor benefitted less proportionately from the benefits of growth in incomes and poverty reduction as well as from changes in inequality in 1997- 2006. We also found that in some instances, growth may have been pro-rich rather than pro-poor. That is, the rich benefitted more proportionately than the poor from income growth.

The OLS results suggest that in 2006, gender of the head, education and fuel were significant household level determinants of poverty. Distance to facilities and other institutional factors were also found to be important and significant drivers of poverty, more so in rural areas. Access to fuel and education had the largest impacts, suggesting the importance of investments in cleaner fuels and continued investment is education on the other. The results for 1997 also show that education, fuel, access to water and institutional variables were important and significant determinants of household well-being, especially in rural areas. The regression based decomposition results suggest that fuel, market access and education attainment were the most important determinants of inequality in 2006. In 1997, the key sources of inequality were education, availability of water and fuel. Though gender and safety/security variables had relatively low contribution to inequality, they were observed to have an equalizing effect.

Growth regressions results suggest that fuel and access to water and education are the most important correlates of growth. Rural areas experienced lower growth in incomes than urban areas, while lower growth was observed in 1997 compared to the other years.

The findings of this paper point at the need for policies related to access to fuel and water, educational attainment, market access and safety and security. First there is need for policies that facilitate affordability and access to fuel by the poor, such as fuel subsidies and reduced taxation on fuels used by the poor, especially kerosene in the wake of escalating energy price. Second, there is need for market-based approaches to water utilization including pollution control and taxes as wee as appropriate incentive-based instruments to ensure access by the poor. Water tariffs should be designed in a progressive manner to ensure that they are pro-poor. Third, the role of education in pro-poor growth cannot be over-emphasized. Special attention must be paid to breaking the poverty cycle for children that limits their participation in schools. The Government should fund early childhood education development programmes that are currently under invested to ensure good quality education for all children at all levels. The Government should also support attempts to provide education outside the formal system so as to cater for poor households and children's diverse needs and even to provide additional support outside academic classes. Fourth, market access has important implications for pro-poor growth and reduced inequalities. Majority of Kenya households are either small holder farmers or business persons engaged in agro-related business. Market enhancing policies must take into account resource endowment, capital, knowledge, and services, as well as intra-household patterns of resource allocation by small holders. The Government should also mobilize various smallholders for collective bargaining. Fifth, it is important to design core interventions to increase security and reduce chronic crime alongside poverty interventions.

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Appendix: Tables

Table A1: Distribution of Institutional Factors - 1997

Variable (per capita)	Mean	Std. Dev.	Min	Max
Number of Constituencies	0.007	0.005	0.004	0.02
Number of active cooperatives	0.212	0.263	0.045	2.34
Total government forest reserves, in km^2	0.330	0.534	0	2.25
Total government land, in km^2	3.036	10.851	0	133.66
Total free hold land, in km^2	0.308	0.966	0	12.42
Total trust land, in km^2	14.747	49.970	0	253.77
Total area under water, in km^2	0.200	0.794	0	4.65
Total graveled roads, in km	1.218	0.894	0	3.39
Number of dispensaries in district	0.107	0.064	0.019	0.31
No. of clusters	988			

Table A2: Distribution of Institutional Factors- 2005/6

Variable	Mean	Std. Dev
Market access factors		
Distance to nearest tar/asphalt road in kms	22.84	64.99
Proportion of tarmac & graded roads in community	0.21	0.41
Distance to nearest health facility (kms)	3.94	14.49
Distance to nearest public primary school	3.64	36.83
Distance to the nearest district head quarter in kms	48.80	63.70
Distance to nearest daily market	13.93	28.52
Distance to the nearest bus stage (kms)	4.60	17.37
Safety and security		
Community satisfied with police response	0.12	0.32
Crime level increased (perception)	0.42	0.49
Community policing & neighbourhood watch	0.50	0.50
Land use		
Most common land use in community is farming	0.75	0.43

Table A3: Poverty, Growth and Inequality Measures 1994-2006

Welfare measure	1994	1997	2006
Poverty rate	46.8	52.3	45.9
GDP growth rate (%)	2.30	0.47	5.84
Growth rate in mean income		-0.204	0.065
Gini Index	0.47	0.42	0.45
Generalized Entropy index (theta =1)	0.46	0.43	0.39

Table A4: Decomposition of Changes in Inequality - Shapley value, 1997-2006

Variable	Gini Index	Coefficient of Variation	Generalized entropy	
			(Theta= 0.5)	(Theta= 2)
Constant	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Sex	0.003 (0.016)	0.007 (0.009)	0.002 (0.015)	0.003 (0.014)
Education	-0.048 (-0.112)	-0.083 (-0.064)	-0.031 (0.033)	-0.057 (-0.075)
water	-0.044 (-0.117)	-0.07 (-0.069)	-0.024 (-0.037)	-0.046 (-0.098)
Market access	0.014 (0.052)	0.023 (0.042)	0.006 (0.091)	0.007 (0.054)
Security and safety	0.001 (0.002)	0.001 (-0.002)	0.000 (-0.004)	0.001 (-0.003)
Land use	-0.003 (-0.008)	-0.002 (-0.001)	0.000 (0.002)	-0.001 (-0.001)
Fuel	0.046 (0.178)	0.113 (0.218)	0.018 (0.347)	0.002 (0.155
Residual	-0.025 (-0.013)	0.045 (0.156)	-0.021 (0.285)	-0.037 (0.084)
Total value	-0.055	-0.222	-0.215	-0.17

Table A5: Marginal Contributions based on Gini Index, 1997

Source	level_1	level_2	level_3	level_4	level_5	level_6	level_7	level_8	level_9	level_10
Sex	0.0006	0.0001	0.0000	-0.0001	-0.0001	-0.0001	-0.0002	-0.0002	-0.0002	-0.0002
Education	0.0135	0.0114	0.0101	0.0091	0.0085	0.0081	0.0078	0.0076	0.0076	0.0076
Availability of water	0.0087	0.0070	0.0060	0.0053	0.0050	0.0048	0.0047	0.0047	0.0047	0.0048
Fuel	0.0018	0.0011	0.0007	0.0006	0.0005	0.0004	0.0004	0.0003	0.0003	0.0003
Land tenure	0.0065	0.0054	0.0049	0.0047	0.0046	0.0046	0.0047	0.0049	0.0051	0.0054
Number of constituencies	0.0005	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Market institutions	0.0025	0.0016	0.0012	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
Health institutions	0.0017	0.0007	0.0002	0.0000	-0.0002	-0.0002	-0.0003	-0.0003	-0.0003	-0.0003
Residual	0.0224	0.0193	0.0169	0.0151	0.0135	0.0122	0.0111	0.0101	0.0093	0.0085

*Levels indicate the point of entry of the other estimated factors. For instance, at level one, we consider the marginal contribution of each factor, holding others constant. In subsequent levels, we evaluate the marginal contribution controlling for successively more factor, until all factors are controlled for.

Table A6: Marginal Contributions based on Gini Index, 2006

Source	level_1*	level_2	level_3	level_4	level_5	level_6	level_7	level_8	level_9
Sex	0.0017	0.0008	0.0005	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003
Education	0.0082	0.0063	0.0052	0.0046	0.0042	0.0040	0.0039	0.0040	0.0040
Water	0.0026	0.0017	0.0013	0.0012	0.0012	0.0012	0.0013	0.0013	0.0014
Market Access	0.0053	0.0037	0.0029	0.0025	0.0022	0.0021	0.0020	0.0020	0.0021
Security and safety	0.0009	0.0003	0.0000	0.0000	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
Land use	0.0007	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Fuel	0.0144	0.0125	0.0113	0.0106	0.0100	0.0096	0.0094	0.0092	0.0092
Residual	0.0212	0.0178	0.0154	0.0134	0.0118	0.0104	0.0092	0.0081	0.0072

*Levels indicate the point of entry of the other estimated factors. For instance, at level one, we consider the marginal contribution of each factor, holding others constant. In subsequent levels, we evaluate the marginal contribution controlling for successively more factor, until all factors are controlled for.