Institutional Determinants of Poverty: The Case of Kenya[*]

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ABSTRACT

This paper examined the impact of institutional factors on poverty in Kenya using household survey and district level secondary data. The analysis focused on the FGT and consumption based measures of poverty. Both descriptive and econometric methods were employed. The results suggest that education attainment, assets and family composition are important correlates of poverty. We also found that except for parliamentary representation, institutional factors were important correlates of poverty when welfare is measured through consumption expenditure, but the results were not robust when welfare was measured through the FGT measures, confirming that consumption functions may be a better approach to measure welfare than poverty functions. The results call for policies that target poor households and regions less endowed with institutions in order to reduce disparities in poverty.

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1   BACKGROUND

The Kenyan economy was regarded as an African success story early into the post-independence years of many African countries. In the 1960s and early 1970s, the country achieved a high growth rate of 6.6 per cent per annum. However, this rapid rate of growth was not sustained thereafter. Between 1974 and 1979, the growth rate declined to 5.2 per cent per annum. Further declines occurred in the 1980-89 and 1990-95 periods when the average growth rates averaged 4.1 and 2.5 per cent per annum respectively. Over the plan period 1997-2001, the target was set at 5.9 per cent per annum. However, the economy only grew by an annual average rate of only 1.5% in this plan period. This was below the population growth rate of 2.5% per annum and led to a decline in per capita incomes. Thereafter, the economy registered a 2.8%, 4.3% and 5.8% growth rates in 2003, 2004 and 2005 respectively. The key reasons for the slow economic growth include: weak implementation capacity in the public service; low levels of donor inflows; exogenous shocks including droughts and deteriorating external environment; poor governance and perceived weak commitment to the reform agenda (resulting in loss of business and investor confidence).

Due to the poor economic performance, coupled with increased income inequality and access to basic services, about 13.6 million Kenyans in 2000 lived under the poverty line, and the situation has continued to worsen to reach a high of 17 million or 56% of the population in 2005. The categories at risk include pregnant women and lactating mothers (1.1 million); under 5 year children (5.3 million); elderly people above 55 years; AIDS orphans (1.8 million); people living with AIDS (2.2 million) and people suffering from tuberculosis and malaria (32,000 and 6.7 million cases respectively reported each year). In addition, there are marked differences in the geographical distribution of poor households in the country. A close examination of the status of poverty by administrative and climatic zones however imply that there may be no clear relationship between the incidence of poverty and the climatic zone in which a household is located (see appendix Table A2). Additional information about the zone (e.g., differences in institutional structures) is necessary for accurate targeting of public assistance to poor households.

The Kenya Government's commitment to fight poverty dates back to independence with the Sessional Paper No. 10 of 1965 focusing on the elimination of poverty, disease and ignorance. Various development plans and sectoral plans thereafter targeted poverty reduction and growth. In the recent years, the Government has also published a number of policy and strategy papers geared towards achieving broad-based sustainable improvement in the welfare of all Kenyans. These include the National Poverty Eradication Plan (NPEP) and

the Poverty Reduction Strategy Paper (PRSP). The launch of the National Poverty Eradication Plan (NPEP) 1999-2015 however created policy ambivalence in the country concerning poverty reduction strategies. NPEP ushered in a prolonged and uncertain process of preparing a national poverty reduction strategy. Although the preparation of the poverty reduction strategy paper (PRSP) was meant to be inclusive, consultative and locally driven, it excluded key stakeholders, especially the private sector, and was not free from external influences. To implement the PRSP and the government's development agenda to restore economic growth and reduce poverty through employment and wealth creation, the current Government's (NARC) designed the Economic Recovery Strategy Paper (ERS) in 2003. The ERS is anchored on four pillars, namely: restoration of economic growth within the context of a sustainable macroeconomic framework; strengthening the institutions of governance; restoration and expansion of the physical infrastructure; and investing in the human capital of the poor. The ERS presents a broad development framework for reviving the economy, creating jobs and reducing poverty and aims among other things at: (a) reducing the proportion of the population below the poverty line from 56% in 2000 to 28% by 2010, 10% by 2015 and 0% by 2020; and (b) reducing the proportion of food poor from 48.4% in 2000 to 23.5% in 2010, 10% in 2015, and be eliminated altogether by 2020.

Though the ERS targets relate to the core objective and targets of the Millennium Development Goals (MDGs - adopted during the Millennium Declarartion of 2000), especially that of reducing poverty by half between 1990 and 2015, the successful implementation of these plans and strategies has been hampered by limitations in capacity, financing and governance problems among other bottlenecks. Available evidence on Kenya's progress towards realizing the MDGs by the target date indicate that at the current trend and pace, achieving MDGs in Kenya will be an uphill task. The performance of the country towards realizing the goals is still low. The failure to drastically improve the country's investment and savings record threatens the recovery effort. It is projected that the number of people living in poverty will increase to 65.9% by 2015 if the current trend continues and unless the economy grows at a rate of about 7%, which is needed to support implementation of MDG-related activities within the remaining decade to 2015 (UNDP, GOK and GOF, 2005) .

In the context of growing inequalities, increasing absolute poverty, and challenges in achievement of the ERS and MDGs targets, there is need to understand the key factors associated with poverty in Kenya. Though a large and increasing number of studies now exist on Kenyan poverty, its measurement and determinants (see for instance Collier and Lall, 1980; Greer and Thorbecke, 1986; Mukui, 1994; Republic of Kenya, 1998, 2000; Mwabu et

al., 2000; Oyugi et al., 2000; Manda et al., 2000; Geda et al.; 2001), there is a dearth of empirical studies on institutional determinants of poverty in Kenya. Mwabu et al. (2004) however employed descriptive methods to explain the impact of rural institutions on poverty. This paper is a response to this research gap. It builds on the existing studies on determinants of poverty and Mwabu et al. (2004) to analyze the institutional perspectives of poverty.

Persistence of high poverty rates in some regions of the country suggest that poverty reduction interventions should be targeted to regions most afflicted with poverty. However, in designing and implementing such interventions, differences in institutional structures in regions need to be considered. This study seeks to address these and related policy concerns. In particular, the study seeks to: identify and analyze institutional determinants of poverty in Kenya, to identify mechanisms for reducing growth imbalances in the country and to suggest a pattern of investment portfolio that is likely to have the greatest impact on poverty reduction.

The rest of the paper is organized as follows: The next section presents the methodology, while section three presents a detailed analysis of distribution of institutions across provinces. Section four discusses regional differences in poverty while section five presents the empirical results. Section six concludes the paper.

2   METHODOLOGY

2.1   Analytical issues

Poverty is not spatially homogeneous but tends to be concentrated in areas of adverse biophysical conditions or socioeconomic deprivation. In Kenya, the poor are not only deprived of income and resources but also of opportunities. Markets and employment are often difficult to access in certain parts of the country because of low capabilities and geographical and social isolation. Further, limited access to education and health (institutional structure) affects the ability of the population to get non-farm employment and to obtain information that would improve the quality of their lives. The limited and degraded lands and environmental risks (due to unfavorable institutional structures) further exacerbate this fragile position of the ecosystem.

Table 1 shows the issues that the study examines to establish the key factors contributing to various dimensions of poverty differentials within and between regions. While this paper addresses monetary measures of poverty, we address non-monetary measures in Kabubo-

Mariara and Kirii (2005) and Kabubo-Mariara et al. (2005). Income poverty is analyzed in the context of institutional structures prevailing in regions (provinces, rural and urban areas). Institutions are formal and informal rules that govern behavior of economic agents (North, 1991). Examples of formal institutions in the sense of North include government regulations (e.g., by laws governing licensing of businesses; inter-regional movement of commodities; property ownership and sale, particularly land; establishment of order and peace in a region), while institutions of the informal nature include customs and social beliefs and norms in a region. Institutions as rules of the game, as above, do not include organizations. However, institutions can be broadly conceived as encompassing organizations (Putnam, 1993; Platteau, 1994).

Table 1   Analytical Issues and Data Requirements

Dimension of poverty	Poverty measure or indicator	Poverty line (where applicable)	Data source
A. Income poverty.	FGT indices; household expenditure per capita or per adult equivalent.	CBN Poverty Line adjusted for inflation and regional differentials in price indices	Kenya Welfare Monitoring Survey (WMSIII)
B. Non-income poverty.	Education enrollment and attainment; child anthropometrics and nutritional status.	Non-money metric poverty lines (see Morrisson et al., 2000).	(WMSIII), Demographic and Health Survey Data

Source: Own construction.

This paper uses institutions in the broad sense that includes organizations, such as cooperatives, marketing boards, schools, health facilities, courts, and police stations. Institutions are also used to include public utilities and social capital. Although in the literature, a distinction is made between social capital and institutions (Putnam, 1993); we do not make this differentiation in the empirical analysis of this study because of data limitations. Indicators of social infrastructure, public utilities, social norms and social capital are roughly taken as proxies for institutional structures of regions. Table 2 shows indicators of institutions that are analyzed (with respect to their bearing on poverty), and regional levels at which they are measured. A detailed analysis of the distribution of these institutions across provinces is presented in section 3.

Table 2   Regional institutional structures and associated data sources

Institutions	Proxy Variables	Level at which measured	Data Source
Land tenure system	Proportions of land under private and public /government ownership.	District	Statistical Abstracts, Economic Surveys.
Social infrastructure	Roads, electricity, health, education and water facilities.	District	Statistical Abstracts, Relevant ministries
Cooperatives	Number of active cooperatives including coffee and tea cooperative societies; marketing boards e.t.c.	District	Statistical Abstracts.
Law order and governance system	Courts, police posts, prisons, provincial administration	District	Relevant ministries
Markets	Market centers: towns and other urban centers	District	Statistical Abstracts.
Participation in Legislative affairs	Number of parliamentary constituencies	District	Constitution of Kenya Review Commission

Source: Own Construction.

2.2   Modeling the determinants of poverty.

Economists have long been occupied with defining a money metric measure of household welfare. The most often used such measure is consumption expenditure per person or per adult equivalent. While controversy exists over the use of consumption expenditure as a measure of well being it remains the preferred metric in light of difficulties involved in measuring income. Consumption better reflects long-term economic status of a household compared to income, from the permanent income hypothesis point of view. The controversy arises because income and expenditure measures of welfare can yield very different poverty indices (Geda et al., 2001) and policy implications. Although consumption data is collected at the household level, welfare is often measured through expenditure/consumption per adult equivalent rather than per capita in order to reflect the needs of all members of a family, including children (Appleton, 2002). A comprehensive measure of consumption must also measure the total value of consumption of food and non-food items.

Once the decision to use consumption instead of income has been decided on, the next issue becomes to specify the framework for analyzing the determinants of poverty. There are generally two approaches to the analysis of poverty determinants. In one approach, probabilities of being poor are estimated using logit or probit procedures. This is based on the FGT measures of poverty as the dependent variables. These are in turn based on a pre-determine poverty line, which requires first a food poverty line which is then adjusted for non-food requirements.

The FGT poverty measures can be defined as

$$P_{\alpha} = 1/n \sum \left[(z - y_i)/z \right]^{\alpha} ; \alpha \geq 0, \text{ for } y < z \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Where z is the poverty line, y_i is a measure of economic welfare of household i (say real per capita household expenditure), ranked as $y_1 \leq y_2 \ldots y_q \leq z \leq y_{q+1 \ldots} \leq y_n$. The household equivalents of the headcount index, poverty gap index and the squared poverty gap index are obtained when $\alpha = 0$, 1 or 2 respectively. The head count index measures household poverty as a binary variable (poor/non poor). The poverty gap is an aggregate of the preferred measure of household poverty: the shortfall of the consumption from the poverty line. A poverty function with the poverty gap gives coefficients that can be readily comparable with those from a consumption function and is therefore preferred to the squared poverty gap index (Appleton, 2002).

In the second approach, household welfare functions (proxied by household expenditure functions) are estimated using least squares methods. The two approaches may yield similar results because factors that increase household expenditure, especially on food and assets reduce the probability of a household being poor and vice versa. The first approach has however been criticized because of the arbitrariness of the poverty line and unnecessary loss of information in transforming household expenditure into a binary variable that indicates whether a household is poor or not (Ravallion, 1994, Grootaert, 1994). In addition, the model makes unnecessary distributional assumptions, which do not have to be made using the other approach. Although these limitations make the consumption function approach more attractive, the approach is also imperfect. Some studies show that the two methods can be have equally well in explaining poverty (see for instance Appleton, 2002)

To investigate the determinants of poverty, we can specify a consumption based reduced form model of a household's economic welfare following the works of Glewwe (1991). The model takes the form:

$$\ln y_i = \beta' x_i + \varepsilon_i \quad\text{..} \quad (2)$$

where x_i is a set of house hold characteristics and other determinants of welfare, β is a vector of parameters to be estimated and ε_i is a random error term. Modelling the poverty measures/rates using the same principal would yield:

$$P_{\alpha i} = \beta_\alpha' x_i + \mu_i \quad\text{..} \quad (3)$$

Where P_{ai} is the FGT measure, β_α is a vector of parameters to be estimated and μ_i is a random error term.

In this paper we use both approaches to model determinants of poverty. We use variants of equations (2) and (3) to explain consumption/expenditure and poverty measures respectively. Our innovation is to introduce a vector of district level institutional factors as determinants of welfare. First we estimate a district level variant of each equation to explain the role of institutions at the district level, before mapping the district level data onto the household level data. We base our poverty measures on absolute CBN poverty lines computed by the Central Bureau of Statistics, Republic of Kenya (2000). However, there is controversy in the Kenyan poverty literature as to the appropriate poverty line to use to identify the poor. There are two commonly used techniques for setting poverty lines: the food energy intake (FEI) and the cost of basic needs (CBN) methods. In the Kenyan context (like in other countries), the CBN poverty line has, in general, yielded higher poverty rates than the FEI poverty line (see Mwabu et al., 2000). The FEI method is derived using regression methods, whereas the CBN line is based on cost of a specified basket of basic needs. The cost of a specific basket of basic needs is more easily understood as a standard indicator of a socially desirable level of well being (which everyone in society should attain) than an expenditure level computed from regression coefficients. It is probably for this reason that the poverty rates computed by the Central Bureau of Statistics (Republic of Kenya, 1996; 2000) are based on CBN poverty lines.

3   REGIONAL DISTRIBUTION OF INSTITUTIONS

Market Institutions

Market institutions are rules and conventions that regulate trade in goods and services. In Kenya, the operation of markets is governed by the Local Authorities Acts and by social norms of localities (Mwabu et al., 2004). Local market institutions affect volume and type of trade and hence household welfare. Furthermore, households with less access to markets have lower welfare than their counterparts in remote areas (Mwabu et al., 2004, Oduro et al., 2004, Greer and Thorbecke, 1986). The link between households and markets could be measured through distance to particular market institutions and presence or number of market institutions. Alternatively, the link could be measured using commercialization indices: output and input commercialization indices; and food market transactions index (Oduro et al., 2004). In this paper we proxy markets by institutions which include number of municipalities, county councils and all towns. The per capita distribution of these institutions by region is presented in table 3. The table suggests that except for Nairobi, there are no marked regional disparities in the per capita distribution of market based institutions other than for towns. Coast province has the highest number of towns per capita, while Western province has the lowest. Given the regional distribution of poverty, the results do not support the expectation that regions with less access to markets have lower levels of poverty.

Table 3:   Regional distribution of market institutions per capita, 1997

	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	National
Number of municipalities	0.0005	0.002	0.001	0.002	0.002	0.002	0.002	0.002
Number of county councils	0	0.002	0.005	0.004	0.004	0.003	0.003	0.003
Number of towns	0.043	0.043	0.462	0.048	0.047	0.158	0.006	0.132
Number of active cooperatives	0.476	0.192	0.199	0.133	0.103	0.338	0.055	0.206

The distribution of number of active cooperatives is presented in the last row of Table 3. We include cooperatives as a proxy for markets given that most cooperatives deal with marketing and processing of goods and services. Institutions governing operation of cooperatives affect the welfare of a large number of people, especially in rural areas where cooperatives are dominant (Mwabu et al., 2004). Table 3 shows wide disparities in the distribution of active cooperatives per head, with Nairobi leading in the number per capita, while Western province has the lowest. Once again the distribution suggests no clear relationship between the number of active cooperatives and poverty rates, except for Nyanza and Western provinces.

Land Ownership

Land tenure and distribution is governed by the government land act, which provides for three key types of land ownership in Kenya: private, public and customary systems. Private land ownership encompasses all land held by individuals under free hold titles, public land ownership encompasses all trust land (land held in trust by the government on behalf of the public), while customary land encompasses all land registered under group ranches or schemes and is yet to be subdivided (Kabubo-Mariara, 2006). In this paper, we focus on the regional distribution of trust land and the resulting impact on welfare. The impact of trust land on welfare is ambiguous. A lot of trust land could be associated with higher household welfare so long as households can access the land or the proceeds from the land. For instance, returns from national parks could be used to improve local infrastructure, while local residents could benefit from employment opportunities in the parks and other reserves.

Table 4:   Regional Distribution of Trust Land per capita, 1997

Land category	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	National
Area of national parks (Km^2)	0.055	0.309	12.380	0.203	0	0.063	0	1.785
Total government land (Km^2)	0.256	1.577	46.87	1.712	1.158	4.273	0.212	8.366
Total free hold land (Km^2)	0.063	1.243	2.089	0.205	0.106	0.279	0.184	0.583
Total trust land (Km^2)	0	1.298	17.940	32.216	3.407	10.567	1.842	12.938
Total area of water (Km^2)	0	0.0004	0.783	0.001	0.892	0.038	0.062	0.246
Total reserve land (Km^2)	0.036	1.590	0.667	0.925	0.005	1.144	0.297	0.739
Percentage of registered land*	-	90.22	19.59	45.70	68.60	70.05	48.60	44.99

* Province level estimates. Source: Statistical abstracts, various issues

On the contrary, presence of more trust land in a region could be associated with adverse agro-ecological conditions such as droughts, which translate to lower productivity and poverty (Kabubo-Mariara, 2006). The regional distribution of trust land is presented in Table 4. The table displays wide disparities in the per capita distribution of trust land. Furthermore, Nyanza, Western and Coast province, regions, with the highest levels of poverty, seem to be relatively disadvantaged with respect to the endowment of government trust land, implying a positive correlation between trust land and welfare. However, the reverse is observed for land under water, with Nyanza and Coast province reporting the highest, implying an inverse

correlation between amount of land under water and welfare. The last row of the table shows province level estimates of the percentages of land with titles. Central province has the highest percentage of registered land (and also the lowest amount of government land), which is interesting given that it has the lowest level of poverty (Mwabu et al., 2004).

Road Infrastructure

Development of roads improves welfare through increased access to markets and other basic services. Transport and telecommunication systems are also important determinants of the physical costs of accessing markets (Oduro et al., 2004). Furthermore, low level of infrastructure restricts the development of input and product markets, as well as adoption of inputs (Kebede and Shimeles, 2004). Regional disparities in the distribution of transport and communication facilities would therefore be expected to have an impact on the regional distribution of welfare. In this paper, we focus on the regional distribution of the per capita roads network, measured by different road types (see Table 5). The table highlights marked disparities in regional road endowments. Of all the road types, Nairobi is best endowed with premix roads with only 0.14 (Km^2) per person. Central, Nyanza and Western provinces are best endowed with graveled roads, while Coast and Eastern provinces are best endowed with earth roads. Relative to population density, Coast and Eastern provinces have the longest total road lengths compared to all other provinces and the national average.

Table 5:   Regional distribution of per capita road infrastructure, 1997

Institution	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	National
Total surface dressed roads (Km^2)	0.015	0.421	0.292	0.259	0.128	0.325	0.081	0.262
Total premixed road s(Km^2)	0.149	0.064	0.011	0.029	0.097	0.014	0.054	0.040
Total graveled roads (Km^2)	0.014	1.018	0.903	1.263	1.362	1.737	0.790	1.268
Total earth roads (Km^2)	0.001	0.774	2.485	1.528	0.929	0.739	0.263	1.108
Total road length (Km^2)	0.179	2.276	3.690	3.076	2.516	2.800	1.186	2.673

Law, Order and Governance System

Good governance is expected to be welfare improving through several channels. In the first place, representation of the community in government decision making ensures that local basic needs are taken into account, while adequate security is a pre-requisite for production. We proxy governance through the number of constituencies, an indicator of parliamentary representation, the number of administrative divisions, number of prisons, courts and police

stations in a given region. The per capita distribution of these institutions is presented in Table 6. Other than for Nairobi, distribution of constituencies shows little variation across provinces. The relatively lower representation for Nairobi is attributable to higher population densities compared to other regions. Central, Western and Nairobi report the lowest number of administrative divisions per capita, while Coast and Eastern have the highest. Rift Valley and Western have the lowest number of courts and police stations per capita compared to all other rural provinces.

Table 6:   Regional distribution of governance institutions per capita, 1997

Institution	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	National
Number of Constituencies	0.004	0.008	0.009	0.009	0.008	0.007	0.007	0.008
Number of divisions	0.004	0.010	0.031	0.026	0.023	0.022	0.014	0.022
Number of prisons	0.003	0.003	0.007	0.004	0.002	0.004	0.001	0.004
Number of courts	0.002	0.005	0.009	0.004	0.005	0.003	0.005	0.005
Number of police stations	0.014	0.013	0.022	0.011	0.008	0.013	0.007	0.013

Social Services
Access to social services is welfare improving. Oduro et al., (2004) argue that education and skill acquisition are critical factors for explaining the pattern of rural poverty. Education contributes to the process of moulding attitudinal skills and developing technical skills, and also facilitates the adoption and modification of technology Oduro et al., (2004). An unhealthy population cannot participate effectively in employment and other production activities. Access to health facilities and medication is therefore a crucial determinant of household welfare (Kabubo-Mariara, 2004). Van der Berg (2004) also argues that limited access to basic services such as to running water, sanitation on site, grid electricity and health care services is an impediment to escaping from poverty.

Table 7 presents the regional distribution of per capita education and health inputs. For all education inputs, it is interesting to note that the poorest provinces (Nyanza and Western) seem to be relatively better off in terms of per capita endowment of social service inputs. On the contrary, Central province, the province with the lowest level of poverty seems to be relatively disadvantaged. With regard to government health institutions, Western, Coast and Central provinces are relatively less disadvantaged. Nyanza province seems to be relatively

better endowed with health facilities than better off regions. The analysis in tables 7 and 8 imply that taken individually, the current distribution of social services across districts and provinces may not have a defined impact on welfare, which probably explains the finding that the number of hospitals per capita isn't a significant correlate of welfare in the empirical analysis.

Table 7:   Regional distribution of Education and Health inputs, 1997

	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	National
Per Capita Education Inputs								
Number of public sec school teachers	0.021	0.156	0.064	0.110	0.210	0.082	0.100	0.111
Number of private sec school teachers	0.022	0.009	0.006	0.049	0.016	0.009	0.003	0.017
Number of total sec school teachers	0.043	0.164	0.070	0.158	0.227	0.090	0.103	0.129
Number of primary schools	0.116	0.509	0.550	1.042	0.988	0.746	0.687	0.766
Total trained primary school teachers	2.117	7.511	5.177	18.491	12.375	7.707	7.776	9.951
Total untrained primary school teachers	0.009	0.207	0.407	1.100	0.849	0.600	0.274	0.611
Total teachers in primary schools	2.126	7.718	5.584	19.592	13.224	8.307	8.050	10.563
Average number of pupils per class	0.018	0.054	0.127	0.059	0.044	0.071	0.037	0.068
Ratio of pupils to untrained teachers	0.346	2.101	1.991	1.556	0.740	1.196	1.067	1.418
Ratio of pupils to trained teachers	0.016	0.053	0.133	0.056	0.048	0.074	0.044	0.069
Average number of pupils per school	0.284	0.791	1.220	0.576	0.435	0.648	0.447	0.683
Per Capita Health Institutions								
Number of government hospitals	0.003	0.004	0.009	0.006	0.005	0.005	0.003	0.005
Number of NGO hospitals	0.004	0.005	0.002	0.005	0.006	0.006	0.003	0.005
Number of government health centers	0.013	0.011	0.031	0.014	0.021	0.015	0.019	0.018
Number of NGO health centers	0.001	0.003	0.0003	0.001	0.013	0.005	0.004	0.004
Number of government dispensaries	0.028	0.069	0.109	0.090	0.053	0.077	0.018	0.073
Number of NGO dispensaries	0.042	0.031	0.053	0.058	0.030	0.056	0.022	0.046

The provincial distribution of health institutions however imply that the district level estimates presented above mask a lot of regional inequalities. For instance, the distribution of health facilities implies that 29% of all facilities are in Rift Valley province, while Western province has only 7% (Table 8). However, this distribution does not take into account differences in population densities in the provinces. For rural provinces, the number of beds and cots per 100,000 populations is highest for Nyanza, implying that facilities in the province are relatively better equipped than those of other regions. It is surprising that Rift Valley has the lowest number of beds and cots per 100,000 people in spite of having more facilities.

Table 8:   Health Institutions, Hospital beds and Cots by Province, 1997

Region	Hospitals	Health centres	Health sub centres and dispensaries	Total (%)	Hospital beds and cots	
					No. of beds and cots	No. per 100,000 population
Nairobi	47	36	297	9.34	6,487	323
Central	45	76	341	11.35	7,009	182
Coast	43	47	358	11.01	4,136	176
Eastern	52	71	660	19.24	6,361	130
Nyanza	79	101	293	11.62	9,625	195
Rift Valley	80	145	954	28.98	10,158	149
Western	46	81	151	6.83	5,567	164
Total	398	566	3,105	100	50,909	176

Source, Statistical Abstract, 1998

Although the availability of social facilities is important, financing of social services is also as important. For instance, availability of hospitals without drugs and personnel would be of little value. In table 9, we present the regional distribution of per capita expenditure on basic social services. The results show that the highest per capita expenditures on water and roads went to the Rift Valley province, while the highest expenditures on rural electrification and health went to Coast and Western provinces respectively. However, Western province was clearly disadvantaged with respect to expenditures on water and rural electrification. Eastern and Coast provinces received the lowest expenditure on roads and health expenditures respectively.

Table 9:   Total per Capita Expenditure on Infrastructure, 1997 ('000 Kshs)

Total expenditure on	Nairobi	Central	Coast	Eastern	Nyanza	Rift Valley	Western	National
Water	1129.15	51.99	59.37	42.55	67.49	171.75	11.87	109.40
Roads	37.33	19.71	80.53	55.05	122.85	158.19	115.91	99.36
Rural electrification	0.35	4.15	10.14	6.53	9.62	5.36	4.27	6.48
Health	38.16	9.23	7.18	8.59	12.04	8.83	18.34	10.57

The descriptive analysis of regional distribution of institutions in Kenya point at wide disparities in institutional endowments. Though there is no definite pattern of the correlation between poverty and distribution of institutions, the analysis implies that regions with the lowest number of key institutions per capita have relatively lower welfare than their counterparts with more institutions. Taking into account population density, the analysis clearly indicates that Coast province is at a relative advantage in endowment of all institutions except education services. Western province is clearly at a relative disadvantage. Though Nyanza was the poorest province in 1997, there is no evidence that it is the worst in terms of institutional endowments, implying that welfare is a function of the interaction of many factors, and that analysis of the institutional determinants of poverty need to take into account other determinants of poverty as well.

4   REGIONAL DIFFERENTIALS IN POVERTY

Poverty is multidimensional and complex in nature and manifests itself in various forms making its definition difficult. No single definition can exhaustively capture all aspects of poverty. Poverty is perceived differently by different people, some limiting the term to mean a lack of material well-being and others arguing that lack of things like freedom, spiritual well-being, civil rights and nutrition must also contribute to the definition of poverty. Economists have long been occupied with defining a money metric measure of household welfare. The most often used such measure is consumption expenditure per person or per adult equivalent. While controversy exists over the use of consumption expenditure as a measure of well being it remains the preferred metric in light of difficulties involved in measuring income. The controversy arises because income and expenditure measures of welfare can yield very different poverty indices (Geda et al., 2001) and policy implications. Since expenditure is more accurately measured than income, the present study adopts expenditure as a measure of household welfare.

Welfare Monitoring Survey analysis in Kenya adopted the material well-being perception of poverty in which the poor are defined as those members of society who are unable to afford minimum basic human needs, comprised of food and non-food items. Although the definition may seem simple, there are several complications in determining the minimum requirements and the amounts of money necessary to meet these requirements (Kabubo-Mariara and Ndenge, 2004).

Results of Welfare Monitoring Surveys in Kenya show that poverty is concentrated in rural areas and among vulnerable groups in urban areas. Based on an absolute poverty line, it emerges that Central province had the lowest proportion of households under poverty in 1997, while Nyanza province had the highest. Central province also had the lowest poverty gap and severity of poverty indices while Coast province had the largest (Table 10). However Coast province contributed the least to overall poverty in the country, while Nyanza contributed the most.

Table 10: Overall Rural Poverty by Region, 1997

Region	Head count $P\alpha=0$			Poverty Gap, $P\alpha=1$	Severity of poverty $P\alpha=0$	% of population	Contribution to		
	adult equiv	HHs	Mem				$P\alpha=0$	$P\alpha=1$	$P\alpha=2$
Central	31.4	25.7	31.4	9.3	3.9	17.3	10.3	8.3	7.4
Coast	62.1	51.9	62.2	24.4	11.9	6.6	7.7	8.3	8.5
Eastern	58.6	53.1	58.2	22.4	10.7	18.2	20.1	21.0	21.2
Nyanza	63.1	56.7	62.9	23.4	11.4	19.9	23.7	24.1	24.7
Rift Valley	50.1	44.1	50.2	17.6	8.2	24.5	23.2	22.3	21.8
Western	58.8	53.6	59.3	22.8	11.2	13.5	15	15.9	16.4
Total	52.9	46.4	53.1	19.3	9.2	100	100	100	100

Source: Republic of Kenya, (2000) and WMS(III) database.

The poorest province also had the highest proportion of hard core poor in 1997 (Hard core poor are defined as people who cannot afford to meet the basic minimum food requirement even if they allocated all their spending on food). Coast province had the largest proportion of hardcore poor, followed by Nyanza, Western and Eastern provinces (Table 11). Nyanza province with 20% of the national population contributed the most (24%) to hard core poverty (head count index), while Coast province still contributed very little to national hard core poverty. The minimal contribution of Coast province could be attributed to the very low proportion (7%) of the national population in the province.

Table 11: **Hardcore Rural Poverty by Region, 1997**

Region	Head count Pα=0			Poverty Gap, Pα=1	Severity of poverty Pα=0	% of population	Contribution to		
	adult equiv	HHs	Mem				Pα=0	Pα=1	Pα=2
Central	15.6	12.8	15.6	4.0	1.4	17.4	7.8	6.7	6.0
Coast	44.8	36.8	45.1	13.5	5.4	6.6	8.5	8.6	8.7
Eastern	40.9	36.2	40.6	12.2	4.7	18.1	21.3	21.3	21
Nyanza	41.9	37.8	42.1	13.1	5.5	19.9	24.0	25.3	26.7
Rift Valley	31.7	27.4	31.5	9.1	3.5	24.6	22.3	21.7	21.1
Western	41.7	37.9	41.8	12.5	5.0	13.5	16.1	16.3	16.6
Total	34.8	30.1	34.9	10.3	4.1	100	100	100	100

Source: Republic of Kenya, (2000) and WMS(III) database.

Urban poverty is much harder to analyse across regions because of relatively small urban samples across provinces. The bulk of the urban population is concentrated in the cities of Nairobi, Mombasa, Kisumu and in Nakuru town. Analysis of the 1997 Welfare Monitoring Survey shows that almost half (49%) of the total urban population was living below the absolute poverty line, and 38% below the food poverty line. However, only a very small proportion (7.6%) were hard core poor. Kisumu city in Nyanza province was the worst hit by all categories of poverty (food, absolute and hard core poor) in 1997, just like in earlier surveys. Nakuru town in Rift valley province recorded the lowest incidence of food and hardcore poverty in 1997, while Mombasa recorded the least incidence of overall poverty in the same year (Table 12).

Table12: **Urban Differentials in the Incidence of Poverty, 1992-1997**

City/town	% of food poor			% of overall poor		
	1992	1994	1997	1992	1994	1997
Nairobi	41.92	27.26	38.38	26.45	25.90	50.24
Mombasa	44.84	33.12	38.57	39.17	33.14	38.32
Kisumu	-	44.09	53.39	-	47.75	63.73
Nakuru	-	37.18	26.81	-	30.01	40.58
Other towns	-	27.07	37.91	-	28.73	43.53
Total urban	45.58	29.23	38.29	29.29	28.95	49.20

Source: Republic of Kenya, (2000) and WMS(III) database.

Based on the four Welfare Monitoring Surveys in Kenya, regional differences in poverty across different survey years are presented in Table 13. The estimates show that Central province has consistently emerged the least poor region in all the four surveys. Coast province was ranked number 5 in three of the four surveys and similarly Western region has been ranked 4th in three of the four surveys. This indicates that the poverty trends are somewhat robust in spite of the difficulties of comparing different welfare surveys. However, the design and timing of welfare surveys may have contributed to the poverty dynamics apparent in the table above where some regional poverty rankings have changed over repeated surveys.

From table 13 and due to the nature of the surveys, one is unable tell whether the observed changes are real or whether they are statistical artifacts. Similarly the three WMS data sets cannot strictly speaking be used as a panel and it becomes very hard for the analyst to distinguish those households who are transitorily poor from those that are chronically poor. This factor could also explain the implied modest increase in the headcount index between 1981/82 and 1997. Another possible reason for the differentials is the use of unrepresentative prices where regional price deflators and poverty estimates may have under or over estimated the real situation. It is however noted that strict temporal adjustment and comparison of prices when analysing the various survey datasets has not been carried out (Kabubo-Mariara and Ndenge, 2004).

Holding differences in survey datasets constant, the regional variations in poverty are a result of regional differences in the determinants of household welfare. These include household and non-household level covariates. Among non-household level covariates, institutional factors are important determinants of poverty more so in rural areas (Nissanke, 2004). Though a large number of studies now exist on poverty and its measurement in Kenya (see Collier and Lall, 1980; Greer and Thorbecke, 1986; Mukui, 1994; Republic of Kenya, 1998, 2000; Mwabu et al., 2000; Oyugi et al., 2000; Manda et al., 2000; Geda et al.; 2001), most of the studies have concentrated on household level based determinants of poverty in Kenya. No empirical study has empirically investigated the institutional determinants of poverty in Kenya. Mwabu et al., (2004) investigate the link between rural poverty and institutions using descriptive methods. We build on this study to investigate the institutional determinants of poverty using econometric procedures.

Table 13: **Rural Absolute Poverty Ranking by Province**

Year /Region	1982		1992		1994		1997	
	Head count %	Rank	Head count %	Rank	Head count %	Rank	Head count %	Rank
Coast	54.55	5	43.50	3	55.63	5	62.1	5
Eastern	47.73	2	42.16	2	57.75	6	58.6	3
Central	25.69	1	35.89	1	31.93	1	31.4	1
Rift Valley	51.05	3	51.51	5	42.87	3	50.1	2
Nyanza	57.88	6	47.41	4	42.21	2	63.1	6
Western	53.79	4	54.81	6	53.83	4	58.8	4
Total	47.89		46.33		46.75		52.9	

Source: Republic of Kenya (2000).

5 INVESTIGATING THE INSTITUTIONAL CORRELATES OF WELFARE

5.1 The Primary Data and Variables

The household level empirical analysis is based on Welfare Monitoring Survey III (WMSIII) data collected by the Central Bureau of Statistics and the Planning Unit of the Ministry of Planning and National Development. The survey was 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 except in the semi-arid districts. Data was collected from a sample of 50,713 individuals from 10,873 households. The survey collected information on socio economic characteristics of the household, economic activities and time use, household asset endowments, consumption and income among other variables of interest. To this data, we map in district level data described earlier.

In this section, we present and discuss sample characteristics by poverty status (see also appendix table A1). In the dataset, about 72% of the household heads are male, while 77% are married. 43% of all household heads have at least primary school education, 28% post-primary including university, while the rest have no education at all. We adopt this categorization of education because of the distribution of respondents across different levels of education, since higher levels of education have relatively few observations. In addition, we include variables to capture household composition and size. Due to potential endogeneity of household size, we use dummies for number of family members of different categories (for instance, number of children less than 5 years old, number of children less than 14 years e.t.c.). This is based on the expectation that household members of different age will have different consumption requirements, which have different welfare implications. The data shows that on average, every household has at least one person from each family composition category except for seniors (adults over 65 years).

We also include employment sector and main occupation of the head. In the sample, about 48% of all household heads work in the formal sector while 42% are in agricultural sector related activities (appendix table A1). The other variables include distance to source of water (with a mean distance of about 2 and 1 kilometers in rural and urban areas respectively),

place of residence (80% rural), number of rooms in main house (with a mean of about 2 rooms per house), total land holding in acres and total livestock units owned.

Turning to characteristics by poverty status, the data shows that there are marked differences between characteristics of the poor and non-poor. In particular, the poor have significantly lower levels of post primary education than the non-poor and have larger families (Table 14). Though the number of senior members of the household are quite few, the data also implies that poor households have higher dependency ratios than non poor households. In terms of spatial location of the poor, there are large regional differentials in the status of poverty. Less than 10% of all households are poor in Nairobi, Central and Eastern provinces compared to over 20% in Nyanza and the Rift Valley. There is a higher concentration of the absolute and food poor in Nyanza and Rift Valley provinces, while the highest proportion of the non poor are concentrated in Rift valley and Central provinces. The implication here is that given that Rift valley is the largest of the 7 provinces, it has the highest concentration of households in all categories: poor, non poor and food poor.

Table 15 shows that the poor are more concentrated in activities of lower economic status. About 70% of the poor and food poor are either unemployed or employed in the agricultural sector compared to only 55% of the non poor (this supports Geda et al., 2001, who argue that the poor are more concentrated in rural areas and in the agricultural sector). A larger proportion of the poor (about 26%) are unpaid family workers, compared to 18% of the non poor. In addition, the poor are more likely to be in the private informal sector than the non poor. The data therefore implies correlation between the sector of employment, occupation and position in employment and the status of poverty. Empirical investigation of this relationship is presented in the next section.

Table 14: Sample characteristics by poverty status

	Poor	Non Poor	Food Poor
Age (yrs)	45.80 (15.03)	42.72 (14.85)	46.30 (14.75)
Sex (1=male)	0.699 (0.459)	0.729 (0.445)	0.722 (0.448)
Marital Status (1= married)	0.774 (0.418)	0.769 (0.422)	0.799 (0.401)
Primary schooling	0.450 (0.498)	0.406 (0.491)	0.455 (0.498)
Post primary schooling	0.172 (0.378)	0.361 (0.480)	0.179 (0.383)
Employment sector	0.509 (0.500)	0.444 (0.497)	0.487 (0.500)
Main occupation	0.462 (0.499)	0.379 (0.485)	0.462 (0.499)
Rural area dummy	0.808 (0.394)	0.788 (0.409)	0.844 (0.363)
Time to source of water	2.403 (1.457)	2.089 (1.453)	2.403 (1.449)
No. of rooms in main house	2.224 (1.186)	2.453 (1.389)	2.301 (1.217)
Log total land holding (acres)	1.191 (1.294)	1.049 (1.154)	1.206 (1.238)
Total livestock units owned	0.872 (0.978)	0.927 (1.055)	0.919 (0.990)
No of kids under 5 yrs	0.767 (0.922)	0.632 (0.872)	0.771 (0.939)
No of kids 6 to 15 years	1.697 (1.563)	1.077 (1.373)	1.754 (1.585)
No. of females 15 to 65 yrs	1.417 (0.935)	1.125 (0.903)	1.460 (0.972)
No. of males 15 to 65 yrs	1.270 (1.048)	1.073 (0.912)	1.350 (1.089)
No. of adults over 65 years	0.147 (0.399)	0.114 (0.362)	0.145 (0.395)
Nairobi	0.093 (0.290)	0.091 (0.287)	0.076 (0.265)
Central	0.092 (0.289)	0.218 (0.413)	0.092 (0.289)
Coast	0.080 (0.271)	0.083 (0.275)	0.083 (0.275)
Eastern	0.160 (0.367)	0.122 (0.327)	0.167 (0.373)
Western	0.130 (0.337)	0.097 (0.296)	0.142 (0.349)
Nyanza	0.218 (0.413)	0.141 (0.348)	0.216 (0.411)
Rift Valley	0.225 (0.417)	0.247 (0.431)	0.224 (0.417)

Values are means (standard deviations)

Table 15:   Main occupation, sector and position in employment by poverty status

Category	Poor (%)	Non Poor(%)	Food poor (%)
Occupation			
None	23.42	17.12	23.82
Agriculture	46.22	37.93	46.24
Forestry	0.44	0.64	0.38
Fishing	0.52	0.62	0.66
Sales/service	21.62	34.78	21.46
Manufacturing	2.52	2.82	2.42
Mining	0.18	0.29	0.28
Transport	1.69	3.29	1.93
Construction	3.39	2.52	2.8
Sector of employment			
Public sector	6.62	14.95	7.64
Semi-public	2.22	3.77	2.33
Private formal	15.67	23.96	16.66
Private informal	75.5	57.31	73.36
Position in employment			
Unemployed	5.43	3.44	5.57
Employer	0.51	0.89	0.40
Regular employee (skilled)	8.45	21.00	9.36
Regular employee (unskilled)	7.63	8.13	7.00
Casual employee (skilled)	3.34	3.06	3.28
Casual employee (unskilled)	9.66	7.76	8.88
Self employed	37.51	35.64	37.10
Unpaid family worker	25.46	17.83	26.16
Student/apprentice	0.21	0.16	0.28
Pensioner/investor	0.36	1.00	0.36
Sick/handicapped	1.44	1.10	1.61

5.2   Estimation Results

In this section, we investigate empirically the institutional correlates of poverty. Institutions are a very important conduit to transmit globalization effects on rural poverty, playing a key role in explaining the extent, distribution and changes in rural poverty. Institutions and their changes also determine who is poor and who remains poor (Nissanke, 2004). Previous studies on the impact of rural institutions and globalization on poverty in Africa have identified several institutional determinants of poverty. These include road infrastructure, social dysfunction, operations and failure of agricultural factor and product markets, limited access to social services and high levels of corruption (Nissanke, 2004). Nissanke argues that infrastructure, social dysfunction and markets have deteriorated over the last two decades as a direct result of stabilization/liberalization policies. To investigate the impact of institutional factors on welfare, we run three different series of regressions: first we run the district level model of institutional determinants of poverty, second we model the household level determinants of poverty and then we combine household and institutional determinants of poverty in the final set of regressions. We discuss each of these regressions in turn.

District level regressions: Institutional determinants of poverty
We base these regressions on district level data described earlier. Poverty is measured through a range of variables, namely: the FGT measures, adult equivalent monthly expenditure and food poverty status. All district level models are estimated using ordinary least square regressions. This is because for the status of poverty (both food and absolute), we use district means estimated from binary variables (whether a household is food or absolute poor) in the household data. The estimated means are therefore continuous variables (ranging from 0 to 1), which necessitate use of ordinary least square regressions rather than probit/logit regression methods. Regional models could not be estimated at this level because of issue of degrees of freedom. As expected, correlation analysis shows that most institutional variables described earlier are correlated. After taking care of collinearity, we experiment regressions with a narrow range of selected institutional variables. In the end, the explanatory variables that we settle for in the regressions include the number of constituencies, number of active cooperatives, ratio of public to private secondary school teachers, health facilities, government land and infrastructure. Other than the ratio of public to private secondary school teachers and earth roads, all other variables are at the per capita level.

The regression results for the FGT poverty measures are presented in table 16. Since the results are consistent across various FGT measures, we base our discussion on the head count index, food poverty and expenditure functions. Though the F values are quite low, they are all significantly different from zero at all conventional levels of significance, implying that

the models fit the data better than the intercept only model. The low F values are most likely due to limited degrees of freedom given a very small sample size. Further, the R^2 indicates that the variables explain about 60% of the total variation in poverty rates and about 53% of the variation in adult equivalent expenditure. The number of constituencies per capita, which is a sign of good governance, has the unexpected sign for all poverty measures implying that parliamentary representation may not be an important determinant of poverty. This result is consistent with the results for expenditure.

Table 16:   Institutional correlates of poverty; FGT measures 1997

Variable	Head count ratio	Poverty gap	Poverty gap squared	Food Poor	Adult equiv. monthly expenditure
	Parameter estimates	Parameter estimates	Parameter estimates	Parameter estimates	Parameter estimates
No. of constituencies per capita	18.603 (2.50***)	7.325 (2.19**)	3.561 (1.96*)	14.654 (3.09***)	-10.869 (-1.99**)
Number of active cooperatives per capita	-0.048 (-0.70)	-0.039 (-1.26)	-0.023 (-1.36)	-0.059 (-1.35)	0.038 (0.75)
Ratio of public to private teachers	-0.345 (-1.50)	-0.150 (-1.45)	-0.075 (-1.34)	-0.150 (-1.02)	0.289 (1.71*)
Number of hospitals per capita	-1.030 (-2.27**)	-0.521 (-2.56***)	-0.271 (-2.45**)	0.060 (0.21)	0.138 (0.42)
Number of health Centers per capita	-2.953 (-1.71*)	-1.806 (-2.33**)	-1.096 (-2.60***)	-4.074 (-3.71***)	1.922 (1.52)
Total government land per capita	-0.181 (-2.38**)	-0.106 (-3.11***)	-0.061 (-3.30***)	-0.008 (-0.17)	-0.006 (-0.10)
Total area under water per capita	0.507 (2.60***)	0.262 (2.99***)	0.144 (3.01***)	0.388 (3.12***)	-0.074 (-0.51)
Total earth roads (Kms)	0.0001 (1.25)	0.0001 (1.10)	0.00003 (1.05)	-0.00003 (-0.35)	0.00002 (0.02)
Nairobi	0.397 (1.55)	0.139 (1.21)	0.063 (1.01)	0.096 (0.59)	0.141 (0.75)
Central	-0.321 (-3.63***)	-0.143 (-3.59***)	-0.073 (-3.40***)	-0.232 (-4.12***)	0.147 (2.26**)
Coast	0.071 (0.76)	0.056 (1.33)	0.036 (1.56)	-0.041 (-0.69)	0.111 (1.62*)
Eastern	-0.011 (-0.15)	-0.013 (-0.41)	-0.009 (-0.51)	-0.071 (-1.59)	0.080 (1.57)
Western	-0.110 (-1.05)	-0.057 (-1.22)	-0.030 (-1.18)	0.049 (0.75)	-0.019 (-0.25)
Nyanza	-0.078 (-0.78)	-0.043 (-0.96)	-0.021 (-0.87)	0.023 (0.37)	-0.054 (-0.73)
Constant	0.670 (7.92)	0.293 (7.71)	0.149 (7.24)	0.468 (8.69)	3.294 (53.16)
No of Observations	44	44	44	44	44
R-squared	0.5828	0.6359	0.6439	0.6234	0.5358
$F_{(14, 29)}$	2.89***	3.62***	3.75***	3.43***	2.39**

***, **,* Significant at 1%, 5% and 10% respectively

The number of active cooperatives is associated with lower poverty rates and levels though the coefficients are insignificant. This finding supports the argument that membership of a cooperative provides benefits that could have a positive impact on welfare (Oduro et al. 2004). Ratio of public to private trained secondary school teachers is also welfare improving, though the impact is only significant in the expenditure function. Health institutions are also clearly important determinants of welfare though the number of hospitals per capita do not seem to matter for food and absolute poverty. These results support earlier studies which find that access to basic services and infrastructure is important for household welfare (Kebede and Shimeles, 2004).

The same result is observed for government land ownership. Total area under water exert a strong positive impact on the poverty rates, implying that districts 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 districts have lots of waste water (such as large flood plains) which adversely affect productivity and welfare. Except for Nairobi and Coast provinces, all regional dummies exert a negative impact on poverty rates, implying that relative to Rift Valley province, these regions are likely to have lower levels of poverty, which is consistent with the FGT poverty rates (see Table 13). However, only the dummy for Central province is significant.

Household level determinants of poverty

Next we turn to investigate the impact of household level determinants of poverty, using the same dependent variables as in the previous section. The sample statistics of the variables used in these regressions are presented in appendix table A1. Before discussing the regression results, first we note that some of the variables used in the models are arguably endogenous though they have been used in a large number of studies. These variables include sector of employment, occupation of the household head, total livestock units owned and ownership of agricultural land. In the face of endogeneity of some variables, instrumental variable methods would be most appropriate, so long as suitable identifying instruments are available in the data. In the absence of suitable variables, the researcher could resort to reduced form models that exclude the predetermined variables. It is however always useful to carry out endogeneity tests to be sure that the problem exists before discarding important determinants of a variable of interest. If the test rejects endogeneity, then these variables can be incorporated in the reduced form model.

Due to lack of suitable instruments, we employ the general Hausman specification test to verify whether it is appropriate to incorporate the above variables in our model (Stata Corp, 1999). The test involves determining whether there exist systematic differences in two estimators: a consistent estimator (without endogenous variables) and an efficient estimator (with suspected endogenous variables). The idea is to test whether the efficient estimator is

also consistent. The Hausman specification test for each of the suspected variables does not reject the null hypothesis and therefore the suspect variables are unlikely to affect the signs and magnitudes of the coefficients of other variables in the model. We therefore retain the variables in our estimation, though like some other variables, their performance is not consistent in all models.

The regression results for the full sample are presented in table 17. We present the marginal effects for the head count index and food poverty functions and OLS parameter estimates for the poverty gap, poverty gap squared and expenditure functions. The results indicate that age and age squared have an inverted U shaped relationship with household welfare, with households getting worse off as the household head becomes older. This result is consistent with hypothesis of life cycle models (Appleton, 2002). The result is consistent across the three models. The results further show that sector of employment, employment in the agricultural sector and distance to source of water are associated with lower household welfare. This is also the case for larger households with all family composition variables exhibiting a positive relationship with the FGT measures and food poverty, but an inverse relationship with adult equivalent monthly expenditures. Distance to source of water is associated with higher levels of poverty, implying that households that have to spend a lot of time collecting water have less time for productive activities and thus lower welfare (Mwabu et al., 2000). The results also show that other than for Central province, all other regions are likely to have higher poverty rates than the Rift Valley province. Male heads and marital status are associated with lower poverty rates but the impact is insignificant. Number of rooms in a house and number of total livestock units owned reduce household poverty rates, implying that assets are important determinants of poverty. Education is an important determinant of household poverty and the result is consistent across the three models. Furthermore, welfare is an increasing function of education attainment. This finding is consistent with earlier findings for Kenya (Geda et al., 2001, Mwabu et al, 2000, Oyugi, 2000).

The results for FGT poverty measures differ with those for food poverty in several respects. In the first place, the head count index model fits the data much better than the food poverty model as shown by the differences in the Wald Chi(2) test. However, both models fit the data better than the intercept only model and the variables are jointly significant in explaining variations in household poverty. Second, the signs and significance of a few variables differ in the two models. Rural residence, gender and marital status of the household head are associated with higher levels of food poverty, though the coefficients are insignificant, but the reverse impact is observed for the head count index function. The other difference is in total agricultural land holding, which has the expected impact of reducing food poverty though the impact is insignificant.

Table 17:   Household correlates of poverty: Full Sample

Variable	Head count index	Poverty gap	Poverty gap Squared	Food Poor	Adult equiv. monthly expenditure
	Estimates	Estimates	Estimates	Estimates	Estimates
Age (yrs)	-0.006 (-2.68***)	0.005 (8.63***)	0.002 (6.23***)	-0.004 (-1.58*)	0.467 (80.49***)
Age squared	0.0001 (2.75***)	-0.0001 (-5.35***)	-0.00001 (-3.22***)	0.0001 (2.18***)	-0.005 (-51.02***)
Sex (1=male)	-0.008 (-0.53)	0.007 (0.90)	0.004 (0.83)	0.009 (0.62)	0.324 (6.54***)
Marital Status (1= married)	-0.007 (-0.44)	0.008 (1.14)	0.006 (1.45)	0.019 (1.23)	-0.073 (-1.23)
Primary schooling	-0.107 (-7.59***)	-0.042 (-5.60***)	-0.024 (-5.44***)	-0.057 (-4.15***)	0.987 (20.34***)
Post primary schooling	-0.284 (-17.03***)	-0.096 -(10.77***)	-0.050 (-9.97***)	-0.193 (-11.88***)	1.609 (25.32***)
Employment sector	0.036 (3.37***)	0.006 (1.09)	0.0002 (0.07)	0.001 (0.12)	0.228 (6.85***)
Main occupation	0.070 (5.90***)	0.024 (4.51***)	0.013 (4.11***)	0.042 (3.68***)	-0.126 (-3.62***)
Rural area dummy	-0.126 (-6.47***)	-0.025 (-3.31***)	-0.014 (-3.06***)	0.023 (1.23)	0.300 (4.51***)
Time to source of water	0.014 (3.85***)	0.008 (4.47***)	0.005 (4.46***)	0.008 (2.09**)	0.079 (6.96***)
No. of rooms in main house	-0.052 (-11.00***)	-0.017 (-8.12***)	-0.008 (-6.57***)	-0.042 (-9.17***)	0.067 (5.12***)
Log total land holding (acres)	0.007 (1.56)	0.003 (1.00)	0.001 (0.35)	-0.002 (-0.55)	0.016 (0.91)
Log total livestock units	-0.068 (-11.50***)	-0.025 (-8.45***)	-0.013 (-7.43***)	-0.053 (-9.28***)	0.026 (1.41)
No of kids under 5 yrs	0.025 (3.95***)	0.010 (3.12***)	0.005 (2.44***)	0.015 (2.48***)	0.126 (6.42***)
No of kids 6 to 15 years	0.080 (19.88***)	0.026 (12.41***)	0.013 (10.69***)	0.065 (17.05***)	-0.291 (-24.62***)
No. of females 15 to 65 yrs	0.065	0.020	0.009	0.065	-0.168

	(10.12***)	(5.54***)	(4.69***)	(10.46***)	(-7.46***)
No. of males 15 to 65 yrs	0.066 (10.38***)	0.016 (4.94***)	0.007 (3.56***)	0.080 (13.03***)	-0.290 (-16.53***)
No. of adults over 65 years	0.075 (3.42***)	0.034 (3.28***)	0.011 (1.87*)	0.043 (2.02**)	1.321 (14.59***)
Region (Rift Valley is reference)					
Nairobi	0.059 (2.42***)	0.014 (0.86)	-0.0001 (-0.01)	0.057 (2.31)	1.116 (10.39***)
Central	-0.132 (-7.50***)	-0.040 (-6.23***)	-0.019 (-5.49***)	-0.140 (-8.27***)	0.427 (8.39***)
Coast	0.011 (0.51)	0.025 (2.95***)	0.015 (3.05***)	0.053 (2.51***)	0.517 (8.05***)
Eastern	0.082 (4.63***)	0.038 (4.64***)	0.020 (4.16***)	0.077 (4.47***)	-0.002 (-0.03)
Western	0.125 (6.57***)	0.062 (6.47***)	0.034 (5.95***)	0.135 (7.19***)	-0.006 (-0.11)
Nyanza	0.130 (8.02***)	0.051 (6.49***)	0.027 (5.76***)	0.107 (6.69***)	-0.045 (-0.95)
No of Observations	10729	10847	10847	10729	10729
LR chi2 (24)	2026.6***			1750.8***	
Log Likelihood	-6378.6			-6369.3	
R-squared		0.4388	0.3365		0.9885
F(24, 10823)		192.97	117.65		F(24, 10705)=36231

***, **,* Significant at 1%, 5% and 10% respectively

The results for the household determinants of adult equivalent monthly expenditure also differ with the determinants of the poverty rates in several respects: The t values for age and age squared are very high, which is a result of suppressing the constant. When the model is estimated without the constant, the t values are quite low though significant. Suppressing the constant also raises the R squared value from 0.73% to 0.99% implying that the constant alone explains about 25% of the total variation in expenditure. This could probably imply that our model may have omitted important variables. However an R squared of 73% still implies that the variables of the fitted model have a reasonably high explanatory power. Gender of household head is positive and highly significant, implying that female headed households are poorer than male headed households, a finding which is supportive of findings in a large number of studies (Geda et al., Mwabu et al., 2000). Marital status is inversely correlated with expenditure, implying that household whose heads are married are likely to be poorer than single parent households. Although this result is unexpected and surprising, the coefficient is insignificant.

Another difference is in the signs of the coefficient for sector of employment, where we find that households headed by formal sector workers are better off than all other households. Distance to source of water has an unexpected positive and significant impact. Number of rooms and livestock ownership have the unexpected impact but only the impact of livestock is significant. The results for household composition imply that the presence of more children below 5 years and more elderly adults (over 65 years) are associated with more expenditure. This result is unexpected and contrary to the poverty functions which give the expected results. The final difference in our model results is that regional dummies indicate that the welfare of households in Nairobi, Central and Coast provinces is higher than households in the Rift Valley province, while households in Eastern, Nyanza and Western are worse off. This conforms to the ranking of provinces by mean adult equivalent expenditures where Rift valley ranks 4th.

The results for regional analysis are presented in tables 18 and 19. The rural models fit the data better than for the full sample, while the poverty gap and expenditure functions for urban areas also perform better than the respective full sample and rural functions. Except for the age variables which are clearly unimportant in rural areas, the FGT and food poverty function results for rural areas are consistent with those for the full sample. However, the age variables have a significant impact on expenditure in rural areas. There are more marked differences in the urban model, where age, gender, employment sector and land holdings are more significant determinants of poverty. Marital status has an unexpected negative and significant coefficient in urban areas. Household assets (land and livestock) reduce the

likelihood of a household falling into poverty in rural areas, but the signs and magnitudes of the results for the full sample and urban areas are mixed implying that these assets are more critical in rural areas. Regional location does not seem to be important in urban relative to rural areas probably because of the relatively small size of the urban sample across regions. However, Western and Nyanza provinces are clearly worse off than Rift Valley in terms of the head count index and food poverty. The results for expenditure do not support this, but show that all households in urban areas are better off than those in urban Rift Valley, though the coefficients for Western and Nyanza are insignificant.

Table 18:   Household Correlates of poverty; Rural Sample, 1997

Variable	Head count index	Poverty Gap	Poverty Gap Squared	Food Poor	Adult equiv. monthly expenditure
	Marginal effects	Parameter est.	Parameter est.	Marginal effects	Parameter est.
Age (yrs)	-0.0004 (-0.14)	0.004 (7.03***)	0.002 (4.73***)	-0.001 (-0.38)	0.455 (83.82***)
Age squared	0.00002 (0.68)	-0.00003 (-3.70***)	-0.00001 (-1.87**)	0.00003 (1.01)	-0.004 (-50.47***)
Sex (1=male)	0.010 (0.63)	0.005 (0.64)	0.002 (0.40)	0.008 (0.53)	0.210 (4.19***)
Marital Status (1= married)	-0.003 (-0.17)	0.006 (0.83)	0.005 (1.02)	0.005 (0.31)	0.245 (4.12***)
Primary schooling	-0.106 (-7.14***)	-0.041 (-5.63***)	-0.022 (-5.01***)	-0.053 (-3.62***)	0.879 (18.16***)
Post primary schooling	-0.280 (-15.38***)	-0.102 (-12.48***)	-0.051 (-10.64***)	-0.185 (-10.18***)	1.314 (20.51***)
Employment sector	0.009 (0.78)	-0.006 (-1.13)	-0.005 (-1.50)	-0.022 (-1.91**)	0.143 (4.30***)
Main occupation	0.083 (6.92***)	0.030 (5.42***)	0.015 (4.64***)	0.055 (4.68***)	0.010 (0.29)
Time to source of water	0.016 (4.14***)	0.008 (4.32***)	0.005 (4.13***)	0.009 (2.28**)	0.094 (8.40***)
No. of rooms in main house	-0.031 (-5.99***)	-0.011 (-4.75***)	-0.006 (-3.97***)	-0.033 (-6.58***)	0.086 (6.21***)
Log total land holding (acres)	-0.008 (-1.47)	-0.002 (-0.59)	-0.001 (-0.64)	-0.005 (-1.03)	0.041 (2.69***)
Log total livestock units	-0.065 (-(10.39***)	-0.023 (-7.39***)	-0.012 (-6.28***)	-0.054 (-8.72***	0.052 (2.98***)
No of kids under 5 yrs	0.025 (3.73***)	0.010 (3.10***)	0.005 (2.59***)	0.016 (2.46***)	0.174 (9.11***)
No of kids 6 to 15 years	0.074 (17.65***)	0.025 (11.54***)	0.013 (9.80***)	0.066 (16.25***)	-0.249 (-20.39***)
No. of females 15 to 65 yrs	0.056 (7.83***)	0.015 (4.56***)	0.007 (3.47***)	0.065 (9.43***)	-0.241 (-11.50***)
No. of males 15 to 65 yrs	0.058 (8.52***)	0.016 (4.72***)	0.008 (3.56***)	0.071 (10.68***)	-0.294 (-17.25***)

No. of adults over 65 years	0.063 (2.85***)	0.022 (2.12**)	0.007 (1.07)	0.054 (2.45***)	1.031 (12.05***)
Central	−0.164 (-8.91***)	-0.053 (-7.73***)	-0.026 (-6.73***)	−0.165 (-9.17***)	0.568 (10.57***)
Coast	0.032 (1.20)	0.025 (2.53***)	0.014 (2.45***)	0.048 (1.88*)	0.213 (3.41***)
Eastern	0.076 (4.14***)	0.036 (4.05***)	0.018 (3.46***)	0.074 (4.08***)	0.033 (0.63)
Western	0.112 (5.68***)	0.055 (5.50***)	0.029 (4.91***)	0.121 (6.21***)	0.083 (1.39)
Nyanza	0.115 (6.74***)	0.044 (5.10***)	0.023 (4.47***)	0.088 (5.25***)	-0.052 (-1.02)
No of Observations	8860	8944	8944	48860	8944
LR chi2 (22)	1680.05			1432.45	
Log Likelihood	−5273.37			−5335.98	
R-squared		0.4459	116.8		0.9883
F(22, 8922)		190.33	0.3434		F(22, 8838)= 36010

Table 19:   Household Correlates of poverty; Urban Sample, 1997

Variable	Head count index	Poverty gap	Poverty gap squared	Food Poor	Adult equiv. monthly expenditure
	Marginal effects	Parameter est.	Parameter est.	Marginal effects	Parameter est.
Age (yrs)	-0.018 (-2.10**)	0.005 (2.68***)	0.002 (1.77*)	-0.024 (-3.23***)	0.554 (37.32***)
Age squared	0.0001 (1.31)	-0.0001 (-2.43***)	-0.00002 (-1.43)	0.0003 (3.35***)	-0.006 (-24.48***)
Sex (1=male)	-0.146 (-2.89***)	0.017 (0.88)	0.015 (1.27)	0.038 (0.86)	0.923 (5.63***)
Marital Status (1= married)	0.076 (1.77*)	0.024 (1.42)	0.013 (1.36)	0.059 (1.55)	-0.964 (-8.42***)
Primary schooling	-0.125 (-2.69***)	-0.079 (-2.42***)	-0.050 (-2.70***)	-0.081 (-2.02**)	0.872 (6.51***)
Post primary schooling	-0.299 (-6.20***)	-0.116 (-3.41***)	-0.065 (-3.51***)	-0.203 (-4.76***)	1.308 (9.37***)
Employment sector	0.116 (4.32***)	0.047 (3.39***)	0.019 (2.65***)	0.082 (3.38***)	0.323 (4.39***)
Main occupation	-0.019 (-0.31)	0.004 (0.19)	0.007 (0.46)	-0.071 (-1.28)	0.515 (2.98***)
Time to source of water	0.009 (0.66)	0.010 (1.52)	0.007 (2.02**)	-0.002 (-0.17)	0.114 (3.31***)
No. of rooms in main house	-0.130 (-9.78***)	-0.030 (-6.85***)	-0.013 (-5.84***)	-0.071 (-6.50***)	0.196 (5.72***)
Log total land holding (acres)	0.048 (4.39***)	0.015 (3.02***)	0.005 (1.76*)	-0.004 (-0.53)	0.041 (1.09)
Log total livestock units	-0.088 (-4.91***)	-0.031 (-4.58***)	-0.015 (-4.07***)	-0.056 (-3.66***)	0.080 (1.71*)
No of kids under 5 yrs	0.033 (1.87**)	0.005 (0.50)	-0.001 (-0.20)	0.010 (0.68)	-0.011 (-0.22)
No of kids 6 to 15 years	0.131 (9.5***)	0.042 (6.40***)	0.024 (5.53***)	0.071 (6.13***)	-0.345 (-10.61***)
No. of females 15 to 65 yrs	0.081 (4.68***)	0.035 (3.46***)	0.018 (3.32***)	0.077 (5.13***)	0.019 (0.35)
No. of males 15 to 65 yrs	0.136 (7.25***)	0.025 (3.34***)	0.009 (2.20**)	0.121 (7.85***)	-0.280 (-3.96***)

No. of adults over 65 years	0.219 (1.73*)	0.092 (1.85**)	0.031 (1.00)	-0.290 (-2.29***)	3.623 (5.34***)
Nairobi	0.030 (0.87)	0.007 (0.45**)	0.002 (0.28)	0.052 (1.65*)	0.318 (3.37***)
Central	0.031 (0.46)	0.045 (2.63***)	0.027 (2.99***)	0.045 (0.68)	0.224 (1.92**)
Coast	-0.011 (-0.25)	0.027 (1.65*)	0.021 (2.31**)	0.088 (2.18**)	0.267 (2.56***)
Eastern	0.070 (1.08)	0.036 (2.14**)	0.025 (2.75***)	0.024 (0.38)	0.203 (1.86**)
Western	0.144 (1.86**)	0.092 (2.82***)	0.066 (2.98***)	0.223 (3.04***)	0.178 (1.28)
Nyanza	0.168 (3.08***)	0.076 (4.28***)	0.045 (4.18***)	0.211 (4.05***)	0.152 (1.49)
No of Observations	1869	1903	1903	1869	1869
LR chi2 (21)	497.61			310.07	
Log Likelihood	-1028.53			-1006.4	
R-squared		0.4516	0.3389		0.9932
F(23, 1880)		33.71	19.68		F(23, 1846)= 10187

Household and Institutional Determinants of Poverty

To model both household and institutional determinants of poverty, we map district level institutional factors onto the household level data, then run models with the relevant determinants. The results for the full model are presented in table 20. The Chow test results and R-squared values show that combining these two sets of determinants significantly improves the fit and stability of the models. The results for household characteristics are consistent with those of regressions with household characteristics alone. However, the impact of land holding is reversed in the expenditure function while livestock ownership has the expected and significant impact. Signs and magnitudes for coefficients of regional dummies are significantly different from those in the household characteristics model. In particular, the results for the expenditure function show that all regions are better off than the Rift Valley province but as before, the result is not consistent for the poverty functions. Household characteristic results for rural and urban areas are also consistent with the household variable only model. However, we also observe differences in behavior of the provincial dummies (see tables 21 and 22).

Turning to the institutional factors, per capita endowment of active cooperatives, health centers and ratio of public to private school teachers reduce absolute and food poverty rates. In addition to these factors, government land and total length of earth roads increase expenditures and reduce the likelihood of households falling into absolute poverty. The results for road length and hospitals are not consistent across different welfare measures. Poverty gap and poverty gap squared results are consistent with those of the head count index and food poverty functions. Except for per capita government land ownership and total length of earth roads, the results for the rural sample are consistent with those of the full sample. Overall the results confirm that institutions are important determinants of poverty and the results are consistent with the district level institutional determinants of poverty. But parliamentary representation does not seem to be an important determinant of household welfare. Maybe this could be explained by the fact that parliamentary representation may only help to enhance provision of public goods if at all, which may not have any direct short term impact on household welfare.

Turning to regional analysis, results for urban areas are considerably different from those of rural areas. In urban areas, except for parliamentary representation, number of health centers, government land per capita and abundance of earth roads all institutional variables are welfare improving when welfare is measured through the proportion of people below absolute and food poverty lines. However, only length of earth roads and number of hospitals per capita exert a significant impact on welfare in the head count index function. When

welfare is measured through expenditure, all institutional factors are welfare improving except for total area under waste water and length of earth roads. The impact of these factors is significantly different from zero. For rural areas, health centers and earth roads are clearly welfare improving, while other institutional factors do not seem to matter for absolute and food poverty. However, only parliamentary representation and total area under water are associated with lower welfare when welfare is measured through expenditure. Comparing the results for different poverty measures for all regions, including the full sample, we conclude that although household variables perform almost equally well in all specifications (Appleton, 2002), welfare measured through consumption expenditure give more robust results than when welfare is measured through the status of poverty.

Table 20:   Household and institutional correlates of poverty; FGT measures 1997

Variable	Head count index	Poverty gap	Poverty gap Squared	Food Poor	Adult equiv. monthly expenditure
	Estimates	Estimates	Estimates	Estimates	Estimates
Age (yrs)	-0.007 (-2.78***)	0.004 (6.53***)	0.002 (5.46***)	-0.003 (-1.27)	0.396 (58.05***)
Age squared	0.0001 (3.03***)	-0.00003 (-4.26***)	-0.00001 (-3.12***)	0.0001 (2.00**)	-0.004 (-41.41***)
Sex (1=male)	0.010 (0.61)	0.019 (2.59***)	0.011 (2.48***)	0.035 (2.20**)	0.325 (6.66***)
Marital Status (1= married)	-0.025 (-1.52)	0.0001 (0.02	0.002 (0.44	0.002 (0.15)	-0.109 (-1.93**)
Primary schooling	-0.116 (-7.64***)	-0.046 (-5.89***)	-0.026 (-5.59***)	-0.072 (-4.94***)	0.866 (19.45***)
Post primary schooling	-0.287 (-16.11***)	-0.096 (-10.29***)	-0.050 (-9.71***)	-0.202 (-11.73***)	1.496 (25.87***)
Employment sector	0.057 (5.01***)	0.012 (2.12**)	0.003 (0.86)	0.024 (2.16**)	0.183 (5.53***)
Main occupation	0.089 (6.8***)	0.031 (5.74***)	0.017 (5.29***)	0.054 (4.29***)	-0.021 (-0.59)
Rural area dummy	0.017 (4.22***)	0.009 (4.92***)	0.006 (5.15***)	0.002 (0.11)	0.055 (4.69***)
Time to source of water	-0.059 (-11.56***)	-0.018 (-9.12***)	-0.009 (-7.56***)	0.009 (2.29**)	0.057 (4.17***)
No. of rooms in main house	-0.155 (-7.58***)	-0.035 (-4.38***)	-0.019 (-4.07***)	-0.045 (-9.16***)	0.259 (4.39***)
Log total land holding (acres)	0.013 (2.52***)	0.005 (1.58)	0.002 (0.97)	-0.002 (-0.52)	-0.009 (-0.48)
Log total livestock units	-0.078 (-12.37***)	-0.027 (-9.14***)	-0.014 (-7.94***)	-0.059 (-9.86***)	0.067 (3.67***)
No of kids under 5 yrs	0.028 (4.05***)	0.011 (3.40***)	0.005 (2.5***)	0.019 (2.91***)	0.103 (5.26***)
No of kids 6 to 14 years	0.081 (18.56***)	0.027 (12.56***)	0.014 (10.77***)	0.064 (15.52***)	-0.270 (-22.7***)
No. of females over 14 yrs	0.075 (10.84***)	0.023 (6.21***)	0.011 (5.43***)	0.070 (10.66***)	-0.142 (-6.68***)
No. of males 15 to 65 yrs	0.066	0.013	0.005	0.078	-0.272

	(9.63***)	(3.90***	(2.53***)	(11.97***)	(-15.65***)
No. of adults over 65 years	0.061 (2.6***)	0.026 (2.53***	0.008 (1.33)	0.024 (1.06)	1.128 (12.68***)
Number of constituencies per capita	1.634 (0.68)	-1.636 (-1.48)	-1.052 (-1.62*)	2.011 (0.87)	-63.79 (-8.74***)
Number of active cooperatives per capita	-0.050 (-2.12**)	-0.016 (-2.450***)	-0.011 (-3.22***)	-0.027 (-1.18)	0.861 (19.52***)
Ratio of public to private teachers	-0.151 (-2.24**)	-0.013 (-0.51)	-0.002 (-0.16)	-0.153 (-2.32***)	1.174 (6.7***)
Number of hospitals per capita	0.361 (2.03**)	0.280 (3.61***)	0.143 (3.18***)	0.395 (2.31***)	6.635 (12.24***)
Number of health Centers per capita	-2.516 (-3.85***)	-0.852 (-3.64***)	-0.511 (-3.91***)	-3.010 (-4.75***)	17.54 (10.03***)
Total government land per capita	-0.024 (-0.86)	-0.001 (-0.06)	-0.002 (-0.30)	-0.005 (-0.17)	0.818 (12.00***)
Total area under water per capita	0.411 (7.05***)	0.113 (4.29***)	0.058 (3.55***)	0.343 (6.25***)	-1.993 (-12.45***)
Total earth roads (Kms)	0.000 (1.33)	-0.00001 (-0.46)	-0.00001 (-1.06)	0.00004 (0.97)	0.0001 (0.72)
Nairobi	0.234 (3.92***)	0.037 (1.44)	0.007 (0.46)	0.222 (3.69***)	0.137 (0.84)
Central	-0.138 (-5.37***)	-0.022 (-2.19**)	-0.009 (-1.56*)	-0.145 (-5.96***)	1.146 (15.72***)
Coast	-0.046 (-1.45)	0.025 (1.89**)	0.017 (2.14**)	-0.004 (-0.12)	1.217 (13.82***)
Eastern	0.049 (1.69*)	0.038 (3.32***)	0.020 (2.96***)	0.065 (2.33**)	0.632 (8.59***)
Western	0.099 (3.18***)	0.080 (5.96***)	0.044 (5.64***)	0.137 (4.47***)	1.378 (14.84***)
Nyanza	0.056 (1.74*)	0.050 (3.50***)	0.029 (3.29***)	0.054 (1.71*)	1.002 (11.36***)
No of Observations	9951	9656	9656	9551	9551
LR chi2 (32)	2077.31			1714.19	
Log Likelihood	-5505.71			-5513.56	
F(32, 9519)		F(32, 9624) = 132.39	F(32, 9624)= 80.36		27316
R-squared		0.4413	0.3395		0.9899

Table 21: Household and institutional correlates of poverty; Rural Sample

Variable	Head count index	Poverty gap	Poverty gap squared	Food Poor	Adult equiv. monthly expenditure
	Marginal effects	Parameter est.	Parameter est.	Marginal effects	Parameter est.
Age (yrs)	0.0002 (0.08)	0.003 (5.33***)	0.001 (4.08***)	0.0004 (0.16)	0.399 (62.08***)
Age squared	0.00002 (0.68)	-0.00002 (-2.73***)	-0.00001 (-1.70*)	0.00002 (0.60)	-0.00380 (-41.88***)
Sex (1=male)	0.034 (1.95**)	0.019 (2.42***)	0.010 (2.11**)	0.036 (2.10**)	0.204 (4.00***)
Marital Status (1= married)	-0.026 (-1.41)	-0.005 (-0.59)	-0.001 (-0.23)	-0.015 (-0.80)	0.191 (3.23***)
Primary schooling	-0.115 (-7.21***)	-0.044 (-6.08***)	-0.023 (-5.22***)	-0.068 (-4.37***)	0.796 (17.29***)
Post primary schooling	-0.284 (-14.58***)	-0.101 (-12.64***)	-0.051 (-10.97***)	-0.194 (-10.03***)	1.287 (20.88***)
Employment sector	0.033 (2.58***)	-0.0001 (-0.01)	-0.002 (-0.75)	0.002 (0.13)	0.119 (3.43***)
Main occupation	0.105 (7.92***)	0.036 (6.56***)	0.019 (5.80***)	0.070 (5.42***)	0.094 (2.67***)
Time to source of water	0.019 (4.52***)	0.009 (4.65***)	0.005 (4.67***)	0.010 (2.35***)	0.067 (5.73***)
No. of rooms in main house	-0.033 (-5.79***)	-0.012 (-5.18***)	-0.006 (-4.42***)	-0.035 (-6.36***)	0.058 (3.91***)
Log total land holding (acres)	-0.006 (-1.00)	0.001 (0.19)	0.0003 (0.16)	-0.006 (-1.00)	0.007 (0.44
Log total livestock units	-0.073 (-10.78***)	-0.024 (-7.84***)	-0.012 (-6.50***)	-0.058 (-8.83***)	0.090 (4.99***)
No of kids under 5 yrs	0.032 (4.31***)	0.012 (3.81***)	0.006 (3.01***)	0.023 (3.23***)	0.150 (7.59***)
No of kids 6 to 14 years	0.075 (16.41***)	0.026 (11.82***)	0.013 (10.01***)	0.065 (14.86***)	-0.241 (-19.36***)
No. of females over 14 yrs	0.064 (8.29***)	0.018 (5.27***)	0.008 (4.11***)	0.070 (9.42***)	-0.207 (-9.8***)
No. of males 15 to 65 yrs	0.056 (7.66***)	0.013 (3.61***)	0.006 (2.46***)	0.068 (9.55***)	-0.283 (-16.62***)

No. of adults over 65 years	0.045 (1.92**)	0.013 (1.23)	0.002 (0.39)	0.036 (1.56)	0.889 (10.42***)
Number of constituencies per capita	5.754 (2.28**)	0.552 (0.48)	-0.048 (-0.07)	4.387 (1.79*)	-53.531 (-7.21***)
Number of active cooperatives per capita	-0.022 (-0.94)	-0.015 (-2.33)	-0.011 (-3.12***)	-0.015 (-0.67)	0.692 (15.55***)
Ratio of public to private teachers	-0.087 (-1.17)	0.014 (0.51)	0.010 (0.59)	-0.074 (-1.02)	0.985 (5.05***)
Number of hospitals per capita	0.600 (3.28***)	0.280 (3.44***)	0.142 (3.02***)	0.551 (3.08***)	5.289 (9.37***)
Number of health Centers per capita	-4.351 (-5.99***)	-1.656 (-6.34***)	-0.880 (-5.91***)	-4.208 (-5.93***)	16.244 (8.85***)
Total government land per capita	0.017 (0.55)	0.003 (0.31)	0.001 (0.16)	0.014 (0.46)	0.596 (8.29***)
Total area under water per capita	0.513 (8.51***)	0.168 (6.11***)	0.085 (4.98***)	0.398 (6.95***)	-1.890 (-11.73***)
Total earth roads (Kms)	-0.0001 (-1.91**)	-0.0001 (-3.00***)	-0.00004 (-2.89***)	-0.0001 (-0.97)	0.0003 (2.25**)
Central	-0.144 (-5.28***)	-0.031 (-3.09***)	-0.013 (-2.27**)	-0.146 (-5.54***)	1.095 (14.42***)
Coast	0.045 (1.20)	0.050 (3.49***)	0.030 (3.48***)	0.055 (1.49)	0.832 (8.56***)
Eastern	0.048 (1.62*)	0.030 (2.45***)	0.016 (2.22**)	0.068 (2.31**)	0.438 (5.82***)
Western	0.162 (4.88***)	0.085 (6.22***)	0.045 (5.73***)	0.175 (5.33***)	1.142 (11.76***)
Nyanza	0.104 (3.00***)	0.054 (3.65***)	0.030 (3.30***)	0.082 (2.42***)	0.707 (7.75***)
No of Observations	7785	7859	7859	7785	7859
LR chi2 (32)	1787.15			1468.03	
Log Likelihood	-4444.3			-4528.8	
R-squared		0.4524	0.3506		0.9895
F(32, 9624)		126.13	76.61		F(30, 7755)= 25557

***, **,* Significant at 1%, 5% and 10% respectively

Table 22:   Household and institutional correlates of poverty; Urban Sample

Variable	Head count index	Poverty gap	Poverty gap squared	Food Poor	Adult equiv. monthly expenditure
	Marginal effects	Parameter est.	Parameter est.	Marginal effects	Parameter est.
Age (yrs)	-0.020 (-2.29**)	0.003 (1.14)	0.001 (0.64)	-0.027 (-3.38***)	0.425 (19.84***)
Age squared	0.0002 (1.59)	-0.00004 (-1.26)	-0.00001 (-0.57)	0.0003 (3.55***)	-0.0048 (-15.72***)
Sex (1=male)	-0.139 (-2.62***)	0.019 (0.92)	0.016 (1.3)	0.057 (1.24)	0.707 (5.53***)
Marital Status (1= married)	0.063 (1.43)	0.023 (1.36)	0.013 (1.33)	0.046 (1.15)	-0.730 (-7.43***)
Primary schooling	-0.123 (-2.52***)	-0.079 (-2.33***)	-0.051 (-2.61***)	-0.083 (-1.99**)	0.749 (6.63***)
Post primary schooling	-0.294 (-5.81***)	-0.116 (-3.24***)	-0.065 (-3.35***)	-0.205 (-4.59***)	1.123 (9.51***)
Employment sector	0.120 (4.29***)	0.048 (3.36***)	0.019 (2.56***)	0.087 (3.48***)	0.203 (3.26***)
Main occupation	-0.022 (-0.33)	0.009 (0.36)	0.009 (0.57)	-0.069 (-1.18)	0.436 (3.01***)
Time to source of water	0.007 (0.48)	0.012 (1.62*)	0.009 (2.11**)	-0.001 (-0.08)	0.085 (2.92***)
No. of rooms in main house	-0.136 (-9.66***)	-0.031 (-6.81***)	-0.014 (-5.92***)	-0.072 (-6.33***)	0.203 (6.69***)
Log total land holding (acres)	0.052 (4.58***)	0.016 (3.22***)	0.005 (1.89**)	-0.004 (-0.47)	0.030 (1.03)
Log total livestock units	-0.096 (-4.99***)	-0.032 (-4.54***)	-0.015 (-3.98)	-0.061 (-3.76***)	0.089 (2.23**)
No of kids under 5 yrs	0.029 (1.59)	0.004 (0.41)	-0.002 (-0.31)	0.007 (0.46)	-0.018 (-0.43)
No of kids 6 to 14 years	0.130 (9.18***)	0.043 (6.33***)	0.024 (5.44***)	0.070 (5.87***)	-0.284 (-10.04***)
No. of females 15-65 yrs	0.091 (4.94***)	0.037 (3.56***)	0.019 (3.46***)	0.084 (5.30***)	-0.033 (-0.79)
No. of males 15 to 65 yrs	0.137 (7.00***)	0.025 (3.29***)	0.010 (2.28**)	0.120 (7.48***)	-0.258 (-4.69***)

No. of adults over 65 years	0.231 (1.77*)	0.087 (1.74*)	0.030 (0.97**)	-0.297 (-2.28***)	2.709 (4.99***)
Number of constituencies per capita	11.784 (1.11)	3.209 (0.89)	1.357 (0.61**)	9.907 (0.99)	3.064 (0.13)
Number of active cooperatives per capita	-0.343 (-0.83)	0.021 (0.67)	0.015 (0.85**)	-0.014 (-0.07)	1.714 (4.84***)
Ratio of public to private teachers	-0.378 (-1.61)	-0.149 (-2.07**)	-0.057 (-1.33**)	-0.411 (-2.14***)	0.968 (2.31**)
Number of hospitals per capita	-1.475 (-2.10**)	-0.052 (-0.23)	0.024 (0.17**)	-0.873 (-1.3)	8.539 (5.38***)
Number of health Centers per capita	2.043 (1.08)	0.840 (1.43)	0.225 (0.75**)	0.794 (0.45)	18.428 (3.96***)
Total government land per capita	0.124 (1.22)	0.077 (2.33*)	0.037 (1.89**)	0.027 (0.32)	0.884 (4.12***)
Total area under water per capita	-0.483 (-1.47)	-0.305 (-2.90**)	-0.197 (-2.93***)	0.052 (0.19	-0.184 (-0.34)
Total earth roads (Kms)	0.000 (1.74*)	0.00003 (0.71)	-0.00001 (-0.27)	0.0001 (0.75)	-0.0001 (-0.56)
Nairobi	0.364 (2.44***)	0.105 (1.88**)	0.028 (0.85)	0.336 (2.38***)	-0.210 (-0.73)
Central	-0.118 (-1.18)	0.013 (0.44)	0.014 (0.80)	-0.093 (-1.07)	1.119 (5.45***)
Coast	-0.017 (-0.17)	0.018 (0.45)	0.025 (1.00)	-0.070 (-0.76)	0.392 (1.44)
Eastern	0.055 (0.50)	0.046 (1.55)	0.029 (1.75*)	-0.022 (-0.22)	0.576 (2.46***)
Western	-0.079 (-0.69)	0.087 (1.96**)	0.069 (2.44***)	0.041 (0.36)	2.027 (7.59***)
Nyanza	0.044 (0.34)	0.123 (2.61***)	0.087 (2.89***)	0.046 (0.38)	1.632 (6.10***)
No of Observations	1797	1797	1797	1797	1766
LR chi2 (31)	495.06			300.16	
Log Likelihood	-959.71			-950.27	
F(31, 1766)		25.31	14.82		9241.34
R-squared		0.4594	0.3479		0.9945

***, **,* Significant at 1%, 5% and 10% respectively

6 CONCLUSIONS AND POLICY RECOMMENDATIONS

6.1 Summary and Conclusions

This paper investigates the impact of institutional factors on poverty in Kenya using descriptive and econometric methods. We test the hypothesis that institutions improve household welfare and therefore regional disparities in institutional endowments will result to regional disparities in poverty. The paper is based on both secondary and survey data. The secondary data comprises the distribution of institutions across districts in Kenya, and is drawn from government publications and relevant ministries, while the survey data is drawn from the Welfare Monitoring Survey (III) household level data. To achieve the key objective of the paper, we map the district level institutional data onto the WMS dataset. Descriptive statistics suggest that taking into account population density, there seem to be marked regional disparities in the distribution of key institutions in Kenya. Coast province, which ranks 5th poorest of the 6 rural provinces seem to be at a relative advantage in terms of institutional endowments, while Western province is at a relative disadvantage. Nyanza province, the poorest province in 1997, does not seem to fare too badly compared to other regions. These results do not show a clear correlation between institutional endowment and poverty but imply that that analysis of the institutional determinants of poverty need to take into account other determinants of poverty as well.

The empirical analysis focuses on the determinants of the FGT poverty measures, the food poverty status and the adult equivalent monthly expenditure. Regressions results uncover no significant effect of parliamentary representation on poverty. However, the results suggest that the number of active cooperatives, ratio of public to private secondary school teachers, government land ownership and social services are important determinants of poverty. More robust results are however found when we measure welfare through consumption expenditures rather than poverty. The findings are consistent with previous studies on institutional determinants of poverty. In addition, we find that household characteristics are important correlates of poverty. Most notable is education attainment, which exerts a significant and increasing impact on welfare. Family composition and assets are also found to be important determinants of welfare. The paper also finds that except for levels of significance, the factors determining poverty in rural areas are also associated with higher poverty in urban areas.

6.2   Policy Recommendations

The findings of this paper point to a number of policy options. These options can be discussed at two levels: household and institutional.

Household level

Concerning household characteristics, the results imply that improvements in education attainment would improve household welfare. Reducing household size and increasing assets would also improve welfare. These results have important bearing on Economic Recovery Strategies (ERS) in Kenya as well as the Millenium Development Goals (MDGS) of reducing extreme incomes poverty and inequality. ERS identify landlessness, lack of education and poor enrollment, low productivity, inequality in land and capital and vulnerability as key development issues. Our results point at the need for policies that target poor households, who are likely to be asset poor and whose members are less likely to go to school. In particular, the state needs to improve access of the poor to productive resources. Employment creation and agricultural sector growth should also be prioritized as outlined in the ERS. Though the government has affirmed its commitment towards this direction, more effort and resources are required in order to accelerate economic growth, raise incomes for the poor and improve equity and quality of welfare, all which have important implication on poverty reduction. For government's commitment to be realized three specific interventions are recommended.

First, since close to 70% of rural residents are dependent on rain fed agriculture for their survival, adequate extension services should be intensified to enhance growth of the sector. The government should also encourage farmers in marginal areas to adopt some of the recently developed drip irrigation systems that utilize very little water to grow various crops on small plots. This should be accompanied by establishment of drip irrigation demonstration farms at the location level and establishment of credit schemes for poor farmers who want to adopt these technologies. The results also show that total livestock units owned are negatively correlated with poverty. To reduce poverty, livestock producers and pastoralists should be targeted through extension services, veterinary services, markets and reduction of input prices.

Second, the results indicate that distance to source of water is a positive correlate of poverty. This means that some households have to spend a lot of time collecting water and thus have less time for productive activities. The government and development partners should support rural water development programmes, targeting areas where access to water is a major

problem. Among other financing options, constituency development funds could be channeled into water provision in water scarce areas.

Third, the results establish that education is an important determinant of household poverty. Though the Government is currently implementing programmes such as free primary education and bursary schemes for secondary education, education is still not accessible to all. First the government should work out strategies which will ensure that free primary education is actually compulsory to all eligible children in Kenya. Second the Government in collaboration with other stakeholders should consider a policy on universal secondary education given the huge gap between primary and secondary school enrollments. Third, the Government also needs to strengthen and promote post secondary institutions of learning, focusing on quality and relevance. Other institutions that indirectly impact on human capital development (for example, health sector initiatives) need to be targeted to complement education sector policies.

Institutional Level
The findings indicate that institutions are important correlates of poverty. In particular, the results show that that the per capita endowment of active cooperatives, health centres and ratio of public to private school teachers reduce absolute poverty rates. In addition to these factors, government land and total length of earth roads increase expenditures and reduce the likelihood of households falling into absolute poverty. There is need to design pro-poor and targeted policies to provide the additional impetus needed to build institutions and investments that are welfare increasing. This will require responsible and effective governance structures at all levels in order to transform economic growth into delivering key services including better schools, a stronger health care system, road networks, effective security and justice system and a safety net that effectively protects the poor, marginalized and vulnerable groups. The specific policy recommendations from the results are as follows:

Co-operatives and marketing boards: Co-operatives and marketing boards are considered very vital to the success of the Economic Recovery Strategy. Despite the enormous potential of the cooperative societies to significantly contribute to Kenya's development, the performance of this sector has been constrained by a number of factors including: poor governance and limited transparency in management, lack of professionalism due to inadequate managerial capacity, market intelligence and market research, narrow resource and borrowing base and infrastructural weakness occasioned by operational and structural flaws. Though the Cooperative Societies (amendment) Act, 2004, was enacted to improve governance in the cooperatives by addressing management and stakeholder participation,

implementation of the Act has not facilitated the envisaged strong cooperative sub-sector. To improve governance and management, the Government should undertake to seriously monitor and enhance the implementation of the reforms proposed by the amended Act. In addition, the Government and other stakeholders need to improve infrastructure and widen the resource base for cooperatives to increase their efficiency. Cooperatives particularly targeting poor households, small holders and small businesses should be targeted to ensure that these groups have access to extension services, credit and inputs.

Social Infrastructure: With rapid human population growth in Kenya, there is increased competition for basic services such as water, health, road access and electricity. Access to health care is vital given the importance of human capital development in poverty reduction. Access should be improved through construction of more health facilities and mobile units in marginal areas. In addition, provision of quality care in available units is essential. A major policy concern in water resource management for example will be the strengthening of the legislative frameworks on water use and pollution control by raising penalties and water use charges, broadening participation in management of water resources, and establishing planning frameworks for preventing and resolving conflicts among competing water users. Improvement of roads is important to enhance marketing of products. Though the Government has embarked on a comprehensive roads programme, the speed of implementation needs to be enhanced. In addition, rural feeder roads need to be incorporated in the current road maintenance projects.

Local and Legislative affairs: The findings of this study clearly demonstrate the crucial role played by local institutions in reducing poverty. Devolved funds target resources at the local level and can improve development outcomes and boost the role of institutions in poverty reduction by optimizing the amount of resources reaching the poor, and involving local communities in the decision-making process and management of projects. A pertinent policy intervention that can enhance the role of local institution is to strengthen and closely monitor the recently established constituency and district based development funds: the Constituency Development Fund (CDF), the Community Development Trust Fund (CDTF), the District Roads Fund, the AIDS Fund, the Local Authority Transfer Fund (LATF), and the Constituency Education Bursary Fund.

Law Order and Governance systems: The ERS identifies security, maintenance of law and order as one of the key pillars of governance in Kenya. Good representation of the community in government decision making structures and the presence of governance

structures close to the community ensure that local basic needs are taken into account, while adequate security is a pre-requisite for investment. The positive correlation between governance variables and poverty reduction imply the need to improve governance in Kenya. The critical policy areas that require attention include: restoration of the rule of law, maintenance of an efficient and motivated police force; development of strong coordinated administration and governance systems; elimination of corruption; strengthening capacity for crime management including investigation and prosecution. In addition to improvement in governance, there is need to promote devolvement of all governance structures. In particular, the Government should undertake to establish more rural courts and police posts at all local levels to enhance security and justice and therefore improve investment climate.

Land tenure system: Land Tenure system is a crucial institution in the agricultural sector given the large proportion of the population depending on agriculture. The results indicate a positive correlation between government trust land and household welfare. Though this implies that areas with more trust land (e.g. National parks) are better off than those with less, we note that there are neither easy, nor uniform policy solutions to the issue of land tenure, as the country is marked by a wide array of varied approaches that have been adopted to date. Existing tenure arrangements generally reflect the socio-cultural and political system that fashioned land ownership in the period before colonization and after independence. With increasing socio-political instability, population pressure and degradation of the environment, and the need to invest in sustainable production systems, the Government should increasingly pay greater attention to land management and the impacts of the various tenure arrangements on people's welfare. In some marginal areas in Kenya, these problems are already undermining traditional systems of individual tenure and group control over land use, leading to a downward spiral in short-term exploitation of the natural resource base and conflict.

Role of Private Sector: Generally, the ERS identifies the private sector as the main engine of economic recovery and employment generation as the business environment improves. Necessary reforms should therefore be undertaken to enable increased participation of the private sector in the key productive sectors and in the development and provision of institutions that facilitate the investments in key infrastructure such as health facilities, schools, roads, electricity, energy, transport and communications. In addition, non-governmental, civil society and community based organizations need to be encouraged to partner with the government and other stakeholders in provision of basic services and also in monitoring and evaluation of existing institutions.

6.3 Areas for further research

Though this study analyzed the correlation between poverty and government institutions, one key limitation was the nature of the data available. First, while the welfare monitoring survey is quite dated (almost 10 years old), it was the only survey data available for the country at the time of carrying out this study. The household level analysis needs to be updated as new survey data for the country becomes available. Second highly aggregated secondary data on institutions was used. The government and development partners need to develop a data bank of more disaggregated spatial data (at lower geographical levels). This data should not only focus on number but also on quality aspects of institutions. For instance, in governance issues, strength of parliamentary and local administration representation would have larger impacts on poverty than just the number of constituencies and local administration units. Further research should then be undertaken to disentangle/shed light on the relative importance of the various determinants of poverty incorporating the disaggregated data. Further research work should also consider the role of socio-cultural and agro-climatic factors and other institutions such as non-governmental, civil society and community based organizations in poverty alleviation. We recommend research in this direction

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APPENDIX

Table A1:   Sample Statistics

Variable	Full Sample		Rural		Urban	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Poverty status (1=poor)	0.52	0.18	0.52	0.18	0.50	0.16
Food poverty status (1=poor)	0.40	0.49	0.42	0.49	0.28	0.45
Adult equiv. monthly expenditure (Kshs)	2384.9	3039.5	1855.4	1958.3	4462.9	5003.9
Age (yrs)	44.08	15.02	46.06	15.32	36.348	10.686
Sex (1=male)	0.72	0.45	0.70	0.46	0.795	0.404
Marital Status (1= married)	0.77	0.42	0.78	0.42	0.731	0.443
Primary schooling	0.43	0.49	0.44	0.50	0.363	0.481
Post primary schooling	0.28	0.45	0.21	0.41	0.539	0.499
Employment sector (1= formal, 0 otherwise)	0.48	0.50	0.48	0.50	0.472	0.499
Main occupation (1= agriculture worker, 0 otherwise)	0.42	0.49	0.51	0.50	0.045	0.208
Rural area dummy	0.80	0.40	1.00	0.00	0.000	0.000
Time to source of water (kms)	2.23	1.46	2.44	1.50	1.423	0.909
No. of rooms in main house	2.34	1.30	2.48	1.25	1.787	1.349
Total land holding (acres)	3.31	11.22	3.56	10.04	2.23	14.96
Total livestock units owned	4.46	17.99	5.04	19.24	2.19	11.59
No of kids under 5 yrs	0.69	0.90	0.73	0.92	0.553	0.793
No of kids 6 to 14 years	1.36	1.50	1.53	1.54	0.684	1.087
No. of females 15-65 yrs	1.253	0.930	1.300	0.934	1.068	0.889
No. of males 15 to 65 yrs	1.164	0.982	1.158	1.010	1.187	0.863
No. of adults over 65 years	0.129	0.380	0.158	0.415	0.019	0.143
Region (Rift Valley is reference)						
Nairobi	0.09	0.29	--	--	0.451	0.498
Central	0.16	0.37	0.19	0.39	0.043	0.203
Coast	0.08	0.27	0.06	0.24	0.165	0.372
Eastern	0.14	0.35	0.16	0.37	0.045	0.208
Western	0.11	0.32	0.13	0.34	0.031	0.172
Nyanza	0.18	0.38	0.20	0.40	0.071	0.257
Rift valley	0.24	0.42	0.25	0.43	0.182	0.386
Maximum no. of observations	10873		8944		1911	

Table A2: Rural Poverty Rates by Best and Worse-off Districts by Province and Zone (1997)

Province	Best District	Worst District	Approximate zone
Central (31.39)	Kiambu (25.08)	Muranga (38.62)	Highland
Coast (62.10)	Tana River (34.22)	Kilifi (66.30)	Lowland
Eastern (58.56)	Nyambene (47.29)	Makueni (73.51)	Midland
Rift Valley (50.10)	Kajiado (27.87)	West Pokot (68.46)	Lowland/Highland
Nyanza (63.05)	Kisii (57.22)	Homa Bay (77.49)	Highland/Lowland
Western (58.75)	Bungoma (55.21)	Busia (65.99)	Midland

Source: Republic of Kenya, 2000