UNIVERSITY OF NAIROBI
SCHOOL OF ECONOMICS

INCOME INEQUALITY AND ECONOMIC GROWTH IN KENYA
DECLARATION

This is my original work and has never been presented for any degree in any other university institution for any degree award.

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DATE: ________________________________

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ACKNOWLEDGEMENT

I would like to thank my supervisor Mr. Oleche for his advice and assistance throughout the period of doing this project. I would also like to appreciate my friends and classmates, who we struggled together, encouraged one another and reviewed our work during this period.
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ABBREVIATIONS

GDP  Gross Domestic Product
KNBS  Kenya National Bureau of Statistics
HDR  Human Development Report
PWT  Penn World Table
SID  Society for International Development
UN  United Nations
UNDP  United Nation Development Programme
INCOME INEQUALITY AND ECONOMIC GROWTH

CHAPTER ONE

INTRODUCTION

1.1 Background

Economic growth is the increase in output of a country. It is the process by which a nation's wealth increases over time. It occurs when the productive capacity of a country increases. Economic development takes place when there is accelerated economic growth accompanied by major changes in social structures, popular attitudes and national institutions, reduction of inequality and eradication of poverty (Todaro). An increase in GDP (gross domestic product) per capita is an indicator of economic growth. For economic development to take place the economic growth rate has to be raised and inequality reduced.

Inequality is the degree to which distribution of economic welfare generated in an economy differs from that of equal shares among its inhabitants (SID, 2004). It may also entail comparison of certain attributes or well-being between two persons or a group of people and the differences in share of these attributes. Inequality is observed not only in incomes but also in terms of social exclusion and the inability to access social services and socio-political rights by different population groups, genders and even races. Inequality can be classified into various types:

- Income inequality: refers to the gap between the rich and the poor or people with similar background, status, qualifications but with different incomes.
- Gender inequality: Manifested in wages, discrimination, domination of positions of power and responsibility. It limits extent to which women or men can make it to the top.
- Opportunity inequality: It is caused by ease of access to education, work, and housing, markets on the basis of race, ethnicity or gender, even across countries.
- Asset/wealth inequality: It results from disparity not just in quantity but also in quality of natural resources, infrastructure, raw materials, amount of human capital and assets

Income inequality will be the main focus in this paper. Income inequality means that one segment of the population has a disproportionately large share of income compared to other segments of that population. It depends on how income is distributed. The income
distribution arises from people’s decisions about work, savings and investment as they interact through markets and are affected by the tax system. Inequalities result from education, experience, family structure, qualification, skills, abilities and regressive tax system. Distortion in factor prices may also result in income inequality. Inequality is an important issue in economic development as it can hinder economic growth, and it can result in social instability.

The global income distribution highlights the extraordinarily high degree of inequality. 80% of the world’s population had an income less than the average (HDR 2005). The average income of the top 20% of the world’s population is about 50 times the average income of the bottom 20% (HDR 2005). At the top, the richest 20% of the population hold three-quarters of world income. At the bottom, the poorest 40% hold 5% of world income and the poorest 20% hold just 1.5%. Rich countries dominate the top 20% (HDR 2005). Sub-Saharan Africa accounts for a rising share of the poorest 20%. Since 1980 that share has more than doubled from 15% to 36% (HDR 2005).

Statistics for Kenya show that income is heavily skewed in favour of the rich and against the poor. The country’s top 10% households control 42% of the total income while the bottom 10% controls less than 1% (SID, 2004). This means that for every shilling earned by the poorest 10% households, the richest 10% earn about 56 shillings. It is notable that the 8th, 9th and 10th population groups account for over 70% of the income (SID, 2004).

Kenya experienced rapid economic growth after its independence, an average of 6.5 per cent per annum during the period (Legovini, 2002). This growth declined in the late 1970s to about 4 per cent. In the year 1990 to the year 2002 economic performance was almost constant (Legovini, 2002). Economic performance improved in 2003 up to 2007 reaching to a high of 7.1 per cent economic growth rate in 2007, after which it was threatened by post election violence (KNBS). The growth rate dropped to 1.7 per cent in 2008 (KNBS, 2009). The economy is now picking up. The number of Kenyans classified as poor, living below a dollar a day (UN), has increased from 29 per cent in 1970 to 57 per cent in 2000 (UNDP). The number of people living below a dollar a day has increased.

Countries aim at increasing economic growth and set strategies towards achieving this, Kenya being no exception. The Kenyan Government has introduced such measures as free primary education, constituency development funds, and other sector-level reform initiatives
to reduce income inequality. The government has been from time to time coming up with strategies to improve economic performance of the country. Most recently, ‘The economic recovery strategy for wealth and employment creation’ (ERS), for the period 2003 to 2007, whose implementation improved the country’s economic performance significantly. Vision 2030 is long term plan by the government for the period 2008 to 2030, which aims to transform Kenya into newly industrializing “middle-income country providing a high quality life to its citizens by the year 2030. It is based on three pillars; economic, social and political. Kenya aims to achieve a sustainable economic growth of 10 per cent per annum, an equitable social development and a democratic political process that is issue-based, people-centred, result-oriented, and accountable.

There are expectations of higher economic growth with the implementation of vision 2030 and increase in trade that is likely to result from the regional integration (East African Community); common market protocol was signed on 20th November 2009 and was effected from 1st July 2010.

Studies done on Kenya have covered income inequality and poverty. Not much has been done on the relationship between income inequalities and economic growth. Kuznets hypothesis states that economic growth will raise income inequality initially, but the income inequality will finally decrease with further economic growth, the relationship between income inequality and economic growth appears to follow an inverted U-shape (1955). An increasing income inequality arises in the initial stage of a country’s economic development, and when a country approaches a further stage of development, the income inequality will decrease.

Kenya is a developing country which seeks to be industrialized by the year 2030. Economic growth is expected to rise to accomplish the vision. Kenyans need to know how the economic growth will affect the distribution of income. The government also needs to know the trend of income inequality so as to formulate relevant policies to ensure equitable distribution of income, and ensure high standards of living by the year 2030.
1.2 Research question

This paper seeks to answer this question: How has economic growth affected income inequality in Kenya?

1.3 Objectives of the study

The main objective of the research will to find out the relationship between inequality in income and growth of the economy in Kenya. The specific objectives include; to

- Examine whether the economic growth and income inequality follow a Kuznets curve
- Study the cause of the relationship
- Analyse the trend of Kenya’s income inequality

1.4 Significance of the study

Few studies have been done on this topic in the country. Most research carried out in this area cover relationship between poverty and inequality. Inequality has remained high in the country since independence. Kenya has high prospects for growth. Is the economic growth affected in any way by income inequality? With what magnitude does income inequality affect economic growth? The paper will answer these questions which have not been answered fully by current research.

This paper will focus on economic growth and income inequality across Kenya. The paper will contribute to existing literature on income inequality. The information will also be relevant to the people and policy makers.

1.5 Organisation of the paper

The first chapter is the introduction, which has given the background of the study, research question, objectives and significance of the study. The second chapter has the literature review which analyses previous work done on economic growth and income inequality. The third chapter is the methodology which gives the variables and data sources. Chapter four comprises of the findings of the study. Final chapter is the conclusions and recommendations.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical literature review

A lot of research has been done on the relationship between economic growth and income inequality. Various researchers have used different types of data to study the relationship. This chapter will summarise previous work done on this area.

Kuznets first investigated this relationship in 1955. He tried to answer the questions; Does inequality in the distribution of income increase or decrease in the course of a country's economic growth? What factors determine the secular level and trends of income inequalities? At the time, this field of study was plagued by looseness in definitions, unusual scarcity of data, and pressures of strongly held opinions. The general conclusion suggested for developed countries using scanty data was that, the relative distribution of income, as measured by annual income incidence in rather broad classes, has been moving toward equality; with these trends particularly noticeable since the 1920's but beginning perhaps in the period before the first world war. The scanty empirical evidence suggested that the narrowing of income inequality in the developed countries did not characterize the earlier stages of economic growth. The reduction in the inequality of income in developed countries was accompanied by significant rises in real income per capita. However, for underdeveloped countries, the income inequality increased. The wider inequality in the secular income structure of underdeveloped countries is associated with a much lower level of average income per capita.

According to Kuznets, the level of economic development is related to the degree of income inequality. Income inequality tends to increase during the early stages of economic growth, then levels off, and finally decreases during later stages. The Kuznets curve illustrates this relationship; the level of inequality first rises at the early phases of economic growth and then starts declining at the later phases of economic growth. The Kuznets curve is an inverted U shaped curve.
Kuznets describes a positive relationship between income inequality and economic growth at the early phases of growth and a negative relationship in the later phases.

Perotti (1996) studied the reduced form relationship between income distribution and growth. He used cross sectional data for a number of countries. From the reduced form estimates and tests performed he found that: there is a positive association between equality and growth, although a good deal of it is coming from intercontinental variation; this positive association is quantitatively much weaker, and statistically insignificant, for poor countries; however, this can be explained both on empirical and theoretical grounds; there is some indication that the association between equality and growth is stronger in democracies; however, the democracy effect does not seem to be very robust; because of the high concentration of democracies in rich countries, it is virtually impossible to distinguish an income effect from a democracy effect in the relationship between income distribution and growth.

More equal societies have lower fertility rates and higher rates of investment in education. Both are reflected in higher rates of growth. Also, very unequal societies tend to be politically and socially unstable, which is reflected in lower rates of investment and therefore growth. The data did not support the idea that more equal societies, particularly those with democratic institutions, grow faster because they generate fewer demands for redistribution and therefore fewer distortions.

Lee and Roemer (1998) studied the political economy of inequality and growth by combining the political economy approach with an imperfect capital market assumption. They show that inequality affects private investment not only through the political effect, which relates inequality to private investment negatively, but also through the threshold effect, which
associates inequality to private investment positively. In general, private investment and inequality do not show a monotone negative relationship. A high inequality induces a high redistributive tax rate with a median voter political process; a high tax rate chokes off private investment due to the disincentive effect; and any factors detrimental to private investment are harmful to growth. On the other hand, a high tax rate might choke off private investment, but it also boosts public investment. Hence a high tax rate is not necessarily detrimental to economic growth.

A study by Dahan and Tsiddon (1998) investigated the dynamic interactions among demographic transition, income distribution, and economic growth. It showed that fertility and income distribution follow an inverted U-shaped dynamics in the process of economic development. In the first stage fertility increases and income inequality widens, whereas in the second stage fertility declines, income becomes more equally distributed, human capital becomes more abundant, and growth of income per capita takes off.

The dynamic process is based on two main elements. The net return to education of the child of an educated parent is higher than the net return to education of the child of the uneducated parent, and the costs of raising children are measured in terms of parents' foregone earnings. Hence, provided that children are viewed as a normal good, educated parents have fewer children than uneducated parents have. As long as the children of uneducated parents choose to remain uneducated, fertility is high, and the supply of uneducated individuals increases faster than the supply of educated individuals. This change in the composition of the labour force increases the return to education and thus increases income inequality. As the premium to investment in human capital increases, eventually some of the offspring of the uneducated poor choose to invest in human capital and become educated. During this second phase, the population's overall level of education rises, fertility declines, income becomes more equally distributed and output per capita takes off. Since the poor have a growing weight in the economy in the first phase and a declining weight in second phase, the economy wide average rate of fertility first increases and subsequently declines.

A study by Barro (2000) using a broad panel of countries showed little overall relation between income inequality and rates of growth and investment. However, for growth, higher inequality tended to retard growth in poor countries and encourage growth in richer countries. The Kuznets curve - whereby inequality first increases and later decreases during the process of economic development - emerged as a clear empirical regularity.
Panizza (2002) used a cross-state panel for the United States to assess the relationship between inequality and growth. His paper did not find evidence of a positive relationship between inequality and growth but found some evidence in support of a negative relationship between inequality and growth. However, the paper showed that the relationship between inequality and growth is not robust and that small differences in the method used to measure inequality can result in large differences in the estimated relationship between inequality and growth.

Banerjee and Duflo (2003) described the correlations between inequality and the growth rates in cross-country data. They used non-parametric methods, to show that the growth rate is an inverted U-shaped function of net changes in inequality: changes in inequality (in any direction) are associated with reduced growth in the next period. The estimated relationship was robust to variations in control variables and estimation method. They however cautioned that, for education expenditures to have the intended results to the fullest, it was imperative that there be competent administration at lower levels of government to formulate and execute the budget and to allocate resources efficiently within the education sector. Otherwise without this background, resources allocated to the education sector would not have appreciable positive impact on economic growth.

Voitchovsky (2005) investigated the importance of the shape of the income distribution as a determinant of economic growth in a panel of countries. Using comparable data on disposable income from the Luxembourg Income Study, results suggested that inequality at the top end of the distribution is positively associated with growth, while inequality lower down the distribution is negatively related to subsequent growth. The central hypothesis of his paper was that the positive and negative influences of inequality on growth are mostly associated with inequality in different parts of the income distribution. Many of the positive mechanisms were linked to inequality at the upper end of the income distribution, while many of the negative mechanisms were associated with inequality further down the distribution.

He highlighted the potential limitation of investigating the effect of income distribution on growth was using a single inequality index; a single inequality statistic is likely to capture a relatively unimportant average effect of inequality on growth, and mask the underlying complexity of the relationship. The results of the study suggested that growth was facilitated by an income distribution that is compressed in the lower part of the distribution, but not so at
the top end. In this view, redistributive policies - such as progressive taxation and social welfare - are likely to facilitate growth through their impact on the bottom of the distribution, and to inhibit growth through their impact on the top of the distribution

Musila and Belassi (2004) used time-series technique to investigate the relationship between government education expenditure per worker and economic growth in Uganda during the period 1965-1999. The empirical results showed that education expenditure per worker had a positive and significant impact on economic growth both in the long run and short run. The estimates of error correction model suggested that a 1% increase in average education expenditure per worker will lead to about 0.04% increase in output in the short run. The co integration estimates showed that a 1% increase in average education expenditure per worker would increase output by about 0.6% in the long run.

Gunther (2006) focused on a supply-driven explanation of how the link from education to income inequality and growth may operate. In his model, education directly affects income inequality and growth. It was found that the effects of more education on income inequality could not be unambiguously ascertained when inequality was assessed by the Lorenz dominance criterion. An Increase in education first increases and then decreases growth as well as income inequality, when measured by the Gini coefficient. There was no clear functional relationship between growth and measured income inequality. In the model this relationship between inequality and growth depended on the level of human capital as well as on structural parameters for the education and production technology. He argued that determination of these would be crucial when analysing the inequality–growth nexus.

Peñalosa and Turnovsky (2005) developed an endogenous growth model with elastic labour supply, in which agents differed in their initial endowments of physical capital. In this frame work, the growth rate and the distribution of income were jointly determined. The key equilibrating variable was the equilibrium labour supply. It determined the rate of return to capital, which in turn affects both the rate of capital accumulation and the distribution of income across agents. They then examined the impact of various structural shocks on growth and distribution and found that faster growth is associated with a more unequal, contemporaneous distribution of income, consistent with recent empirical findings.

A study by Nel (2003) used high-quality household-expenditure-based data to estimate the effect of income distribution on economic growth for a sample of sub-Saharan African states.
He used an ordinary least squares (OLS) technique to estimate the effects of income inequality in a standard reduced-form growth regression for a set of cross-section data for the period 1986-97. He found that higher levels of inequality seem to impinge negatively on growth prospects over the medium term, but that this effect is weak and that the finding of a negative relationship is not robust. He then tested whether this negative consequence of inequality for growth is attributable to inequality's effect on political instability, as the literature suggests. The evidence indicated that high levels of inequality do not affect political instability in any statistically significant manner for the countries in the sample, but that they do negatively affect the risk perceptions of potential investors, and so may contribute to lower growth prospects.

2.2 Summary of literature

The research of Simon Kuznets (1955) laid a foundation for studying the relationship between economic growth and income inequality. The main conclusion of his study was that an increasing income inequality arises in the initial stage of a country’s economic development, and when a country approaches a further stage of development, the income inequality will decrease. The relationship between economic growth level and income inequality is likely to show an inverted U-shape. This relationship between economic development level and income inequality has been tested broadly over years. Williamson (1965) collected and cited the studies which generally supported the Kuznets inverted U-shape hypothesis for non-socialist economies. Barnejee and Duflo (2003) research findings came to the same conclusion of the inverted U shaped relationship between inequality and growth. Dahan and Tsiddon (1998) supported the U shaped dynamics in the process of economic development.

This consensus was been challenged by recent studies; Deininger and Squire (1998), Li and Zou (1998), Forbes (2000) and Barro (2000) found non-robust or even positive associations, suggesting that income inequality might be good for growth, especially in rich countries. Barro (2000) found a negative relationship between inequality and growth for poorer countries, but a positive relationship in the case of richer countries. Voitchovsky (2005) found that inequality is positively related to growth at the top end of distribution and negatively at the lower end of distribution.

Few studies on income inequality have been carried out in Kenya. One of such studies is a study on poverty and inequality, a stochastic dominance approach by Njuguna (2005). The study compared changes in poverty and inequality in Kenya between regions and their robustness using stochastic dominance analysis. He concluded that robust information is necessary for policy makers on issues of poverty and income inequality. Income inequality has been declining according to a study carried out for the period 1997-2007 (Suri, Tschirley, Irungu, Gitau and Kariuki, 2008). The findings of this study supported government’s efforts on free primary and free tuition for secondary schools.

Society for International Development (SID) has been actively involved on inequality issues in Kenya. It has carried out studies on inequality across Kenya and organised conference to discuss the same. It has published ‘Pulling apart’ and ‘Readings on inequality in Kenya’ which give statistics on the various aspects of inequality in Kenya. These studies give an account of the gaps in distribution of income and wealth, and social economic rights like education, water, health. Regional inequalities are also described. Nairobi, Nyanza and Rift Valley province have the widest income inequalities, North Eastern and Coast provinces have lesser income inequalities (SID 2004)

Studies done have not focused on the relationship between economic growth and inequality in Kenya. This paper will fill this gap and make contribution to the existing literature on income inequality in Kenya.
CHAPTER THREE

3.0 METHODOLOGY

3.1 Model specification

The main objective of the research is to find out the relationship between inequality in income and growth of the economy in Kenya. Economic growth and income inequality are the main variables. Education, health expenditure and population growth are control variables. Economic growth will be the dependent variable. Income inequality, education, health expenditures, employment and population growth are explanatory variables.

Kenya is a developing country. It is therefore at lower stage of development. According to Kuznets (1955), inequality will increase with economic growth. Therefore a positive relationship between economic growth and income inequality is expected, for the purposes of this study.

A previous study by Musila and Belassi (2004) in Uganda showed that increasing education expenditures is good for growth. In the study, I expect economic growth to be positively related to education. Health expenditure will increase as the economy grows, there is a positive relationship. Fertility follows an inverted U-shaped dynamics in the process of economic development (Dahan and Tsiddon (1998). At lower stages of development, fertility is positively related to growth and at higher stages fertility is negatively related to growth. A positive relationship between economic growth and population growth is expected since Kenya is a low income country.

The relationship is specified as follows:

\[
\text{Economic growth} = f(\text{Income inequality}, \text{Education}, \text{Health}, \text{Employment}, \text{population growth})
\]

Let; Economic growth = GDP
Income inequality = GINI
Education = EDUC
Health expenditure = HLTH
Population growth = PG
The equation will be:

\[ GDP = \beta_0 + \beta_1 GINI + \beta_2 EDUC + \beta_3 HLT + \beta_4 PG + \epsilon_i \]

\( \beta_i \)'s are constants and \( \epsilon_i \) is the error term.

### 3.2 Measurement of Economic growth

The most widely used measure of economic growth is the real rate of growth in a country's total output of goods and services gauged by the gross domestic product. Other measures include national income per capita and consumption per capita. The rate of economic growth is influenced by microeconomic factors; natural resources, human resources, capital resources, and technological development as well as macroeconomic factors; level of inequality, education, employment, population growth and the health status, along with institutional structure and stability of the economy.

This study used gross domestic product (GDP) per capita as the measure of economic growth, to investigate the relationship between economic growth and income inequality with the other macroeconomic factors (education, employment, health expenditures and population growth) as control variables.

### 3.3 Measurement of income inequality

Inequality can be measured using the gini coefficient or the quintile ratio. The quintile ratio is the mean value of the chosen indicator for the top quintile divided by the mean for the bottom quintile. For example, the quintile ratio of income inequality would divide the mean income among the top 20% of the income distribution by the mean income among the bottom 20%. Thus, the quintile ratio is an explicit measure of distance between the top and bottom 20% of the population. The gini will be used for this study.

Gini coefficient is a measure of statistical dispersion developed by the Italian statistician Corrado Gini in 1912. Income inequality will be measured using the Gini coefficient. Gini coefficient measures the degree of inequality in the distribution of income in a country. It varies from a value of zero to a value of one, where zero indicates perfect equality (that all households had the same income), and one indicates perfect inequality (one household holds all income in the society). Most countries in Africa have gini coefficients ranging from about...
0.40 to 0.50, while most developed countries fall between 0.20 and 0.30, showing that African countries have more unequal distribution of income than developed countries.

The gini coefficient can be calculated from the Lorenz curve. Lorenz curve plots cumulative income against the population arranged from the poorest to the richest. The 45 degree line represents line of perfect equality. The gini is the ratio of the area between a country’s Lorenz curve and the 45 degree line to the entire triangular area under the 45 degree line. The equal a country’s income distribution is, the closer its Lorenz curve is to the 45 degree line, the lower its Gini index. The more unequal a country's income distribution, the further its Lorenz curve is from the 45 degree line and the higher its Gini index.

![Lorenz curve](image)

Figure 2: Lorenz curve

Gini coefficient = A/ (A+B)

**Statistical basis of the Gini coefficient**

The Gini coefficient (G) is usually associated with the plot of wealth concentration (Lorenz curve) introduced a few years earlier by Max Lorenz (1905). It is a measure of inequality, defined as the mean of absolute differences between all pairs of individuals for some measure. The minimum value is 0 when all measurements are equal and the theoretical maximum is 1 for an infinitely large set of observations where all measurements but one has a value of 0, which is the ultimate inequality.

When G is based on the Lorenz curve of income distribution, it can be interpreted as the expected income gap between two individuals randomly selected from the population (Sen, 1973). The Lorenz curve is plotted as the cumulative proportion of the variable against the cumulative proportion of the sample. To get the cumulative proportion of the variable, first
sort the observations in ascending order and sum the observations, then each \( k \) th cumulative proportion is the sum of all \( x_i/x \) sum, from \( i=1 \) to \( k \). The classical definition of \( G \) appears in the notation of the theory of relative mean difference:

\[
G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} |x_i - x_j|}{2n^2 \bar{x}}
\]

Where \( x \) is an observed value, \( n \) is the number of values observed and \( x \) bar is the mean value.

If the \( x \) values are first placed in ascending order, such that each \( x \) has rank \( i \), the some of the comparisons above can be avoided and computation is quicker:

\[
G = \frac{2}{n(\bar{x})} \sum_{i=1}^{n} i(x_i - \bar{x})
\]

\[
G = \frac{\sum_{i=1}^{n} (2i - n - 1)x_i}{n \sum_{i=1}^{n} x_i}
\]

Where \( x \) is an observed value, \( n \) is the number of values observed and \( i \) is the rank of values in ascending order.

The study will use gini coefficients that have already been computed.

### 3.4 Control variables

Education, employment, health expenditures and population growth were used as control variables in the study. Education was measured by the ratio of education spending and national expenditure. Health was the proportion of health spending in the national expenditure. Population growth was measured by the percentage increase in population from one period to another.

### 3.5 Data

The study relied entirely on secondary data sources of data. The data sources used were Statistical abstracts (Kenya National Bureau of Statistics), World Bank database and the Penn World Table. The Penn World Table (PWT) displays a set of national accounts economic time series covering many countries. Its expenditure entries are denominated in a common set
of prices in a common currency so that real quantity comparisons can be made, both between countries and over time. It also provides information about relative prices within and between countries, as well as demographic data and capital stock estimates. The study uses PWT 6.3, which is the latest version.

Data on GDP per capita and population was taken from Penn World Table 6.3. Data on income inequality is taken from World Bank database. Education and Health expenditures were from statistical abstract prepared by the Kenya National Bureau of statistics.

Time series data was used from on 1950 to 2006. The data was analysed using ordinary least squares (OLS) method. OLS is preferred to other methods because it is simple to use and minimizes the mean sum of squared errors. For OLS to be applied certain assumptions are made about the model. These assumptions include;

a) The error term take any value, positive or negative.
b) Errors are normally distributed with a zero mean and a constant variance.
c) Errors of different observations are not related.
d) The independent variables are uncorrelated with the disturbance term.
e) Independent variables are not linearly related.
f) The model is correctly specified.

The statistical properties of ordinary least squares estimators include;

a) Linearity of OLS estimates.
b) The estimates are unbiased. Its expected value is equal to the true value.
c) OLS estimates have minimum variance. They are efficient.

OLS estimators are said to be best linear unbiased estimators (BLUE).

3.6 Limitations of the study

Data on income inequality in Kenya that was available was not sufficient. Current data on household income in Kenya found in the Kenya Integrated Household and Budget Survey (KIHBS) is not available. It is taken after a number of years due to cost implication. The latest is for the year 2006. Data used for the study is from World Bank database. Data for some years is not given. I have used extrapolation to estimate missing data.
CHAPTER FOUR

4.0 RESULTS AND FINDINGS

The main objective of this paper is to study how the economic growth level is influenced by the income inequality in Kenya. To estimate this relationship, the data obtained is used to run a regression to estimate the relationship of the variable. The dependent variable is the economic growth, which is measured by GDP per capita. The GDP per capita has been growing since 1950s. This trend is illustrated as follows:

![GDP per capita graph](image)

Figure 3: Trend of GDP per capita

The main exogenous variable is income inequality which is measured by the gini coefficient. The figure below shows the trend of income inequality during the period from 1950 to 2009. Income inequality has remained high in the country. The gini coefficient has remained at the range of 0.5.
Figure 4: The trend of income inequality measured by gini coefficient

Data on the variables was regressed using E-views, to estimate the regression equation. The descriptive statistics are presented in the table below:

Table 1: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>EDUC</th>
<th>GDP</th>
<th>GINI</th>
<th>HLTH</th>
<th>PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.158925</td>
<td>1035.535</td>
<td>0.528695</td>
<td>0.046311</td>
<td>0.031664</td>
</tr>
<tr>
<td>Median</td>
<td>0.178692</td>
<td>948.8285</td>
<td>0.540000</td>
<td>0.048817</td>
<td>0.031919</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.228236</td>
<td>2310.000</td>
<td>0.780000</td>
<td>0.072493</td>
<td>0.040808</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.000000</td>
<td>283.4069</td>
<td>0.420000</td>
<td>0.000000</td>
<td>0.020000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.061370</td>
<td>629.7278</td>
<td>0.082795</td>
<td>0.018911</td>
<td>0.005264</td>
</tr>
<tr>
<td>Skewness</td>
<td>-1.659640</td>
<td>0.445499</td>
<td>0.711962</td>
<td>-1.308540</td>
<td>-0.040606</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>4.953447</td>
<td>1.785582</td>
<td>3.159934</td>
<td>4.277801</td>
<td>2.126144</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>36.46586</td>
<td>5.577189</td>
<td>5.047298</td>
<td>20.85130</td>
<td>1.893458</td>
</tr>
<tr>
<td>Probability</td>
<td>0.000000</td>
<td>0.061508</td>
<td>0.080167</td>
<td>0.000030</td>
<td>0.388008</td>
</tr>
</tbody>
</table>

Observations 59 59 59 59 59
The mean expenditure on education as a proportion of national expenditure for the entire period of study, 1950 – 2009 is 0.15. Income inequality for the same period is high with a mean gini coefficient of 0.52. Standard deviation of variables is small except for GDP per capital which is very high. Jarque-Bera test indicates that the variables are normally distributed.

**Table 2: Estimation of equation**

Dependent variable LNGDP

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.547210</td>
<td>2.033487</td>
<td>2.236164</td>
<td>0.0300</td>
</tr>
<tr>
<td>LNEDUC</td>
<td>0.944926</td>
<td>0.486995</td>
<td>1.940320</td>
<td>0.0582</td>
</tr>
<tr>
<td>LNGINI</td>
<td>-0.792770</td>
<td>0.683481</td>
<td>-1.159900</td>
<td>0.2518</td>
</tr>
<tr>
<td>LNHLTH</td>
<td>-0.346401</td>
<td>0.395305</td>
<td>-0.876287</td>
<td>0.3852</td>
</tr>
<tr>
<td>LNPG</td>
<td>-0.659652</td>
<td>0.599996</td>
<td>-1.099427</td>
<td>0.2771</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.186588 \]
\[ \text{Adjusted } R^2 = 0.118803 \]
\[ F\text{-statistic} = 2.752668 \]
\[ \text{Durbin-Watson stat} = 0.141082 \]

\[ \ln(GDP) = 4.5472 - 0.7927 \ln(Gini) + 0.9449 \ln(Edu) - 0.3464 \ln(Hlth) - 0.6597 \ln(Pg) \]

Where:  
\[ GDP = \text{Gross Domestic product per capita} \]
\[ Gini = \text{Gini coefficient} \]
\[ Edu = \text{spending on education as a percentage of national expenditure} \]
\[ Hlth = \text{spending on health as a percentage of national expenditure} \]
\[ Pg = \text{Population growth} \]

According to the results of the study, gini is negatively related to growth. This does not follow Kuznets hypothesis since Kenya is a low income country and this would make economic growth and income inequality to rise at the same time. Our case is different. This can be explained by the social problems associated with inequality. These social problems include stealing, civil wars, political instability.
Education expenditure is positively related to growth. It is inconsistent with the priori specification. Health is negatively related to growth which is different from the priori; we expected a positive relationship between economic growth and health expenditure. Our results give a negative relationship, though its t-statistic of 0.88 shows that health is not statistically significant at 90% confidence level. Population growth is negatively related to growth, also different from priori specification. There is a debate whether population growth is good or bad for growth. Previous work done has not been conclusive. From the results population growth is bad for growth.

Standard error for coefficients is small. The probability of coefficients is small, parameters are significant. The coefficient of determination is 0.19, which means that the variables; income inequality, education expenditure, health expenditure and population growth, explain 19 percent of variations in the GDP per capital. Durbin-Watson statistic is 0.14; it is small and may be an indication of presence of autocorrelation.

The coefficients give the elasticities. The coefficient of gini coefficient is -0.79. This is the income inequality elasticity of GDP per capita. It means that if we reduce income inequality by one percent, GDP per capita will grow by 0.79 per cent. If inequality increases by one percent, growth in GDP per capital growth will reduce by 0.79 per cent.

The education expenditure elasticity of GDP per capita is 0.94, which means that if you increase education by one percent, GDP per capita increases by 0.94 per cent. If education expenditure is reduced by one per cent, growth in GDP per capital growth will reduce by 0.94 per cent.

The coefficient of population growth is -0.66. This is the population growth elasticity of GDP per capita. It means that if we reduce population growth by one percent, GDP per capita will grow by 0.66 per cent. If population growth increases by one percent, growth in GDP per capital growth will reduce by 0.66 per cent.
CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

Economic growth is negatively related to income inequality. High income inequality reduces growth. Income inequality has remained high due to concentration of wealth in a few hands. The rich are able to save and invest their income to accumulate more wealth; their share of income will remain high. Poor people remain poor partly because they cannot borrow against future earnings to invest in production, the education of their children and assets to reduce their vulnerability. The government should take measures to reduce income inequality to encourage economic growth.

Negative social phenomena such as shorter life expectancy, higher disease rates, homicide, infant mortality, obesity, teenage pregnancies, emotional depression and prison population correlate with higher socioeconomic inequality (Wilkinson 2009). Physical health, mental health, drug abuse, education, imprisonment, obesity, social mobility, trust and community life, violence, teenage pregnancies, and child well-being, outcomes are substantially worse in more unequal countries (Wilkinson, 2009). These negative phenomena are a disincentive to economic growth.

Education expenditure is positively related to growth. To encourage more growth, more resources should be dedicated to education. Education is human capital and improves productivity. High productivity will promote growth. Education should be made accessible to everyone. Population growth is negatively related to growth. High population growth retards growth. Population puts pressure on limited resources. The government can introduce incentives for smaller family sizes, fund family planning clinics and provide contraceptives, to lower fertility rate.

Inequalities in income often reflect inequalities in political power. The people in the lower income group have a weak political voice because they are disadvantaged. Political institutions are seen as vehicles for perpetuating unjust inequalities or advancing the interests of elite, that undermines the development of democracy and creates conditions for state breakdown. One policy goal should be equity in income distribution to reduce excessive income disparities. A more equitable distribution of income can stimulate healthy economic expansion by acting as a powerful material and psychological incentive to widespread public participation in the development process (Todaro, 1992).
The government has taken broad steps to redistribute income. The constitutional development fund (CDF), was a measure taken to reduce income inequality among regions. Economic Stimulus Project which was launched by the government in August 2009 will go a long way in improving the income of the people in the lower income group. This will allow more equitable distribution of income and more economic growth. Free primary and free tuition in secondary schools by the government is good for economic growth. The move to expand tertiary education by expanding technical training institutions, will promote economic growth.

Kenya uses a progressive tax system which also promotes equitable distribution of income. Revenue from these taxes should be used to enhance welfare of people in the low income group. This can be done by subsidising food prices, providing education and healthcare for the poor. Policies designed to correct factor price distortions should be set to ensure that market prices provide accurate signal and incentives to both producers and resource suppliers.

More resources should be dedicated to research on appropriate technology focusing on the problems facing affecting the levels of living of all people. Most people in the lower income group are in the agricultural sector. About 70% of the lowest wealth group are employed in agriculture as opposed to the top wealth groups who are employed in professional and managerial activities, sales and services sectors (SID, 2004). Adding value of our products is one of the ways of increasing earnings in this sector in The Vision 2030. It will go a long way to increase the incomes of people in the lower income group. Appropriate technology is required in the value addition process.

The topic of income inequality has not been a major topic of discussion in the country, yet it is an important element in the process of economic growth. More research should be carried out on income inequality, to bring it into light. Data on inequality in Kenya is rare. Research should make this data available to policy makers and researchers.
REFERENCES


Penn World Table 6.3, The Centre for International Comparisons at the University of Pennsylvania, University of Pennsylvania.


