# An Assessment Of Drivers Of Economic Planning In Kenya

**Khayumbi Ayub litsaliah**

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Lecturer. Mount Kenya University, School of Busines and Economics Department of Accounting and Finance.Kitale Campus, Kitale town, Kenya.
Email: ayubkhayumbi@yahoo.com

**ABSTRACT:** The study assessed GDP, energy demand, population, government expenditure, net government debt and government revenue to gain some insight into what exactly happens when changes occur to these economic planning variables. The research used descriptive and correlational design to determine and analyze the economic variables using available data. The study used purposive sampling to select the sample population and the sample. Pearson's product moment correlation coefficient and regression were used to analyze data in this study. The study revealed that the Kenyan population and net government debt have been increasing over the last decade and the trend is likely to continue into the next decade. Government expenditure is significantly affected by the GDP and population. The study recommended that policy makers and government to take into account the impact of GDP, energy demand, population, government expenditure, net government debt and government revenue in their economic planning in order to improve the welfare of its people as they strive to move the country forward in terms of economic development and recommended more specific research of these variables specifically tailored for Kenya.

**Keywords:** GDP, energy demand, population, government expenditure, net government debt and government revenue

## 1 INTRODUCTION

Economic planning is a deliberate attempt by the state to make the best use of the country's resources with the objective of maximizing the economic welfare of its citizens under a given political set up (James & Jerry, 1996; Laurie, 2010). Planning in a wide sense refers to the preparation of a scheme for every economic activity (Boonstra & Gravenhorst, 1998; Higgins & Byrne, 2008; Mallin, 2007). All economic life involves planning. For example the consumer spending his income, the producer deciding what to produce and the government planning for its population in all aspects of people's lives involve planning. The issue is more complex for a government because of the number of variables involved in the planning. The government has forecast its population growth, GDP, expenditure, government debt, demand for energy, employment, unemployment, education and demand for foreign exchange. All these variables present a complex planning environment for policy makers and requires people with expertise to know what planning aspects of the environment are interrelated and which sectors of the economy need to be focal point of expansion if the government is interested in improving the economic welfare of its population. In the case of the government as discussed above, it will a schedule of resources, a schedule of needs and an execution plan. To do this the government will require the services of econometricians who will make use of data collected by economic statisticians and come up with models that can help in the forecasting of the variable in the economic environment to enable the government predict exactly what is to happen should a certain variable change by so much. This study focuses on how the government of Kenya can be able to forecast energy demand, government expenditure, population growth, GDP and government debt by clearly finding out how these variable relate to each other.

## 1.2 Statement of the Problem

Many governments in the developing world face the challenge of planning for their people. Policy makers in these nations come up with numerous propositions on what the country needs to do in order to improve the social welfare of its people (Todaro & Smith, 2009). In Kenya the government has come up with the vision 2030 that envisages Kenya as a country moving and becoming an industrialized middle income economy. The problem in many of the propositions is knowing exactly how to forecast figures for Government revenue, population growth, Government debt, government expenditure, GDP and demand for energy and how these variables affect each other since emphasis on one without knowing which other parts are linked to it present a challenge to most planners. All these variables play a significant role in the country's ability to move to achieve its development goals as planned.

## 1.3 Objectives of the study

1. Estimate the population growth pattern for the next decade and beyond
2. Estimate the pattern of behavior of the changes in government debt over the next decade
3. Find out the relationship between energy demand , GDP per capita and population
4. Estimate the relationship between government expenditure, population, GDP and the net government debt.

## 1.4 Research Questions

The study sort to answer the following research questions:
1. What is the growth pattern of the Kenyan population for last decade?
2. What is the growth pattern of the Government Debt over next decade?
3. What is the relationship between Energy Demand, GDP per capita and population?
4. What is the relationship between Government expenditure, population, GDP and the Net government Debt?

## 1.5 Hypothesis

From the above questions the following null hypothesis were stated and subsequently tested.
1. There was no significant change in the Kenyan population Growth pattern in the last decade
2. There was no significant change in net government debt for the last decade

3. There was no significant relationship between Energy demand , GDP and population growth
4. There was no significant relationship between Government expenditure, population, GDP and the Net government Debt

## 1.6 Significance of the study

Planning for social economic development of a country is no mean task because of the nature of the variables and environment involved. Government expenditure, population, GDP ,energy demand , inflation and net government Debt as variables involved in this planning present a great challenge to policy makers and planners and the presence of any kind of help in terms of a model or otherwise that can help in crunching the numbers is welcome. The study came up with models that could be used to estimate the growth in population, government debt and GDP. The other models developed will help planners is seeing the interrelationships between the variables involved and give guidance on how one affects the other. This will enable them know which areas to pay more attention to in their quest to improve the welfare of the people of Kenya.

## 2.0 REVIEW OF RELATED LITERATURE AND STUDIES

Even as most research shows most developing countries around the world still strive to improve the economic welfare of its inhabitants by trying to follow and adopt measures they deem will be instrumental in getting them out of this situation of under development. Most countries have tried many of these methods for a reasonable number of years including Kenya. from the famous structural adjustment programs (SAPS) of the 1980s by the world bank, millennium development goals and many others. The Kenyan government for example has its own vision 2030 whose flagship programs are aimed at improving the welfare of the common populace and transform this country to a middle income economy by 2030. The vision 2030 hinges on the developing the economic, social and political pillars of Kenya and with all this the country will become a middle income economy by 2030. Maslow's hierarchy of needs illustrates how unlimited human needs and wants mitigate the scarce resources to satisfy them, making economic planning a pursuit of many people especially those within the government and NGOs  as they grapple with the problem of trying to improve the economic and social welfare of the  general population. Hence there is need to continue doing research to come up with recommendations that can help stem this high failure in programs implemented to help the society in general. The work of econometricians become quite important in helping come up with models that give a clear forecast of these variables. This chapter consists of two sections first review of related literature and secondly reviews of related studies on the variables in the study i.e. Government expenditure, population, GDP, energy demand, inflation and net government Debt

### 2.1 Review of Related Literature

Economic growth sustained increase in the country's productive capacity identifiable by a sustained rise in the real national income over a period of years(Hardwick, langmead, & Khan, 1999). More specifically the figure of  about 5% to 7% or more in terms of growth in Gross National Income(Todaro& Smith, 2009). Economic development is characterized growth in the labour force, growth of the capital stock and technical

progress(Hardwick, et al., 1999). Economic growth has both benefits and costs. the benefits of economic growth are increased standard of living, elimination of poverty and income redistribution while the costs of economic growth are negative externalities ( pollution, noise and increased congestion), may last only for a short time due to scarcity of resources , may benefit some but harm others( technological progress may create many new jobs but may render others redundant) and lastly it is an opportunity cost(Hardwick, et al., 1999). Many developing countries are characterized by low levels of living and productivity, low levels of human capital, higher levels of inequality and absolute poverty, higher population growth rates, greater social fractionalization , larger rural populations but rapid rural-to-urban migration, lower levels of industrialization  and manufactured exports, adverse geography, underdeveloped financial and other markets and lastly lingering colonial impacts such as poor institutions and varying degrees of external dependence i.e. economic, political, cultural and environmental(Todaro& Smith, 2009). The mix and severity of these challenges largely set the development constraint and policy priorities of a developing nation (Todaro & Smith, 2009) and for this reason Kenya is not spared either.

### 2.2 Gross Domestic Product GDP

Measures the total value of final use of output produced in an economy, by both residents and non-residents (Todaro & Smith, 2009). But the World Bank uses Gross national Income (GNI) per capita as the most common measure of the overall economic activity, is often used as a summary index of the relative economic well-being of people in different nations. GNI is calculated as the total domestic and foreign value added claimed by a country's residents without making deductions for depreciation of domestic capital stock (Ahmad, 2011; Hardwick, et al., 1999; Todaro & Smith, 2009).

### 2.3 Population

A growing population and hence a growing labour force not only poses  problems for full employment policies in Less developed countries (LDCs) , it also has a direct effect on living standards and society's welfare (Hardwick, et al., 1999; Todaro & Smith, 2009). Classical Malthusian theory of population postulated that there was a direct relationship between population growth and the supply of food. A given increase in food and hence living standards would tend to cause increase in the country's population (Hardwick, et al., 1999). Malthus judged society's welfare by the strict criterion of the amount of food available to the people of the country. This theory worn accolades at the time because the British population was growing rapidly then and with this he painted a very depressing picture of future human societies which according to him would be characterized by population explosion. Critics of this theory say that the most countries escaped the assertions the theory about food by importing from other countries and that most mass starvation in sub Saharan countries have been due to the effect of drought and civil wars rather than from law of diminishing returns the cornerstone of the Malthusian theory. Optimum population can be defined as the size of the population at which, given the level of capital, land resources and level of technology income per head is maximized (Hardwick, et al., 1999). One of the major problems that confront the development planner is that of estimating the optimum population. Apart from the actual calculation problem, economic de-

velopment involves a continuous change in data (Hardwick, et al., 1999).

## 2.4 Net Government debt
Many governments around the world finance fractions of their budget through borrowing either internally or externally(Hardwick, et al., 1999; Todaro & Smith, 2009). But worth noting is that also governments are themselves lenders both internally and externally. The difference between what the government borrows and lends both internally and externally is what is referred to as the net government debt. The government also used lending and borrowing as a method or regulating the level of economic activity in a country. In Kenya through the central bank the government would use the measures to regulate the economic activity.

## 2.5 Government Expenditure
Most of government expenditure is made of capital and recurrent expenditure. Capital expenditure is on capital goods that are expected to generate future returns to the economy in form of cash inflows while recurrent expenditure is made of items of the budget that would not generate any future inflows to the economy for example the wage bill. Most governments are always keen to have a bigger part of their budget to go to capital expenditure since this represents the future earnings that are likely to benefit the economy.

## 2.6 Inflation
Inflation may be defined as a persistent rise in the general level of prices or alternatively as a fall in the value of money over a given period of time (Hardwick, et al., 1999). Any increase in the quantity of money, however small, can be regarded as inflationary. Inflation can also be regarded as a situation where the volume of purchasing power is persistently running ahead of the output of goods and services, so that there is a continuous tendency for prices (both of commodities and factors of production) to rise because the supply of goods and services and factors of production fails to keep pace with demand for them (persistent/creeping inflation). Inflation can also mean runaway or hyper-inflation or galloping inflation where a persistent inflation gets out of control and the value of money declines rapidly to a tiny fraction of its former value eventually to almost nothing, so that a new currency has to be adopted. Because of its impact on the general economic performance, inflation is indeed one of the most unstable macro-economic variables that has drawn extensive concern in many economies, especially in the developing world. Inflation is caused by factors arising from different situations. However, there are basically three types of inflation: Cost-push, Demand-pull and Monetary. **Cost-push inflation** occurs from the supply side of an economy when the increasing costs of production push up the general level o prices. **Demand-pull inflation** is the excess of aggregate demand over the value of output (measured in constant prices) at full employment will create excess demand in many individual markets, and prices will be bid upward. The rise in demand for goods and services will cause a rise in demand for factors and their prices will increase as well. **Monetary type** of inflation stems from the policy orientation/frameworks of the monetary authority (central bank) which may be in form of sale of treasury bills (TB's) at relatively high interest rates (return) and thus creating a tendency for commercial banks to increase their base lending rates; the overall effect is an upward pressure on the general level of prices.

## 2.7 Energy Demand
Data form the World Bank show the figures of oil imports for the period between 1970 and 2010. Economic planners will be concerned so much with this variable because it is an essential ingredient in growth of GDP and also support of the increasing population demand on needs for energy. Till recently Kenya did not have any known deposits of oil and there has relied on imported oil, electricity and geothermal power for its energy needs. In this imports of oil will represent the demand for energy. An increase of fuel prices sends a spiral wave on many sectors of the economy and therefore it is a diver of the economy and many planners would fail to factor in their forecast models. The next chapter presents an analysis of the data collected where interesting information is uncovered about the variables discussed above and gives an insight into important forecast relating to these variables.

# 3.0 RESEARCH METHODOLOGY
In order to be able answer the research questions and have a more in depth understanding of the issues discussed in the literature review this chapter gives a plan of doing this, by looking at the research design, description of the study area, data gathering procedures, population and sampling techniques, data collection procedures, research instrument and statistical treatment of data.

## 3.1 Research Design
The study used quantitative research methodology in which both descriptive and correlational research designs were employed. Descriptive research design describes phenomena associated with or characteristics of a subject population which in this case were economic variables; population, GDP, energy demand, government expenditure and government debt. Under descriptive research design, topics can include people, places, situations, conditions, procedures, interactions and undertakings about which the researcher wishes to know more. Correlational research design identifies variables that relate to each other, makes predictions of one variable trait from the other and examines the possible existence of causation. The two were chosen because in this research description of situations, conditions, procedures, interactions and undertakings as well as identification of variables that were related to each other was carried out, in an attempt to depict and give a clear picture of economic planning process of government. From the research questions, population, GDP, energy demand, government expenditure, government debt were the variables in this study.

## 3.2 Description of Study Area
Kenya is country located in East Africa. With an area of 580367km2 (224081sq miles) Kenya is the world's 47th largest country (after Madagascar). It lies between latitude 5 degrees north and 5 degrees south, and longitudes 34 degrees and 42 degrees east. It has a population of about 40 million people as per the last census in 2009 and like many African country it is grouped as a less developed country(WorldBank, 2010). It major exports are Tea, coffee, horticultural products and tourism services. It's a country that relies heavily on imports of oil, machinery, Automobiles, technology and other many products on which the economy depends for growth.

## 3.3 Population and Sampling Techniques

Since the researcher used available information the collection of the sample data of what variable to use in the study was purposive sampling although the original sample had been assembled using probability sampling by the World Bank in 2010. Purposive sampling was used because the researcher was only interested in studying a number of variables i.e. population, GDP, energy demand, government expenditure and government debt.

## 3.4 Data Gathering Procedures

The researcher collected data from the internet from the World Bank and transferred the data into the excel worksheet. The data contained more variables than those to be studied so that in case anything another variable would be included or be studied as shown in table 1 below.

**Table 1:** Kenya's Economic statistics 1980-2015

| Year | GDP Kshs Billions | OIL IMPORTS US$ Billions | Population Percent Millions | Total Govt Expenditure Kshs Billions | Total Gross Govt Debt Kshs Billions | GDP per capita, constant prices National currency Units (1980) 1986 | Total Govt Revenue Ksh Billions | Inflation (Index Base Year 2000=100) | Total Net Govt Debt Ksh Billions |
|---|---|---|---|---|---|---|---|---|---|
| 1980 | 521.861 | 0.81 | 17.5 | n/a | | 11018.8 | | 7.951 | |
| 1981 | 550.545 | 3.769 | 17.69 | n/a | | 11128.96 | | 8.557 | |
| 1982 | 578.36 | 3.623 | 18.3 | 21.65 | | 11655.24 | 17.73 | 9.719 | |
| 1983 | 587.574 | 3.501 | 18.98 | 22.051 | | 10951.59 | 19 | 10.889 | |
| 1984 | 596.976 | 3.465 | 19.98 | 25.199 | | 10361.4 | 21.1 | 13.116 | |
| 1985 | 621.29 | 3.461 | 19.66 | 39.943 | | 10400.16 | 24.36 | 14.61 | |
| 1986 | 664.669 | 0.3 | 20.37 | 34.48 | | 11099.81 | 28.06 | 16.113 | |
| 1987 | 705.351 | 3.546 | 21.1 | 38.783 | | 12188.80 | 33.46 | 18.256 | |
| 1988 | 745.157 | 3.589 | 21.15 | 44.649 | | 13000.18 | 39.55 | 19.084 | |
| 1989 | 780.107 | 3.543 | 22.61 | 52.608 | | 13170.47 | 45.38 | 20.597 | |
| 1990 | 811.355 | 3.466 | 23.18 | 64.004 | | 13646.91 | 52.35 | 22.807 | |
| 1991 | 821.234 | 3.385 | 24.09 | 69.55 | | 13076.14 | 42.34 | 27.2 | |
| 1992 | 831.342 | 3.412 | 25.61 | 85.792 | | 11797.21 | 45.83 | 34.655 | |
| 1993 | 815.37 | 3.407 | 26.3 | 113.518 | | 10929.14 | 63.86 | 50.559 | |
| 1994 | 834.163 | 3.333 | 26.97 | 132.769 | | 10932.41 | 104.44 | 65.128 | |
| 1995 | 869.623 | 3.461 | 27.6 | 143.569 | | 11173.41 | 142.01 | 68.14 | |
| 1996 | 904.616 | 3.446 | 28.23 | 157.709 | | 12051.45 | 154.66 | 72.001 | |
| 1997 | 906.807 | 3.519 | 28.97 | 180.253 | | 11611.09 | 172.56 | 80.597 | |
| 1998 | 957.008 | 3.552 | 29.47 | 191.917 | 466.62 | 11790.91 | 195.03 | 85.999 | 394.01 |
| 1999 | 959.561 | 3.527 | 30.15 | 183.21 | 488.82 | 11827.71 | 205.94 | 90.946 | 416.28 |
| 2000 | 961.312 | 0.85 | 30.86 | 199.043 | 511.03 | 11784.46 | 213.7 | 100 | 430.85 |
| 2001 | 1,000.94 | 3.721 | 31.54 | 229.469 | 533.22 | 11951.49 | 238.17 | 105.73 | 492.45 |
| 2002 | 1,013.96 | 3.562 | 32.11 | 243.771 | 617.15 | 11883.61 | 288.5 | 107.113 | 578.67 |
| 2003 | 1,042.20 | 3.879 | 32.97 | 266.25 | 691.77 | 15407.51 | 318.01 | 118.389 | 645.37 |
| 2004 | 1,090.31 | 1.119 | 33.63 | 289.735 | 703.77 | 12818.59 | 359.02 | 132.547 | 648.49 |
| 2005 | 1,155.52 | 1.541 | 34.59 | 343.024 | 703.08 | 13703.16 | 423.03 | 143.41 | 654.38 |
| 2006 | 1,228.60 | 1.745 | 37.47 | 401.088 | 717.8 | 14788.71 | 482.17 | 154.188 | 682.42 |
| 2007 | 1,314.56 | 1.919 | 38.6 | 479.579 | 758.69 | 16134.67 | 538.19 | 160.75 | 758.07 |
| 2008 | 1,354.98 | 3.051 | 39.74 | 572.468 | 845.52 | 15615.58 | 627.05 | 186.762 | 855.07 |
| 2009 | 1,389.59 | 2.192 | 40.91 | 660.508 | 960.21 | 15490.01 | 767.11 | 204.039 | 1001.77 |
| 2010 | 1,497.82 | 2.673 | 42.1 | 799.873 | 1124.99 | 16883.79 | 918.15 | 211.909 | 1140.02 |
| 2011 | 1,520.05 | 4.085 | 43.12 | 822.912 | 1270.71 | 17112.35 | 1045.4 | 227.259 | 1317.32 |
| 2012 | 1,609.35 | 4.469 | 44.37 | 1,017.76 | 1463.39 | 37934.98 | 1206.85 | 238.62 | 1474.42 |
| 2013 | 1,729.72 | 4.837 | 45.15 | 1,130.92 | 1625.88 | 38968.18 | 1313.31 | 250.551 | 1664.27 |
| 2014 | 1,847.72 | 5.214 | 47.15 | 1,256.80 | 1871.07 | 40868.71 | 1437.36 | 263.079 | 1858.19 |
| 2015 | 1,971.17 | 5.641 | 48.48 | 1,358.98 | 2069.73 | 45625.16 | 1611.74 | 276.233 | 2003.47 |

## 3.5 Statistical Treatment of Data

In this research the stated null hypotheses ($H_0$) were tested for the purpose of acceptance or rejection. A rejection of the null hypothesis ($H_0$) implied there was a significant relationship which meant the acceptance of the alternative hypothesis ($H_A$). The researcher used econometric models in trying to explain economic phenomena involved that may be employed by government for improvement of the economic welfare of the Kenyan society. The researcher used regression analysis, where linear regression model (GDP and energy demand, government expenditure and population, government expenditure and debt), semi-log model and linear trend (estimate population growth) and multiple regression model (energy demand, GDP and population) Linear regression analyzes the relationship between two variables, $x$ and $y$. For each subject (or experimental unit), one knows both $x$ and $y$ and wants to find the best straight line through the data and the linear regression model is generally given by $\hat{Y} = \beta_0 + \beta_1 x + \varepsilon$ where $\hat{Y}$ is the response or dependent variable, $x$ is the independent or explanatory variable, $\beta_1$ is the slope and $\beta_0$ is a constant representing the $y$ intercept. Regression models are used for studying how changes in one or more variables will change the value of another variable. In general, we can talk about a variable `explaining' some of the variation in another variable. When we use more than one independent variable the model is given by $\hat{Y} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots \ldots \beta_k x_k + \varepsilon$ and is called multiple regression model with $k$ regressor variables and $\beta_j$ , $j = 1, 2, \ldots \ldots k$ are called partial regression coefficients. In the use of linear regression, GDP was the dependent and energy demand was the independent variable and in this case energy demand was represented by oil import.in looking at government expenditure and population, government expenditure was the dependent variable while population was the independent variable. In using multiple regression oil import was the dependent variable while population and GDP were the independent variables resulting in the Model below:

$$Oil\ Imports = \beta_0 + \beta_1 Population + \beta_2 GDP + \varepsilon$$

Where $\beta_0 = constant$, and $\beta_1, \beta_2 , \beta_3$ and $\beta_4$ represent the coefficients of the independent variables and $\varepsilon = error\ term$

The test of significance was by the use of modern computer software Microsoft spreadsheet in which test statistic and probabilities for most test statistic were calculated. The exact probability from the computer software was compared with the critical alpha level i.e. 0.05. If the exact probability was less than the critical alpha level, then the finding was significant. But if the exact probability was greater than the critical alpha then the finding will not be significant. In conclusion therefore the criteria used in choice of statistical test in making decision about research hypothesis were applicability and validity of the test and the power and efficiency of the test. The treatment of data and findings are well covered in chapter four and five of this study where interesting finding relating to economic government planning were uncovered.

## 4.0 DATA PRESENTATION, ANALYSIS AND IN-TERPRETATION

In this chapter statistical analysis and interpretation of data collected is discussed in various sections following the sequence of the research questions. The findings are presented, analyzed and interpreted sequentially as per the research questions with meanings and inferences drawn from the findings of data analysis as compared with the concepts in the literature review. The chapter commences with a look at the findings on data on economic statistics from the World Bank by generally looking at the major trends in relation to the Kenyan economic growth. The chapter then proceeds to analyze each research question giving conclusions at the end of each question analysis.

### 1. What is the growth pattern of the Kenyan population for last decade?

Using ordinary least squares method the semi-log regression model was used to determine the pattern of population growth from 1980 to 2010 and from the output in A1 the model was as shown below.

$$\ln \widehat{\text{Population}} = 2.832219 + 0.028883t$$
$$\text{where: } t = \text{time}$$
$$t - \text{value} = \{352.373365.86942\}$$
$$p - \text{value} = \{0.0000.000\}$$
$$\text{SE} = \{0.0080380.000438\}$$
$$r = 0.99336$$
$$r^2 = 0.99336$$
$$\text{Adj } r^2 = 0.993132$$
$$F = 4338.781$$

The model implies that the population has been increasing at a relative rate of 2.8883% in the last decade and this trend likely to continue into the next decade. The population of 1979 is likely to have been 16.983 million people easily estimated from the model. The population 35 years later i.e. in 2014 is estimated at 46.58455 million people and when the next census figures become available this can be compared, but for the time being this becomes our estimate for population in economic planning. The hypothesis there is no significant change in the Kenyan population over the last decade is rejected and the alternative hypothesis accepted.

### 2. What is the growth pattern of the Government Debt over last decade?

Using OLS the linear trend regression model is developed to help estimate the pattern of growth in Net government debt over the last decade and make projections of the same Pattern over the next decade. From the data the linear trend regression model below was obtained from the output in A2.

$$\ln \widehat{\text{Net Govenment Debt}} = 5.855989 + 0.087084t$$
$$\text{where: } t = \text{time}$$
$$t - \text{value} = \{145.80818.46251\}$$
$$p - \text{value} = \{0.0000.000\}$$
$$\text{SE} = \{0.0401620.004717\}$$
$$r = 0.982849$$
$$R^2 = 0.965993$$
$$\text{Adj } R^2 = 0.963159$$
$$F = 340.8641$$

The above model gives us what the net government debt is likely to be in the next decade or what it was in the past even though only figures from 1998 were available limiting our number of observations only to 14. The net government debt has been increasing at a rate of 8.7% per year. Thus over that period there was an upward trend in the net government debt. The intercept value probably shows the value of government debt in the period prior to 1998 i.e. the net government debt for 1997 is obtained by obtaining the antilog of the intercept value which gives ksh 349.3202 billions. The model can help in the prediction of the level of government debt burden in the next decade were the same trends to continue. This becomes very important information for planning within government circles. The hypothesis there is no significant change in the Kenyan government net debt over the last decade is rejected and the alternative accepted.

### 3. What is the relationship between Energy Demand, GDP per capita and population?

The multiple regression involving the dependent variable energy demand and GDP and population growth resulted in the multiple regression model below and whose output is shown in A3.

$$\widehat{\text{Energy Demand}} = -7.49454 + 0.05253\text{Population}$$
$$- 0.000211\text{GDP}$$

$$t - \text{value} = \{-5.02748 \quad 4.029186 \ 3.958041\}$$
$$p - \text{value} = \{0.000 \quad 0.000 \ 0.000\}$$
$$\text{SE} = \{1.490716 \ 0.013037 \ 0.00005\}$$
$$R = 0.899248$$
$$R^2 = 0.808647$$
$$\text{Adj } R^2 = 0.793927$$
$$F = 54.93711$$

From the above model on energy demand ceteris paribus an increase in GDP per capita by one billion Kenyan shillings would result in an increase in demand for oil imports of $ 0.000211 billion. Energy demand has positive relationship with both Population and GDP per capita as shown by the slope of the curve which is in line with existing economic theory. The hypothesis there is no significant relationship between energy demand, population and GDP per capita is rejected and the alternative hypothesis is accepted.

### 4. What is the relationship between Government expenditure, population, GDP and the Net government Debt?

An attempt to develop a model relating Government expenditure to population, GDP and the Net government Debt showed that there was no significant relationship when the above variable are all included in the model except for GNP. But the variable government expenditure related with population it showed there was a significant relationship between the two as shown in the output from A5. From it the model for government expenditure is as shown below.

$$\widehat{\text{Government Expenditure}}$$
$$= -512.75 - 8.63337\text{Population} - 1.04\text{GDP}$$
$$t - \text{value} = \{-9.63678 \quad -0.69284 \ -2.914789\}$$
$$p - \text{value} = \{0.000 \quad 0.494553 \ 0.007231\}$$

The case was the same when government is related to government debt i.e. there is a high positive correlation between the two variables with and r = 0.9892046 as shown in A6.

# 5.0 SUMMARY, FINDINGS, CONCLUSION AND RECOMMENDATIONS

## 5.1 Summary
The objective of this study was to study the economic variables ; population, GDP per capita, energy demand, government expenditure and  government debt in order to help the economic planner fully understand relations between them in his quest to develop models that would enhance the economic welfare of the Kenya society through planning. This was motivated by need for a tool of planning that takes care of the problems encountered in forecasting especially when the variable involved are many and constantly changing. Among the possible reasons of SMEs failure was inadequate or poor record keeping and inefficient use of accounting information to support their financial decision making process. The research employed both descriptive and correlation research designs. Descriptive research design describes phenomena associated with or characteristics of a subject population which in this case were economic variables; population, GDP, energy demand, government expenditure and government debt. The study sought to answer the following questions;

1. What was the growth pattern of the Kenyan population for last decade?
2. What was the growth pattern of the Government Debt over next decade?
3. What was the relationship between Energy Demand, GDP and population?
4. What was the relationship between Government expenditure, population, GDP and the Net government Debt?

## 5.2 Findings
The model developed on population growth showed that the population has been increasing at a relative rate of 2.8883% in the last decade and this trend likely to continue into the next decade. The population of 1979 was likely to have been 16.983 million people easily estimated from the model. The population 35 years later i.e. in 2014 is estimated at 46.58455 million people and when the next census figures become available this can be compared, but for the time being this becomes our estimate for population in economic planning. The net government debt has been increasing at a relative rate of 8.7% per year. Thus over that period there was an upward trend in the net government debt. The intercept value probably shows the value of government debt in the period prior to 1998 i.e. the net government debt for 1997 was ksh 349.3202 billions. From the model on energy demand, ceteris paribus an increase in GDP per capita by one billion Kenyan shillings would result in an increase in demand for oil imports of $ 0.000211 billion. Energy demand has positive relationship with both Population and GDP per capita as shown by the slope of the curve which is in line with existing economic theory. The model relating Government expenditure to population, GDP and the Net government Debt showed that there was no significant relationship when the above variable are all included in the model except for GDP. But the variable government expenditure regressed on population it showed there was a significant relationship between the two.

## 5.3 Conclusions
Form the study findings the researcher concludes that the Kenyan population and net government debt have been increasing significantly over the last decade. The increase government debt is alarming particularly when on looks at the annual increment of close to 8.7% per annum as seen from the linear trend model for population. Except for GDP, government expenditure has significant relationship to net government debt and population. This may imply that more of the increase in government expenditure has been on the provision for social programs like free education and other social programs. This spending has not been specifically pegged to the changes in population, which one would think is more important in planning for a country's development.

## 5.4 Recommendations
From the conclusion above the study makes the following recommendations to the following:

### Policy makers and planners
To policy makers the study recommends that a close attention be placed on the upward changing of the Kenyan demographics as an important variable in economic planning as impacts the living standards and provision of services in relation to available resources.

### Government
The government to evaluate its population policies put in place to check the population growth so that it is in tandem with its ability to provide the requisite facilities and services. This will enable government evaluate whether the population control methods are working.

### Researchers
More studies to be done in area of the economic variables especially to find which variables i.e. GDP, population, inflation, energy demand, government expenditure and government debt among others should concentrated on for Kenya to grow its economy and improve the wellbeing of its population.

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