IOSR Journal of Economics and Finance (IOSR-JEF)
e-ISSN: 2321-5933, p-ISSN: 2321-5925.Volume 10, Issue 3 Ser. IV (May. – June 2019), PP 09-21
www.iosrjournals.org

Employment Intensity of Output Growth in Kenya

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Abstract: *Creation of productive and sustainable employment opportunities remains a key policy priority of most countries including Kenya. Employment creation in Kenya has been based on the premise that high economic growth should translate to more employment opportunities. Kenya has experienced varying rates of economic growth.In spite of the increase in growth rates, Kenya's employment elasticity declined from 1.28 in 1992-1996 to 0.5 and 0.38 in 2004-2008 and 2009-2016 respectively. Since political independence in 1963, the Kenyan government has implemented various fiscal policies that focus on employment creation. Despite all these interventions, creation of adequate, productive and sustainable employment opportunities continues to be one of the greatest economic challenges in the country. The purpose of the study was therefore to determine employment elasticities in priority sectors in Kenya. The study found that employment elasticities within priority sectors ranged from 0.115 to 0.412. The study concluded that the employment elasticity's response to fiscal policies varied among the priority sectors. The study recommends that government should give more attention to service sectors as a means of enhancing employment creation. The study further recommends that policies pursued by the government to boost employment should be sector specific.*

Keywords: *Employment Elasticity, Output Growth*

Date of Submission: 06-06-2019 Date of acceptance: 21-06-2019

I. Introduction

1.1 Background

Fiscal policy plays an important role in influencing the economic direction of any country. Fiscal policy affects aggregate demand, distribution of wealth, employment levels and economy's capacity to produce goods and services (Rena & Kefela, 2011). According to Siyan and Adebayo (2005), one of the most challenging issues faced by developing countries is rapid increase in labour force, which creates pressure for creation of employment opportunities. Monacelli, Perotti and Trigari (2010) note that many macroeconomists are in agreement that expansionary fiscal policies stimulates employment.

Kenya's employment creation strategies have been premised on economic growth. According to Omolo (2010), the government's aspiration has been that long-term and sustained high rates of economic growth would facilitate generation of employment opportunities at rates higher than the proportionate increase in the labour force. This policy focus on employment in Kenya is manifested by the sheer number of employment targeted development plans and Sessional papers that have been formulated (Omolo, 2012). Basically, all the policy documents developed by Kenya have premised employment creation on economic growth (Republic of Kenya, 1970; 1974; 2011; 2015*).*

The First Medium Term Plan (MTPI, 2008-2012) constituted the first phase in the implementation of the *Kenya Vision 2030* and targeted to achieve an economic growth rate of 10 per cent by 2012. The MTP I (2008-2012) set specific growth targets on the key priority sectors that were to be met through an expansionary fiscal policy and injection of Kshs. 500 billion (Republic of Kenya, 2008). These sectors were tourism, agriculture, wholesale and retail trade, manufacturing, information technology enabled services (ITES) and financial sector. The MTP I (2008-2012) had projected an annual average employment growth of 6.0 per cent and creation of a total of 3.7 million new jobs within the five-year period.

The MTP II (2013-2017) outlined the policies, programmes and projects that the government intended to implement during the five-year period between 2013 and 2017. The government aimed to deliver accelerated and inclusive economic growth, higher living standards, increased job creation, commercialized agriculture and improved manufacturing (Republic of Kenya, 2013a). The government was to implement fiscal policy measures such as increased public spending to expand and modernize the railways, roads, ports, airports, energy, water and the ICT sector. The government was to also devote more investment to infrastructure and to the key sectors of the economy that would drive growth particularly through public private partnership arrangements (Republic

of Kenya, 2013a). The MTP III (2018-2022) targets to increase real GDP annual growth from an average of 5.5 per cent achieved over the 2013-2017 period to 7 per cent in order to support higher economic growth.

1.2 Employment Elasticity

Employment elasticities provide a numerical measure of how employment growth varies with growth in economic output (Kon, 2007). Employment elasticity also provide insight into trends in labour productivity and employment generation. It also assists in detecting and analyzing structural changes in employment over time (Kapsos, 2005). According to Schmid (2008), the type of economic growth (extensive or intensive), is an important factor that determines the rhythm of job creation in relation to economic growth.

The genesis of employment elasticities can be traced to the Okun's Law of 1963. Employment elasticity represents a way of summarizing employment intensity of economic growth. Okun (1963) found that a one per cent increase in Gross National Product (GNP) corresponded to a 0.3 percentage point decrease in unemployment rate. This co-movement between output and unemployment results from the fact that variations in output trigger firms to hire and fire workers, causing changes in employment (Ball, Leigh, and Loungani, 2013). Theoretically, Okun's law gives the link between the aggregate supply curve and the Phillips curve while empirically, the coefficient reflects the degree of adjustment of employment to changes in output. Table 1.1 shows employment elasticities and economic growth rates for the world and parts of Africa for the period 1992-2015.

Table 1.1: World and Regional Estimates of Employment Elasticities (1992-2015)

	Employment elasticities						Average annual growth rate					
Region/ Period	1992-1996	1997-2000	2001-2004	2005-2008	2009-2012	2013-2015	1992-1996	1997-2000	2001-2004	2005-2008	2009-2012	2013-2015
World	0.3	0.4	0.3	0.3	0.3	0.3	3.1	3.7	3.3	4.4	1.7	3.3
Developed Economies & European Union	0.3	0.3	0.2	0.5	0.2	0.5	2.4	3.3	1.9	2.2	0.4	0.9
North Africa	0.8	0.6	0.8	0.7	0.5	0.4	2.3	4.3	4.3	5.6	4.4	4.6
Sub Saharan Africa	0.7	0.7	0.5	0.5	0.3	0.4	2.9	3.0	6.0	6.1	4.0	4.4
East Africa	0.6	0.8	0.8	0.6	0.5	0.4	1.9	3	4.9	6.2	3.8	5.7

Source of Data: Omolo (2010), ILO (2011; 2012; 2013; 2014; 2015)

Table 1.1 shows that the global employment elasticity trends ranged between 0.3 and 0.4 during the period 1992 to 2015. This means that for every one percentage point of additional GDP growth, total world employment grew by 0.3-0.4 percentage points. The employment elasticities for Sub-Saharan Africa ranged between 0.3 and 0.7 over the same period. The employment elasticity for East Africa varied between 0.4 and 0.8 in 1992 - 2015 while the average annual growth rate ranged between 1.9 per cent and 6.2 per cent. Kenya's employment elasticity declined from 1.28 in 1992-1996 to 0.5 in 2004-2008 (Omolo, 2012). However, the decline in Kenya's employment elasticity happened at a time when the country was experiencing high economic growth. Real GDP growth in Kenya increased on an annual basis from 0.3 per cent in 2002 to almost 7 per cent in 2007 (Republic of Kenya, 2008). This growth was at par with growth in sub-Saharan Africa and slightly above the global growth rate of 5.4 per cent at that time (ILO, 2013). Figure 1.1 shows the trend of growth in formal and informal employment and the GDP growth rates in Kenya for the period 1972 to 2015.

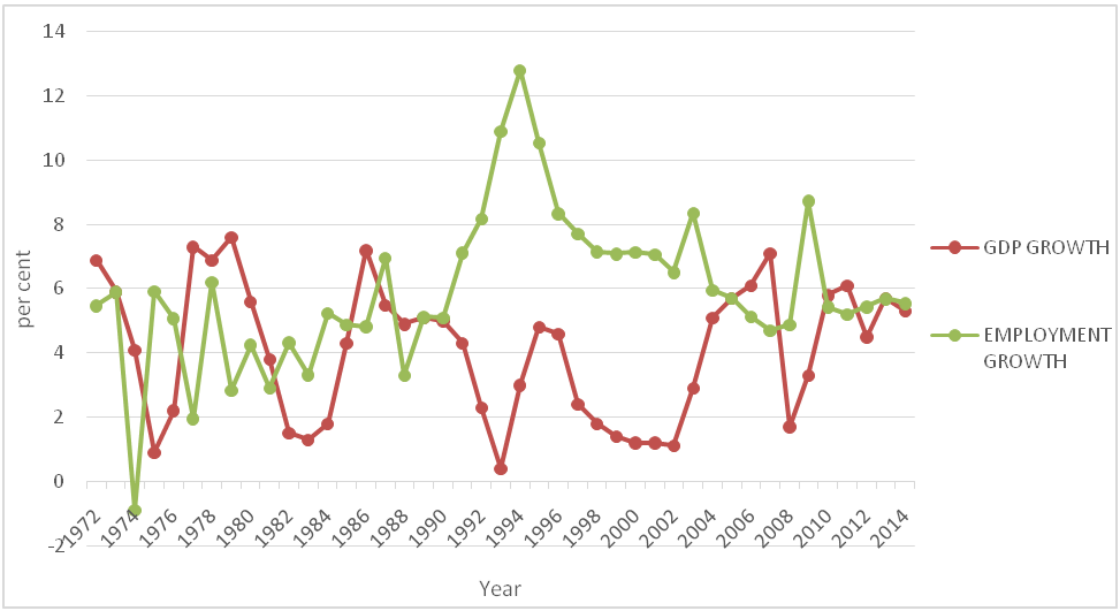

Figure 1.1: Trends in GDP and Employment Growth in Kenya
Source of Data: Republic of Kenya, Economic Survey (various)

Figure 1.1 shows the trends in growth for GDP and employment in Kenya for the period 1972-2015. Over the period, the rates of increase in economic growth have been at variance with the employment growth. The sharp growth in employment for the period 1991-1995 could be explained by liberalization policies and renewed government strategy towards promotion of growth and development of the informal sector. The informal sector employment grew by an average of 42 per cent between 1991 and 1995. The growth rate in the informal sector employment was high compared to an average growth of 10.9 per cent for the period 1986-1990. Figure 1.1 also indicates a decline in employment growth from 2004 to 2008 while GDP growth was on an upward trend for the same period. Between 2009 and 2014, both GDP and employment were on an upward growth trend although the growth rate in GDP was higher than the rate of growth in employment. The trends depicted in Figure 1.1 shows that growth rate in employment are not always in tandem with the growth in GDP.

An employment elasticity value of one implies that for every one percentage point of GDP growth is associated with a 1 percentage point increase in employment. However, Islam (2004) argued that both the growth of employment and rising productivity contribute to economic growth. For a given amount of output growth, any increase in the rate of employment growth must be related to an equal and opposite decrease in labour productivity growth. Khan (2001) asserted that employment elasticities in developing economies should ideally be around 0.7 until these economies attain upper-middle-income status. Khan (2001) also argued that the economies with abundant labour and especially those with relatively high incidences of poverty need to achieve relatively higher employment elasticities to the less labour abundant economies. According to the Republic of Kenya (2015), Kenya is faced by a working poor population estimated at 46 per cent of the employed and a rapid population growth. Coupled with the declining employment elasticities in the country, there is need for an assessment of the responsiveness of priority sectors to output growth in the country.

II. Literature Review

2.1. The Neo-Classical Theory

The neo-classical theory of growth was advanced by Solow (1956). The theory attempts to explain the determinants of long-run economic growth and reasons for the vast differences in both output levels and growth rates across countries over time. The theory also explains the relationship between investment, growth rate and employment in an economy with stationary growth. The neo-classical approach to labour market analysis is based on a microeconomic level analysis. The approach views the labour market as similar to other markets in that the forces of supply and demand jointly determine the wage rate and the demand for labour.

Solow (1956) assumes that the consumer supplies labour, L_t to the market, at a market wage W_t. The consumer owns all of the capital K_t and rents to the market at rental rate r_t. The consumer also owns the firm and receives its total profit π_t where$t$ denotes the time period. The consumer's income, $Y_t$is thus given by:

$$Y_t = r_t K_t + W_t L_t + \pi_t \qquad (1)$$

Labour's share of output is estimated as:

$$\alpha_L = \frac{\partial Y_t}{\partial L_t} * \frac{L_t}{Y_t} \quad (2)$$

Where α_L is the output elasticity of labour. The neo classical theory is simple to understand and lends itself to testing the empirical work. The major contribution of this model is that it establishes the automatic stability of neo-classical growth path through the market adjustment mechanism. According to Bertola&Ichino (1995), the various routes to full-employment via fiscal, monetary and population policies, leaves the nation some leeway to choose whether it wants high employment with high capital investment (rapid growth and low consumption) or the reverse or some mixture of both. A major advantage of this model of growth is that it provides a theoretical apparatus of exploring these practical possibilities. However, the neoclassical theory assumes technology to be completely exogenous and assumes the case of a closed economy.

2.2 The Okun's Law

Okun's law was proposed by Arthur Okun in 1963. Basically, the genesis of employment elasticities can be traced to the Okun's Law. Okun's law is an empirical relationship between the change in the unemployment rate and the percentage growth in real output, as measured by GNP. The law states that if GDP grows rapidly,unemployment rate declines, if growth is low or negative, unemployment rate rises, and if growth equals potential, unemployment rate remains unchanged.

One way to derive Okun's law is to adopt the Solow framework model that is modified to include unemployment. The production function with labour augmenting technological progress is given by:

$$Q_t = AE_t^s K_t^{1-s} \exp(gt) \quad (3)$$

Where Q is output, A is efficiency parameterwhich grows at rate g,E is labour, K is capital, s is substitution parameter and t is time. Taking logs and using lower case letters to denote logs the resulting equation becomes:

$$q_t = \alpha + se_t + (1-s)k_t + gt \quad (4)$$

Taking first differences equation (4) becomes:

$$\Delta q_t = se_t + (1-s)\Delta k_t + g_t \quad (5)$$

Assuming that the growth rate of capital is constant, at Δk, the change in the unemployment rate is approximated as the difference between the constant growth rate in labourforce minus the growth in employment:

$$\Delta u_t = \Delta n - \Delta e_t \quad (6)$$

Where u_t is the unemployment rate, e_t is the employment rate and Δn is the growth rate in labour force. Combining equation (5) and (6) the resulting equation becomes:

$$\Delta q_t = -s\Delta u_t + \{(1-s)\Delta k_t + g - s\Delta n\} \quad (7)$$

Equation (7) is the standard form of Okun's Law and reflects the fact that in the long-run employment determines the output that can be supplied. Okun (1963) further formalized the relationship between unemployment and output growth into a statistical one by measuring the extent to which the unemployment rate is negatively related to real output growth.The standard specification for estimating Okun's law is specified as:

$$\Delta U_t = \alpha_0 + \alpha_1 \Delta lnY_t + v_t \quad (8)$$

Where $\Delta U_t$is the yearly change in the unemployment rate, $\Delta lnY_t$is the yearly change in output and $v_t$is an error term, α_0 is the coefficient parameter,α_1 is the coefficient of unemployment rate and t represented the time period. Though many economists have used Okun's law as a rule of the thumb to relate changes in unemployment to changes in output, the law is just an empirical correlation and not theoretically motivated. A more fundamental critique of the simple Okun equation is that the model neglects important explanatory variables that determines the levels of unemployment. As many of the reduced-form relationships build strictly on associations and not causation, Okun' law appears to vary depending on the sample period studied (Owyang, 2012).

2.2 Empirical Literature

Kapsos (2005) estimated global employment elasticities over the period 1991 to 2003 for 160 countries. The objective of the study was to generate estimates of total, youth, male and female employment elasticities using cross-country panel dataset.The study employed three approaches.The first approach involved estimating arc elasticity and the study found the measure to be highly unstable. The second approach entailed using a pooled regression of the form:

$$lnE_i = \beta_0 + \beta_1 lnY_i + \beta_2 (lnY_i D_i) + \beta_3 D_i + U_i \quad (9)$$

Where E_i represented employment,*Di* was country's dummy variables, Y represented total GDP, u was the error term, β_s were the regression coefficients and i represented a specific country. The estimated employment elasticities suffered from omitted variable bias, as no other variables that influenced either employment performance or overall economic performance were controlled for in the model.

The third approach used the estimated coefficients in the second approach to analyze possible determinants of elasticity levels. Variables explaining the development in demographics, the economic structure, macroeconomic volatility, trade openness, health, tax policy, and labour regulation were used. The results suggested that employment elasticities were positively related with the share of services in the economy, and negatively related with inflation and taxes on labour. The study further found that there was no statistical significant relationshipbetween employment elasticities and employment protection regulations or measures of globalization and export orientation.

Kon (2007) examined the employment effects of economic growth for the Korean economy for the period 1971-2005. The objective of the study was to determine the structural determinants of employment elasticity. Time series data on GDP, employment and wages was used.Elasticity of employment with respect to growth of output was estimated by the equation:

$$\eta_{NY} = \frac{\varepsilon^s NW\zeta NK}{(1-\varepsilon^s NW\zeta NN)} \quad (10)$$

Whereη_{NY} was employment elasticity with respect to output growth, $\varepsilon^s NW$ was labour supply elasticity with respect to real wages, ζNK and ζNN were elasticity of marginal product of labour with respect to capital and labour, respectively. The study found that the employment elasticity for Korean economy ranged between 0.49 and 0.38 for the period of the study. The study also established that the wage elasticity was higher than the employment elasticity over the same period. The study revealed that employment elasticity was determined by preference and technology parameters. The study concluded that there were other factors apart from the labour saving technology that were responsible for the slow growth in employment.

Perugini (2008) investigated the relationship between employment and output growth in Italy for the period 1970-2004 through a static panel data analysis. The objective of the study was to provide a measure of the relationship between employment and output growth in Italy and to illustrate its dynamics across a relatively extended time-span. This was estimated by the equation:

$$lnL_{it} = \alpha_i + \beta_1 Y_{it} + \varepsilon_{it} \quad (11)$$

Where, L and Y were total employment units and real GDP, respectively in region *i* and at time *t*; coefficientβ was the estimated elasticity, $\alpha_i$was the time invariant intercept and$\varepsilon_{it}$was the error term. The study found the existence of remarkable regional differences in employment elasticity levels. The study showed a trend of a relatively stable pattern, which lasted until the end of the 1980s then a steep fall that corresponded to employment drop of the first half of the 1990s. The trend led to negative employment elasticity in the periods within this time-span, a minimum level being reached from the end of the 1980s to end of the 1990s. The relative uniformity of the dynamics of elasticity for the geographical divisions meant that, at GDP level, movements of employment elasticity in time did not depend on spatially specific factors, but were probably influenced by complex and interacting aggregate dynamics. The study concluded that the increase in employment elasticity in the late 1990s was influenced by other institutional factors, especially those linked to various labour market reforms,which greatly favored more flexible employment of labour and stronger labour demand responsiveness to output changes.

Leshoro (2014) conducted an empirical analysis of employment elasticity of growth in Botswana. The objective of the study was toexamine the employment elasticities for various sectors in Botswana. The study employed the error correction model (ECM) using data for the period 1980-2011. The estimated equation was:

$$logE_t = \alpha_{0t} + \alpha_{1t} logGDP + \alpha_{2t} logGDP_{IND} + \alpha_{3t} logGDP_{SER} + \alpha_{4t} logGDP_{AGRI} + \varepsilon_t \quad (12)$$

Where, E was employment; GDP was the output growth, $GDP_{IND}$was the value added of the industrial sector, $GDP_{SER}$was the value added of the services sector and GDP_{AGRI} was the contribution of the agricultural sector to total GDP. α*'s* were the coefficients which were interpreted as elasticities,ε_t was the error term in period and $t$denoted the time period. The study found that employment elasticity of growth of total GDP was negatively related to employment growth. The study also revealed that the coefficients of the sectoral GDP contribution had positive effects on employment. The results also showed that the effect of any of the contributions from these sectors only had a bigger effect on the level of employment after two years. The study recommended that the government policy should consider employment subsidies with more focus on youth employment subsidy and the creation of jobs which are more labour intensive.

Mouelhi and Ghazali (2014) estimated the employment intensity of growth among Tunisian productive sectors. The objective of the study was to determine the key economic sectors which are employment intensive.

The study used time series data for the period 1980-2012. The study used a two-step approach. The first step was to establish sectoral employment elasticities. This was achieved through an OLS estimation of a multivariate log-linear regression model given by:

$$lnL_t = \beta_0 + \beta_1 lnY_t + (\beta_2 lnY_t D_D) + \beta_3 D_D + \mu_t \quad (13)$$

Where Y was output, L was employment,$D_D$was time variable dummy, μ_t was the error term in period t, and β_s were the estimation coefficients. The second step was to investigate the determinants of employment elasticities. The second step involved using the estimated elasticities in step one as the dependent variable in the equation:

$$ln\varepsilon_t = \alpha + \theta lnlf_t + \beta lnsces_t + \rho lninfla_t + \emptyset lnexch_t + vlnopenness_t + \tau lnwage_t + \mu_t \quad (14)$$

Where ε_t denoted overall growth-employment elasticity at time t, lf was the growth rate of the labour force, $sces$ was the share of employment in services, $infla$ was the annual inflation rate, $exch$ was the nominal exchange rate (Tunisian dinar/US dollar), $openness$ was a proxy for trade openness, $wage$ was the average annual real wage α was the intercept coefficient and $\mu_t$was an error term. The study found a significant decrease in total employment elasticity from 0.61 in 1980-1989 to 0.57 in 1991-1999 and 0.48 in 2000-2012. The study also revealed that agriculture and fishing,trade and tourism were the most labour-intensive sectors. The coefficients for both annual rate of inflation and the exchange were statistically significant but negatively associated with employment elasticity. The coefficients for the share of employment in services and the growth in labour force were not statistically significant to employment intensity. However, lower average wages seemed to induce higher employment-growth elasticity. The study concluded that in Tunisia, economic growth has been increasingly driven by productivity enhancement rather than by labour supply.

Jiun and Gha (2011) investigated the relationship of economic growth, employment elasticity, and poverty in Malaysia. The objective of the study was to investigate the effect of economic growth and employment in poverty reduction. This was to be achieved through examining their associations at the level of each sector individually and all sectors as a whole. The study employed both the descriptive and Ordinary Least Square (OLS) regression method to estimate employment elasticities. Annual time series data for the period 1970 to 2009 was used. The study found that the employment elasticity for agriculture sector fluctuated and had great variations ranging between -29.63 and 14.78 during the period of study. The study also revealed that the employment elasticity of construction sector ranged between -7.25 and 64.05 and that the employment elasticity for manufacturing sector ranged between -17.81 and 13.79 during the period of study. The study concluded that the Malaysian employment elasticity declining trend was due to the improvement in the labour productivity. The study also concluded that that the construction sector was the most responsive compared to manufacturing sector and the agriculture sector.

III. Methodology

3.1 Theoretical Framework

The study adopted the neo classical theory as advanced by Solow (1956). The consumer's income, Y_t takes the form:

$$Y_t = r_t K_t + W_t L_t + \pi_t \quad (15)$$

Where L_t is labour supply, W_t is market wage rate, K_t is capital, r_t is rental rate π_t is total profit and t denoted the time period.

Labour supply grows at an exogenous rate of g_l:

$$L_{t+1} = (1 + g_l)L_t \quad (16)$$

Capital is accumulated by the consumer and depreciates at rate δ

$$K_{t+1} = (1 - \delta)K_t + I_t \quad (17)$$

Where I_t is investments. The theory further assumes that firms can take capital and labour and convert it into output which is then sold back to the consumer. The firm's technology is described by the production function:

$$Y_t = A_t F(K_t, L_t) \quad (18)$$

Where $A_t$is the level of technology at time t, and grows at an exogenous rate g_A.That is:

$$A_{t+1} = (1 + g_A)A_t \quad (19)$$

Technological progress is deemed to increase the effective amount of labour. Because the factor markets are competitive, factors are rented by firms at marginal revenue product, and firm profits are zero. The wage, therefore, is:

$$w_t = \frac{\partial f(K_t A_t L_t)}{\partial L_t} \quad (20)$$

Output elasticity of labour is estimated as:

$$\alpha_L = \frac{\partial Y_t}{\partial L_t} * \frac{L_t}{Y_t} \quad (21)$$

Where α_L is the output elasticity of labour.

3.2 Empirical models

Given a general form of output elasticity of labour, (equation 21) was generalized to suit a log linear equation that represented the change in employment associated with a differential change in output. Specifically, the employment elasticity estimatable equation was given by equation 22 as put forth by Perugini (2008), Kapsos (2005) and Islam and Nazara (2000) as:

$$lnL_t = \alpha_0 + \beta_1 lnY_t + \varepsilon_t \quad (22)$$

L and *Y*were total employment units and GDP respectively, fora specific sectorand at time *t.* Coefficient β was the estimated elasticity, $\varepsilon_t$was the error term, and $\alpha_0$was the intercept.

3.3 Definition and Measurement of Variables

The definition and measurement of the variables in equations (22) are explained in Table 3.1.

Table3.1: Variable definition and measurement of variables

Variable	Definition	Measurement
Employment elasticity (EMP)	Responsiveness of employment growth to economic growth	Measured as the ratio of the relative change in employment to the relative change in output.
Sectoral Employment (L_t)	Total number of workers employed in formal sector employment.	Measured in numbers (thousands)
Sectoral GDP(Y_t)	Total value of final goods and services produced within a sector in a given period	Measured as the sector's GDP and expressed on annual basis in million Kenya shillings.

3.4 Testing for Stationary of Data

To detect the presence of unit root in the series, the study employed the Clemente Montanes Reyes (CMR) test. The CMR test is based on the approach that allows for the possibility of having structural breaks in the mean of the series. Structural breaks reflects institutional, technical or legislative changes. The breaks can also reflect changes in economic policies or large economic shocks. The advantage of testing for unit root test and at the same time allowing for structural breaks prevents the tests results from being biased towards non stationarity and unit root. Another advantage is that these tests can identify when the breaks occurred(Perron, 1989).The CMR test is based on the generalaugmented Dickey Fuller test (ADF) model that is expressed as:

$$\Delta Y_t = \rho Y_{t-1} + \sum_{j=1}^{\rho-1} \gamma Y_{t-j} + \mu_t + u_t \quad (23)$$

Where Y_t is a time series of T observations and $\mu_t = \mu_0 + \mu_{1t}$are deterministic terms (if$\mu_0 \neq 0$there is a constant, and there is a deterministic trend when $\mu_0 \neq 1$). The ADF test statistic has a null hypothesis of a unit root process that is, ($\rho = 0$) against the alternative of a stationary ($\rho < 0$) and ($\mu_1 = 0$) or trend stationary ($\rho < 0$) and ($\mu_1 \neq 0$) process.The CMR test improves on the ADF test by providing for structural breaks in the model. This is expressed as:

$$\Delta Y_t = \rho Y_{t-1} + \sum_{j=1}^{\rho-1} \gamma Y_{t-j} + \mu_t + u_t \quad (24)$$

Where $\mu_t = \mu_0 + \mu_0^s d_{tTB} + \mu_{1t} + \mu_1^s (t - TB) d_{tTB}$are the possible deterministic terms (whichcontains a constant when $\mu_0 \neq 0$and deterministic trend when $\mu_0 \neq 1$). The break date is at time T_B.

IV. Empirical Findings

4.1 Unit Root Test Results

Unit root tests for all the variables were conducted so as to establish the order of integration. Unit root tests whether a time series variable is non-stationary and possesses a unit root. Each of the series was tested for presence of a unit root based onClemente-Montañés Reyes(CMR) test.The CMR test was preferred to other unit root tests as it allows for testing of two structural breaks within the series (Perron, 2005). According to Perman and Byrne (2006), structural breaks can have a permanent effect on the pattern of the series.Therefore, testing for unit roots while allowing for structural breaks prevents the test results from a bias that reduces the ability to reject a false unit root null hypothesis. The CMR test also endogenously determines whenthe possible break occurred (Perman and Byrne, 2006).

The test results for all the variables are reported in Table 4.1 and Table 4.2. The CMR test has a null hypothesis of presence of a unit root with structural break(s). Therefore, a rejection of null hypothesis would imply that the series in question was stationary. The CMR test results are based on two models. The AO model which assumes that changes takes place rapidly allowing for a break in the slope and the IO model where changes are assumed to take place gradually and allows for a break in both the intercept and the slope(Clemente*et.al,* 1998).

Table 4.1: Clemente-Montañés-Reyes Unit Root Test with Double Mean Shift (At Levels)

Variable	Additive Outliers		Innovational Outliers	
	t-statistic	Optimal break points	t-statistic	Optimal break points
Employment in Agriculture	-4.062	1989, 2000	-4.061	1985,1993
Employment in manufacturing	-2.781	1986, 2004	-4.452	1974, 2000
Employment in trade	-2.547	1990, 2008	-2.232	1987, 2008
Employment in ICT	-2.690	1991, 2007	-2.225	1987, 2002
Employment in Financial sector	-2.411	1988, 2013	-3.698	1982,2010
Employment in tourism	-2.913	1989, 2008	-2.580	1985, 2004
GDP in Agriculture	-1.349	2005, 2011	-9.664*	2003, 2013
GDP in Manufacturing sector	-1.925	1999, 2007	-5.042	1997, 2008
GDP in Financial sector	-2.588	1987, 2011	-2.248	1984, 2008
GDP in Information & Communication	-2.495	1982,1989	-3.103	1976, 1983
GDP in Tourism	-3.225	1996, 2000	-10.539*	1997, 2011
GDP in wholesale and retail sector	-1.925	1999, 2007	-5.042	1997, 2008

*Source: Derived from the collected data. Note * denotes rejection of the hypothesis at 5% significant level. 5 percent critical value for two breaks: -5.490*

The test statistic for CMR unit root is the minimum t-statistic. The estimation results of the CMR unit root test indicate that variables, agriculture's GDP and tourism's GDP were statistically significant at 5 per cent level. This is because the minimum t- value for these variables were smaller than the critical value of -5.490 at 5 per cent significance value. Thus, according to CMR unit root test, the null hypothesis of presence of a unit root with structural break(s) for variables, agriculture's GDP and tourism's GDP was rejected and the alternative hypothesis that the series are stationary was not rejected. This implies that these variables were stationary at levels suggesting that they are integrated of order zero, I (0).

Table 4.2: Clemente-Montañés-Reyes Unit Root Test with Double Mean Shift (1st Difference)

Variable	Additive Outliers	Innovational Outliers		
	t-statistic	Optimal break points	t-statistic	Optimal break points
Employment in Agriculture	-6.102*	1985, 2000	-5.201	1987,1992
Employment in manufacturing	-5.845*	1984, 2002	-5.776	1978, 2000
Employment in trade	-3.645	1986, 2008	-6.890*	1984, 2004
Employment in ICT	-6.234*	1991, 2010	-4.409	1989, 1999
Employment in Financial sector	-5.687*	1992, 2004	-5.223	1982,2006
Employment in tourism	-4.551	1984, 2005	-5.580*	1985, 2002
GDP in Manufacturing sector	-3.645	1999, 2000	-5.546*	1994, 2000
GDP in Financial sector	-6.265*	1990, 2004	-3.641	1987, 2058
GDP in Information & Communication	-4.237	1979,2001	-5.863*	1978, 1987
GDP in wholesale and retail sector	-3.927	1999, 2005	-5.641*	192, 2008

Source: *Derived from the collected data. Note * denotes rejection of the hypothesis at 5% significant level. 5 percent critical value for two breaks: -5.490*

Test statistic for variables, employment in agriculture, employment in manufacturing, employment in wholesale and retail trade, employment in information and communication, employment in financial sector employment in tourism, manufacturing GDP, financial sector's GDP, information and communication GDP and wholesale and retail sectors GDP were not statistically significant at 5 per cent significance level. This means that the variables were not stationary at levels. Thus, according to CMR unit root test, these variables had at least one unit root and required to be differenced to become stationary. The series were, however, stationary at first difference and therefore integrated of order one, I (1) as shown in Table 4.2.

4.2 Empirical Results

The objective of the study was to determine the employment elasticities in priority sectors in Kenya. To accomplish this, a regression model of a double-log linear equation specified in equation 22 was estimated for each of the priority sector. The priority sectors are the ones envisioned in the*Kenya Vision 2030*. Equation 22

related employment per sector to its sectoral GDP. The statistic of concern was employment elasticity which gave the percentage change in employment due to a change in GDP. The log linear method of estimating elasticities was preferred to the arc method since the method provides more stable values, which are useful for economic policies. According to Islam and Nazara (2000), employment elasticities calculated using arc method tend to exhibit a great deal of instability and may therefore be inappropriate for comparative purposes. The estimation results from this analysis are presented in Table 4.3.

Table 4:3: Employment elasticitiesfor priority sectorsin Kenya from 1970-2016

Sector	**Agriculture**	**Tourism**	**Information & Communication**	**Finance**	**Wholesale& Retail**	**Manufacturing**
Coefficient	0.115**	0.187**	0.412***	0.254**	0.233**	0.199**
Standard errors	(0.042)	(0.0712)	(0.035)	(0.104)	(0.102)	(0.073)
t-statistic	2.747	2.625	11.934	2.432	2.280	2.706
P-value	0.014	0.013	0.000	0.014	0.014	0.013
Adjusted R-squared	0.737	0.155	0.782	0.667	0.728	0.716
F-statistic	127.527	6.892	142.413	91.346	121.768	114.604
Prob(F-statistic)	0.000	0.013	0.000	0.000	0.000	0.000

*Source: Derived from the collected data. Note: [***] and [**] and * denote significant at levels 1%, and 5% respectively. Standard errors are in parenthesis*

Results in Table 4.3 show that the coefficient for the employment elasticity variable for agriculture sector was 0.115 and statistically significant at 5 per cent level. This implies that increase in GDP within agriculture sector by one per cent increased employment within the sector by 0.115 per cent. The employment elasticity within the sector was inelastic since a one per cent increase in the sector's GDP led to a less than proportionate increase in employment within the sector. The adjusted R- squared in the agriculture sector model of 0.737 meant that agriculture's GDP accounted for 73.7 per cent of the variations in employment within the sector. The$F$-statistic value of the agricultural sector model was 127.527 with a corresponding p-value of 0.000. Since the p-value of the F-statistic was less than the significance level of 0.05, the null hypothesis that all slope coefficients are equal to zero was rejected.

The estimation results for the agriculture sector concurs with Jiun and Nga (2011), who found the employment elasticity for agriculture in Malaysia to range between 0.09 and 0.13 during the period 1970 to 2009. The results also concur with Leshoro (2014) who found employment elasticity in the agricultural sector in Zambia to be 0.03 for the period 1980 to 2011. The employment elasticity in the agricultural sector for Kenya was, however, much lower compared to the Sub Saharan Africa of 0.47 and 1.01 for both South Asia and North America for the period 1991 to 2009 (Crivelli*et.al*, 2012).

An employment elasticity coefficient of 0.115 is low compared to 0.7 as recommended by Khan (2001) for developing countries. The low employment elasticity for agricultural sector could be attributed to the deterioration of infrastructure which has increasingly become a major hindrance to development in the agricultural sector (Republic of Kenya, 2010). A key concern in this regard is the expansion and proper maintenance of various modes of transport and communication for adequate coverage of the rural areas. Not only is the stock of rural infrastructure in poor condition and inadequate, but is also unevenly distributed leaving some high agricultural potential areas with little or no coverage. This in turn hinders promotion of agriculture as a commercial business leading to low employment opportunities.

The lowemployment yield of output growth in agricultural sector could also be attributed to inefficiencies in the supply chain resulting from limited storage capacity, lack of post-harvest services and poor access to input markets(Alila & Atieno, 2006). Kenyan farmers also face numerous direct and indirect taxes, which make agriculture less competitive internationally. The impact of these taxes, levies and fees distort market prices thus making farm produce uncompetitive in the domestic as well as in international markets(Republic of Kenya, 2010). The distortion in prices translates to low income for farmer and hence less job opportunities.Lowtechnology absorption capacity in the country could also have led to a low employment elasticity in the agricultural sector. Although Kenya has a well-developed agricultural research system, the use of modern science and technology in agricultural production is still limited which continue to constrain efforts for increasing agricultural productivity (Alila & Atieno, 2006).

Table 4.3indicates that the tourism sector model had an adjusted R-squared coefficient of 0.155. The coefficient of adjusted R-squared in the tourism sector implied that only 15 per cent of the variations in employment within the sector were explained by changes in tourism's GDP. This could be explained by the fact that a big part of the budget in the tourism sector is used in marketing and branding the country as a tourist destination and for infrastructural developments within the sector (Republic of Kenya, 2013b). This may not have a direct impact on job creation. The F-statistic was 6.893 with a corresponding p-value of 0.013. Since this

p-value (0.013) was less than the critical value of 0.05, the model was fit for prediction. The coefficient for the employment elasticity variable for tourism sector was 0.19 and statistically significant at 5 per cent level. This implies that when GDP in the tourism sector increases by one per cent, employment within the tourism sector would increase by 0.19 percent. The employment elasticity within the sector was, however, inelastic since a one per cent increasein tourism's GDP resulted in less than proportionate increase in employment within the sector. Theresults are consistent with Mouelhi and Ghazali (2014) who found an employment coefficient for tourism sector in Tunisia to be 0.82 during the period 1980 to 2012.

The low responsiveness of employment to output growth in the tourism sector in Kenya could be explained by the negative perception on security matters with respect to perceived threats of terrorism that has led to negative travel advisories against travel to Kenya. The negative travel advisories led to huge ripple effects within the sector due to cancellation of bookings by tourists to several parts of the country. The cancellations of flights and travels led to job cuts and job losses as thousands of employees within the tourism sector were made redundant (Republic of Kenya, 2013b). The negative travel advisories also had a direct impact on FDIs within the tourism sector. Investors were inclined to nullify their FDI in Kenya due to the rise of operating costs as a result of the increasing need of security measures, and the rise of recruiting costs due to missing incentives to work in terrorism-prone regions. This further contributed to the loss of job opportunities for tourism development initiatives.

According to Table 4.3, the adjusted R-squared for the ICT sector model was 0.782. This meant that 78.2 per cent of the variations in employment within the sector were influenced by changes in the sectors GDP. The F- statistic was 142.413 with a corresponding p-value of 0.00. This led to the rejection of the null hypothesis that the slope coefficient is equal to zero. The coefficient for the employment elasticity variable forICT was 0.41 and statistically significant at 1 per cent level. This meant that a one per cent increase in GDP for ICT sector would lead to a 0.41 per cent increase in employment within the sector. The employment elasticity for the ICT sector was, however, much higher compared to the other priority sectors.Therefore, the ICT sector had the highest employment intensity of growth among other priority sectors over the study period. The results are consistentwith Sepehrdoust and Khodaee (2013), who established that a one per cent increase in ICT expenditures and GDP of the country led to an employment rate increase of 0.045 and 0.2 percent respectively during the period 2000-2009 for selected Organization of Islamic Conference (OIC) member countries. The results, however, contradict Vivarelli and Pianta (2000) who found that in many countries, both developed and developing, have been experiencing structural unemployment originating from ICT. This is because ICT's contributes to the automation of processes, making some workers redundant.

The employment intensity of growth in the ICT sectorcould be associated with the government's aspiration under *Kenya Vision 2030* where the government recognizes ICT as a foundation for national development. The ICT sector has seen tremendous progress in electronic cash transfer through mobile telephony platform as a result of which micro-credits and savings have been raised using the same platform. The sector has also witnessed developments of the planned national ICT infrastructure to improve universal access to ICT services. All major towns in the country have been connected through the National Optic Fibre Backbone Infrastructure (NOFBI) and government Common Core Network (GCCN). This in turn has increased the demand for internet and data services which has led toenhanced business activities and created job opportunities. The high responsiveness of employment to output growth in the ICT sector as compared to the other priority sectors could also have been as a result of the government efforts inlaunching the digital jobs Programme. Thegovernment heightened its promotion activities to recruit youths for online work and ensured increased job opportunities in the sector from 1,000 in 2008 to 13,500 by 2012. The ICT sector even surpassed the sectoral target of generating20,000 jobs annually in 2013/2014 with the sector generating21,073 jobs (Republic of Kenya, 2014b).

The adjusted R-squared for the financial sector model was 0.667. This implies that 66.7 per cent of the variations in employment within the financial sector are accounted for by changes in the sector's GDP. The financial sector had a F-statistic of 91.346 with a corresponding p-value of 0.00. The coefficient for the employment elasticity variable for financial sector was 0.25 and statistically significant at 5 per centlevel. This implies that a one per cent increase in financial sector's GDP would increase employment in the sector by 0.25 per cent. The results, however,contradict Akinkugbe (2015), who found that the finance, insurance and business services sector in Zambia had relatively low employment elasticity, with each percentage increase in value added giving rise to negative growth in employment for the period under study.

The financial sector was the second most responsive after ICT sector compared to the other priority sectors in terms of employment yield of economic growth. One possible explanation for the sectors performance could be the introduction of mobile phone based banking. The development of mobile based payments has produced an expansion, involving new players from outside the banking system and led to many job opportunities that included mobile phone money transfer agents.The employment elasticity in the financial sector was, however, inelastic.Inelastic employment elasticity means that a one per cent increase in financial

sector's GDP led to a less than one per cent increase in employment within the sector. One possible explanation for the inelastic employment elasticity in the sector could be the large informal sector in the country that accounts for 83.1 per cent of total employment (Republic of Kenya, 2017). The informal sector is encompassed with low levels of usage for financial services and relatively few households make use of formal financial services to manage day-to-day cash-flows and most businesses are still heavily cash dependent.

The coefficient for the employment elasticity variable for manufacturing sector was found to be positive with a magnitude of 0.19 and statistically significant at 5 percent level.This implies that a one per cent increase in GDP for manufacturing sector would increase employment within the sector by 0.19 per cent. The value of the adjusted R-squared for the manufacturing sector model indicated that 71.6 percent of the variations in employment within the sector were influenced by changes in the sector's GDP. The F-statistic was 114.6 with a corresponding p-value of 0.000. Since this p-value (0.000) was less than the critical value of 0.05, the model was fit for prediction.The results are consistent with Akinkugbe (2015) who found the employment elasticity in manufacturing sector for Zambia to be 0.9 between 1990-2008, 2.54 for the period 2000-2005 and 17.2 for the period 2005 to 2008. The results, however, contradict Padalino and Vivarelli (1997) who found elasticities in manufacturing sector to be negative for G-7 countries except for Japan over the 1980-1994period.

The inelastic employment yield of output growth in the manufacturing sector could be explained by the structure of the manufacturing sector in the country. Almost about 95 per cent of manufacturing firms in Kenya are micro and small (KIPPRA, 2017). This means that most firms in the manufacturing sector are mainly informal offering high and increasing number of precarious jobs. Republic of Kenya (2016), also asserts that most of the MSE's die early, churn out jobs and create insecure jobs. The manufacturing sector in Kenya is also faced by increased competition from cheap imports into the local market, especially from China and India. In addition are challenges of increased incidences of illicit trade, including counterfeits and dumping (KIPPRA, 2017).

The coefficient for the employment elasticity variable for wholesale and retail trade was found to be positive with a magnitude of 0.199 and statistically significant at 5 per cent level. This implied that a one per cent increase in wholesale and retail sector's GDP would increase employment within the sector by 0.199 per cent. The estimation results also indicate that 72.8 per cent of the variations in employment within the sector were accounted for by changes in the sector's GDP.The F-statistic value of the wholesale and retail sector model was 121.768 with a p-value of 0.000. The p-value of 0.000 led to therejection of the null hypothesis that all slope coefficients are equal to zero at 5 per cent significance level. The estimation results are consistent with Sahin, Tansel & Berument(2008), who found that employment elasticity for Turkey was positive and statistically significant both in the short and long run for the period 1988 to 2008. The estimated results also concur with Akinkugbe (2015) who found the employment elasticity for wholesale, retail, hotels and restaurants to be elastic in Zambia for the period 1990 to 2008.

A possible explanation to the low responsiveness of employment to output growth in the wholesale and retail sector could be the fact that most enterprises in the sector are micro, small and medium establishments (MSME) in nature. Wholesale and retail accounts for more than half of the total persons working (Republic of Kenya, 2016). According to the Republic of Kenya (2016), a total of 2.2 million MSMEs have been closed since the year 2010 where most of the closed businesses were in wholesale and retail trade which accounted for 73.5 per cent of the total closures. Consequently, this closure of business implies loss of job opportunities. This could also be partly attributed to increased competition in the sector, and the effects of e-commerce and online shopping.

V. Conclusions and Policy Implications

This paper concludes that all the priority sectors were employment inelastic. This suggests that although output within the priority sectors continued to grow, the gain in output growth was based on productivity growth rather than employment growth.Also, from the magnitude of the sectoral employment elasticities, it can be concluded that service sectors that include ICT and financial sector had higher employment yield of output growth compared to other sectors. The study recommends that policies pursued by the government to boost employment should be sector specific. The Kenyan government can achieve this by ensuring that Sector Plans and MTPs designed for realization of national growth targets on employment under the *Kenya Vision 2030,* or any other economic agenda, accommodates programmes that are employment-intensive.The government should also prioritize growth in both the ICT and financial sector. To achieve this, infrastructural development within the ICT should be a central focus. This could be supported by ensuring access to universal ICT and promotion of ICT based industries. For the financial sector, the government though Central Bank could enhance financial deepening. This can be realized by strengthening the financial sector to ensure that entrepreneurs and investors are supported with affordable credit and other financial services.

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Gideon Kiguru Thuku"Employment Intensity of Output Growth in Kenya." IOSR Journal of Economics and Finance (IOSR-JEF) , vol. 10, no. 3, 2019, pp. 09-21.