PUBLIC DEBT AND ECONOMIC GROWTH IN THE EAST AFRICAN COMMUNITY

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ABSTRACT

Public debt is among the main macroeconomic indicators that constitutes a country’s image in international markets and is an inward foreign direct investment flow determinant. A sound public debt management leads to economic growth and stability by mobilizing resources with low borrowing costs as well as limiting the financial risk exposure. The main objective of the study was to analyze the impact of public debt on economic growth in the East African community. Economic growth measured by GDP per capita growth was the dependent variable while gross fixed capital formation, labor force and public debt (both external and domestic) were explanatory variables. The study examined data for 24 years from 1990-2013 for EAC countries. Random effects model was adopted as per the results of the Hausman test. External debt was found to have a negative significant effect on economic growth while Gross fixed capital formation had a positive significant effect on economic growth. The study recommends that relevant policies that enhance gross capital formation and promote reduction of debt burden be adopted for sustainable growth in the EAC.

Keywords: Domestic Debt, Economic Growth, External debt, Panel data

1. INTRODUCTION

Most developing countries focus on looking for funding sources essential for the advancement of the various productive sectors of the economy. This has led to the use of public borrowing by governments to stimulate economic growth (Karazijien & Saboniene, 2009). The term public debt is used to describe the level of debt liabilities owed by a government to its creditors. It is one of the macroeconomic indicators that forms a country’s image in the international market and is an inward foreign direct investment flow determinant (Ribeiro et al, 2012). It can be classified as sum of external debt and domestic debt and indicates how much public spending is financed by borrowing instead of taxation (Chowdhury, 2001). Thus, public debt is one of the instruments used to cover deficits in budget. The positive effects of public debt to countries pertain to the reality that in resource-starved economies, debt financing if done properly contributes to higher growth and increases a country’s capacity to service and repay external and internal debt. However the negative effects work through two main channels i.e. Crowding Out effects and Debt Overhang (Akram, 2010).

The last two decades have seen EAC countries experience strong growth. The per capita income growth for the period 2005-2010 reached 3.7 percent a year compared to 3.2 percent for sub Saharan Africa as a whole (Babu et al,2014). Moreover, the AfDB, OECD and UNDP(2014) observed that the EAC economic outlook has remained optimistic with the IMF(2014) terming it amongst the fastest growing regions economically, at a 6.2 percent average economic growth for the past decade (2004-2013). Amidst the high economic growth, public debt still remains one of the main economic policy issues facing EAC governments. Programs such as Heavily Indebted Poor Countries (HIPC Initiative) and the Multilateral Debt Relief Initiative (MDRI) have been developed by International financial institutions such as the IMF and World Bank to counter public debt in developing countries. For instance, in 1998, Uganda was granted debt relief amounting to US$650 million while Tanzania having qualified in January 2002 as HIPC, was granted debt cancellation of US$190.75 million from the African development bank. According to the IMF (2014), Tanzania, Uganda, Rwanda and Burundi were among the list of countries that had qualified or were eligible for HIPC initiative assistance.

There has also been a rise in government expenditures among the EAC Partner states over the years. This has indeed contributed to the use of borrowing as one of the options by these countries to cover the deficits of the national budget as well as to balance the financial flows of the state and to finance state investments. For instance in Kenya, infrastructure development projects and free primary education program me among others have seen the government expenditure figures soar to Kshs Millions 1,567,601 in 2013 (Kenya National Bureau of Statistics, 2014). According to Mitchell (2005), advocates of bigger governments reason that government...
programs offer valuable public goods like education and infrastructure while proponents point out that increased expenditure undermines economic growth by channeling additional resources away from the productive sectors of the economy to state, which utilizes them less efficiently.

In addition, the growing public debt levels in the region as depicted in Table 1 have raised debate among policy makers as to whether the EAC countries accumulating government debt has been majorly attributed to increasing government expenditure over the years that is not matched with increasing government revenue. Further concerns have arisen as to whether the growth in public debt levels might lead to the stifling of economic growth in the region especially as member countries make efforts towards deepening economic and political integration in the east African community and possibly the establishment of east African federation.

Table 1. EAC General Gross Government Debt (National Currency Billions)

<table>
<thead>
<tr>
<th>Year</th>
<th>Burundi</th>
<th>Kenya</th>
<th>Rwanda</th>
<th>Tanzania</th>
<th>Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>927</td>
<td>642</td>
<td>732</td>
<td>5,611</td>
<td>7,064</td>
</tr>
<tr>
<td>2002</td>
<td>1,222</td>
<td>719</td>
<td>860</td>
<td>6,008</td>
<td>8,286</td>
</tr>
<tr>
<td>2003</td>
<td>1,461</td>
<td>767</td>
<td>999</td>
<td>6,524</td>
<td>9,447</td>
</tr>
<tr>
<td>2004</td>
<td>1,740</td>
<td>769</td>
<td>1,095</td>
<td>7,554</td>
<td>9,529</td>
</tr>
<tr>
<td>2005</td>
<td>1,655</td>
<td>767</td>
<td>1,018</td>
<td>8,936</td>
<td>9,443</td>
</tr>
<tr>
<td>2006</td>
<td>1,706</td>
<td>819</td>
<td>456</td>
<td>7,652</td>
<td>7,157</td>
</tr>
<tr>
<td>2007</td>
<td>1,902</td>
<td>826</td>
<td>551</td>
<td>5,782</td>
<td>5,124</td>
</tr>
<tr>
<td>2008</td>
<td>1,959</td>
<td>1,030</td>
<td>548</td>
<td>7,049</td>
<td>6,038</td>
</tr>
<tr>
<td>2009</td>
<td>561</td>
<td>1,177</td>
<td>682</td>
<td>9,190</td>
<td>7,200</td>
</tr>
<tr>
<td>2010</td>
<td>1,008</td>
<td>1,407</td>
<td>756</td>
<td>11,986</td>
<td>10,042</td>
</tr>
<tr>
<td>2011</td>
<td>1,088</td>
<td>1,604</td>
<td>912</td>
<td>15,070</td>
<td>13,461</td>
</tr>
<tr>
<td>2012</td>
<td>1,283</td>
<td>1,736</td>
<td>1,052</td>
<td>18,066</td>
<td>16,528</td>
</tr>
<tr>
<td>2013</td>
<td>1,344</td>
<td>1,944</td>
<td>1,412</td>
<td>21,540</td>
<td>19,726</td>
</tr>
<tr>
<td>2014</td>
<td>1,435</td>
<td>2,406</td>
<td>1,581</td>
<td>25,322</td>
<td>23,865</td>
</tr>
</tbody>
</table>

Source Data: IMF; World Economic Outlook Database, 2015

Furthermore, the increase in public debt levels among EAC member countries has seen countries such as Uganda witnessing a growth in public debt of close to 2 percentage points of the gross domestic product every year (Ministry of Finance for Uganda, 2013). According to the World Bank (2013) in its Uganda economic update report, the country’s total debt stood at US$6 billion (29 per cent of GDP) in 2013, but was within the country’s ceiling of 35 per cent of GDP. Tanzania on the other hand recorded a government debt to GDP of 39.90 per cent of the country's gross domestic product in 2013. The average government debt to GDP for Tanzania for the period 2003-2013 was 49.44 per cent (Bank of Tanzania, 2014). Rwanda also experienced an increase in its debt to GDP ratios from a level of 23.0 per cent at the end of June 2012 to 30.2 per cent of GDP in June 2013. This growth in total debt was predominantly due to non-concessional loans acquired to finance the nation’s strategic investments, particularly the Kigali Convention Centre and Rwanda Air the national air carrier. Borrowing incurred for financing these investments drove the publicly guaranteed debt from 2 per cent of the entire public debt figure in 2010 to 8 per cent in 2011. External debt accounted for 71 per cent of the total public debt in 2011 with over 70 per cent of it owed to multilateral creditors (Rwanda ministry of finance and economic planning, 2013). Burundi’s public debt to GDP stood at 31.7 per cent in 2013 (World bank, 2014). The country’s public and publicly guaranteed external debt stood at US $476 million or 23.6 per cent of GDP while domestic debt accounted for 15 per cent of GDP at the end of 2011 (IMF, 2013). Burundi’s stock of external debt declined significantly since 2009 as a result of the debt relief under the enhanced Highly Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI). About 90 percent of Burundi’s outstanding nominal external Public and publicly guaranteed debt was owed to multilateral creditors, with bilateral creditors accounting for the remainder.

2. LITERATURE REVIEW

2.1 Theoretical review

Public debt being an important macroeconomic indicator for any country has been known to have consequences which may be positive or negative. Some of the likely adverse effects on the economic growth of a country include higher long term interest rates, higher future distortionary taxation, higher inflation, greater uncertainty and vulnerability to crises. This has led to divided views among scholars on the impact of public debt on economic growth. Classical economists such as Adam smith, Ricardo and Malthus viewed public debt as government loan finance that withdraws funds from productive private employment. According to Adam smith (1759), the state was wasteful; it took borrowed funds for unproductive purposes from private capitalists and
deprived them of capital which was badly needed for promoting production and trade (Varughese, 1999). Smith argued that governments should not run budget deficits because these lead to the accumulation of public debt with destructive effects for the nation even if all of it was owed domestically (Tsoulfidis, 2011). According to Varughese (1999), the dominant views of the classical economists on public debt were; Government loan finance withdraws funds from productive private employment, deficits are less painful than current taxes (unbalanced budgets therefore expand governmental activity and invite irresponsible governmental action), Government borrowing makes future financing more difficult by increasing the proportion of the budget which must go for fixed charges and by increasing the amount of taxes which must be paid to finance the interest on the debt, Loan finance is costly i.e. public outlays financed in this way must be paid for twice - once in meeting the interest charges and once in amortizing the debt and finally public debt leads to currency depreciation.

Keynes (1936) on the other hand, in the general theory of employment, interest and money produced theoretical results entirely different from the body of economic thought existing at the time of its development. This provided the basis for the modern theory of public debt which finds expression in Functional Finance which holds that the absolute size of the national debt doesn’t matter at all and however large the interest payments that are paid, they don’t constitute any burden upon society as a whole (Varughese, 1999). The no burden doctrine treats the economy as a unit, and therefore holds that private debt differs from national government debt in being external. In the event of national domestic debt which is owed by the state to citizens of the same state, there are then no external creditors and thus we owe it to ourselves. The society in this analysis is regarded as being analogous to a family. It also ignores the distinction between economic order based on private enterprise and a command economy. The ‘no burden’ thesis also relies on certain advantages of public borrowing. Through debt creation, the government can tap savings streams, put the resources thus raised to productive use and bring about an increase in national income. The increased flow of income facilitates the payment of taxes to service the debt. At the time of unemployment, increase in public debt contributes to current capital formation. It promotes the development of more and more Institutionalized sources of savings like banks, stock markets and insurance companies. It helps curb consumption, encourages savings and promotes capital formation and makes it possible for the people of a country to improve their standard of living (Varughese, 1999).

Post Keynesian theories on public debt such as the one brought forth by Buchanan (1958), who called the currently dominant theory of public debt the ‘New Orthodoxy’ based on the propositions that public debt creation does constitute any transfer of the primary real burden to future generation, the analogy between private and public debt is fallacious and that there is an important distinction between an internal debt and an external debt (Alvey, 2011). Buchanan (1958) tried to establish that the primary real burden of a public debt is transferred to future generations, the analogy between public debt and private debt is essentially correct and that external debt and domestic debt are basically equivalent. Buchanan asserted that payment of taxes is per se a burden. Since debt finance postpones the levy of taxes, it obviously shifts burden to future generations. Justification for this is that taxes are compulsory and involuntary. In contrast, market transactions, including the purchase of public debt are voluntary agreements (Alvey, 2011).

Refining contributions by Buchanan (1958) and Meade (1958), Modigliani (1961), through the Modigliani’s burden thesis, adopted the aggregate investment approach with a view to isolate the economic effects of national debt. Modigliani (1961) argued that national debt is a burden for the next generations that comes in the form of a reduced flow of income from a lower stock of private capital. In addition to the direct crowding-out effect, Modigliani pointed out to the impact on long-term interest rates, possibly in a non-linear form. Modigliani concluded that an increase in national debt whether internal or external was generally advantageous to those present at the time of increase. Furthermore increased national debt will generally place a gross burden on those living beyond at the time through a reduction in the aggregate stock of private capital and the rate of interest at which the government borrows can be taken as a good approximation of marginal productivity of capital upon which the gross burden (gain) to future generation can be measured by the interest charges on the national debt and gross burden of national debt may be offset or even reduced in so far as the increase in the debt is accompanied by rising public expenditure which contributes to real income of future generations (Checherita and Rother, 2010).

2.2 Empirical Review

The relationship between public debt and Economic growth has been the subject of great research with varying findings. For instance the study by Mencinger, Aristovnik and Verbic (2014), studied the impact of growing public debt on economic growth in the European Union (EU) for the period 1980 to 2010. The study employed panel estimation on a generalized economic growth model augmented with a debt variable in order to account for the effect of the level of debt-to-GDP ratio on the real growth rate of GDP. The findings indicated a statistically significant non-linear impact of public debt ratios on annual GDP per capita growth rates. These
findings were in line with Kumar and Woo (2010) who also found a nonlinear relationship between the initial level of government debt and consequent GDP growth behavior based on panel data of thirty eight advanced and emerging economies countries for a period spanning roughly four decades (1970–2010). Kumar and Woo (2010) noted that a large public debt is likely to have damaging effects on capital accumulation, as well as productivity, which potentially has an adverse impact on economic growth.

Pattillo, Poirson and Ricci (2002) on the other hand studied the consequences of external debt on economic growth. They observed a non-linear, Laffer-type relationship between external debt levels and economic growth. The study used a large panel dataset of ninety three developing countries over the period 1969–1998. The results indicated that the major channel via which excessive external indebtedness depresses growth is through reduced effectiveness of investments rather than the level of investment. The study concluded that lofty burden of debt hampers economic growth, mainly due to decline in the efficiency of investment and not because of its volume. This was in line with other empirical studies that indicated that total factor productivity explained most variations in output (Checherita and Rother, 2010; Clements, Bhattacharya and Nguyen, 2003). In addition, Pattillo, Poirson and Ricci (2004), approximated that the critical value at which external debt had a harmful effect on growth is between 35–40 per cent of GDP for the studied panel of developing countries.

Babu et al (2014) studied the effect of external debt on economic growth in the east African community(EAC) using annual panel data from 1970 to 2010. The study was founded on the solow growth model augmented for debt. The results suggested that external debt had a negative significant effect on per capita GDP growth rate in the EAC. The study concluded that there was need to cut down the external debt burden so as to encourage increased economic growth among the EAC partner states. Christensen (2005) on the other hand, used a cross country survey of the role of domestic debt markets in sub-Saharan Africa based on a new data set of 27 sub-Saharan African countries during the 20 year period (1980-2000) and found out that domestic markets in these countries are generally small, highly short term and often have a narrower investor base. The study also found out that domestic interest rate payments present a significant burden to the budget with significant crowding-out effects.

Makau (2008) did an empirical analysis on the external public debt servicing and economic growth in Kenya. The study used a single growth equation model estimated using Ordinary least Square (OLS) method with annual time series data covering the period 1970 to 2003. The findings of the study indicated that Kenya's external debt is mainly official, of which a bigger proportion is from multilateral sources. Obademi (2012) also analyzed the impact of public debt on economic growth for Nigeria. The study utilized an augmented Cobb Douglas model and later on a dynamic version of the functional relationship was estimated with the use of Co-integration technique so as to factor in the long-run impact of debt variables on economic growth. The findings indicated that the effect of debt on economic growth was negative and quite significant in the long-run while in the short-run the impact of borrowed funds and coefficient of budget deficit was positive. The study concluded that while in the short-run the impact of borrowed funds on the Nigerian economy was positive, the impact of debt in the long-run depressed economic growth due to incompetent debt management.

Al-refai (2015) in his study on the relationship between debt and economic growth for Jordan for the period (1990-2013) adopted a Cobb-Douglas production function approach. The estimated results of the study indicated that gross fixed capital formation and domestic debt had positive and significant relationship on economic growth while labor, external debt, and long-term external debt had a negative and insignificant impact on economic growth in Jordan. Muhdi and Sasaki (2009) also examined the roles of external and domestic debt in Indonesia’s macroeconomic situation by applying ordinary least square (OLS) estimation for the period 1991 to 2006. The study showed the positive effects of the rising trend of external debt on both investment and economic growth.

3. MODEL SPECIFICATION

Economic theory informs us that debt burden has been known to have important implications for capital and labor productivity. According to Akram (2010), nations that have a significant debt burden require to spend a portion of their resources servicing their debt liabilities. This has significant implications on decisions regarding the employment of labor and capital in the production function. Based on this, the study used the Cobb-Douglas production function to analyze the relationship between public debt and economic growth in the east African community as used by Al-Refai (2015) in his study on the relationship between debt and economic growth in Jordan. From economic theory, the Cobb-Douglas production function is written in the following form:

\[ Y = AL^a K^\beta \]  \hspace{1cm} (1)

Where \( Y \), \( K \), \( L \) and \( A \) are the measure of GDP, capital stock, labor force and other constant factors respectively.
Linearizing the production function gives us the form shown in (2):

$$\ln Y_{it} = \ln \alpha_{it} + \beta_1 \ln L_{it} + \beta_2 \ln K_{it} + \ldots$$

Since the study involved the use of percentage change, this is approximately similar to using logarithms (elasticities). Therefore our estimable models augmented with external and domestic debts are represented in (3) and (4).

### 3.1 External Debt and Economic Growth

In order to understand the contribution of each variable namely Capital, Labor, and External debt to economic growth, the Cobb-Douglas production function was written as shown in (3):

$$Y_{it} = C + \beta_1 L_{it} + \beta_2 K_{it} + \beta_3 \text{ExtDebt}_{it} + \varepsilon_{it}$$

Where:
- \text{ExtDebt}: External debt as a share of real GDP
- \text{Y}, \text{K}, \text{L}: as defined earlier in (3)

### 3.2 Domestic Debt and Economic Growth

Similarly, In order to understand the contribution of each variable namely Capital, Labor, and domestic debt to economic growth, the Cobb-Douglas production function was written in the form shown in (4):

$$Y_{it} = C + \beta_1 L_{it} + \beta_2 K_{it} + \beta_3 \text{DomDebt}_{it} + \varepsilon_{it}$$

Where \text{DomDebt} is Domestic debt as a share of real GDP and \text{Y}, \text{K}, \text{L}: as defined earlier in (3)

### 3.3 Data and Methodology

The study set out to analyze the impact of public debt on economic growth for the period 1990-2013 in the East African community. Since both cross sectional and time series quantitative data was used, panel data analysis using Eviews software was employed to find out the relationship between the variables. Panel data models combine the time dimension and the cross sectional dimension. In panel data we sample the same cross sectional units over time, and thus get a two-dimensional data set. The data used was obtained from the World development Indicators database. A Hausman test was carried out to determine the most appropriate model between the fixed and random effects model.

### 4. EMPIRICAL ANALYSIS AND PRESENTATION OF RESULTS

#### 4.1 Panel Unit Root Test

The idea of testing for stationarity is to verify whether the effect of shock is permanent or transitory. If the effect of shock is transient (temporary), the value of the independent variable in subsequent period will return to its long-run equilibrium and when it returns to its long-run equilibrium, we say that the data set is stationary. Eviews support 6 panel unit root test. Levin, Lin, and Chu (LLC) (2002), Breitung (2000), and Hadri (2000) tests all assume that there is a common unit root process. The first two tests employ a null hypothesis of a unit root while the Hadri test uses a null of no unit root. On the other hand, The Im, Pesaran, and Shin (2003), and the Fisher-ADF and PP tests (Maddala and Wu 1999 & Choi 2001) all allow for individual unit root processes under the null hypothesis of unit root. The tests are all characterized by the combining of individual unit root tests to derive a panel-specific result. In this case, a summary of unit root tests: Levin, Lin & Chu, Im Pesaran and Shin W-Stat, ADF-Fisher Chi square and PP-Fisher Chi square tests with automatic lag selection was used in testing for the null hypothesis of Unit root against the alternative that the variables don’t have unit root and results summarized in Table 2.
Table 2. Panel Unit Root Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Levin, Lin &amp; Chu</th>
<th>Im, Pesaran &amp; Shin</th>
<th>ADF Fisher Chi square</th>
<th>PP Fisher Chi square</th>
<th>conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPPC</td>
<td>-5.738</td>
<td>-4.990</td>
<td>45.377</td>
<td>56.609</td>
<td>I(0)</td>
</tr>
<tr>
<td>LF</td>
<td>-6.881</td>
<td>-7.639</td>
<td>65.502</td>
<td>66.130</td>
<td>I(2)</td>
</tr>
<tr>
<td>GFCF</td>
<td>-7.662</td>
<td>-6.841</td>
<td>59.062</td>
<td>68.525</td>
<td>I(0)</td>
</tr>
<tr>
<td>ExtDebt</td>
<td>-8.625</td>
<td>-6.711</td>
<td>57.524</td>
<td>57.319</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Note: GDPPC = Real GDP per capita growth; LF= Labor force participation rate; GFCF= Gross Fixed Capital Formation growth; ExtDebt= External debt as a share of real GDP

The results in Table 2 show existence of stationarity for all the variables at different levels. GDP Per Capita and gross fixed capital formation were stationary at level while external debt and Labor Force were stationary at first and second difference respectively. This means that the data is stable even with the effect of shock; the variables were therefore considered mean reverting at different levels of stationarity.

4.2 Hausman Test

A Hausman test proposed by Hausman (1978) was carried out to decide on whether to use random or fixed effects model. The test is used to determine the effects specification that would produce the most efficient coefficient estimates for the model. The fixed effects regression model allows the intercept to vary but it does not change over time. On the other hand the random Effects model clusters the cross sections and produces a common mean value for the intercept. Hausman Test therefore examines the null hypothesis that random effects model (REM) is appropriate versus the alternative hypothesis that fixed effects model (FEM) is appropriate. Table 3 depicts the Hausman test results indicating chi square p-value of 0.933 is greater than 5% level of significance hence leads to the acceptance of REM being the most appropriate.

4.3 Estimation Results and Discussion

This Section provides the results of the panel regression estimation techniques (FEM and REM) results summarized in Table 3.

Table 3. Summary results for Fixed Effects Model and random Effects Model

<table>
<thead>
<tr>
<th></th>
<th>Fixed Effects</th>
<th>Random Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.055</td>
<td>0.037</td>
</tr>
<tr>
<td></td>
<td>(0.231)</td>
<td>(-0.549)</td>
</tr>
<tr>
<td>LF</td>
<td>-0.029</td>
<td>0.088</td>
</tr>
<tr>
<td></td>
<td>(-0.098)</td>
<td>(1.057)</td>
</tr>
<tr>
<td>GFCF</td>
<td>0.163</td>
<td>0.162</td>
</tr>
<tr>
<td></td>
<td>(8.079)***</td>
<td>(8.110)***</td>
</tr>
<tr>
<td>External debt</td>
<td>-0.048</td>
<td>-0.057</td>
</tr>
<tr>
<td></td>
<td>(-2.042)***</td>
<td>(-2.890)***</td>
</tr>
<tr>
<td>R squared</td>
<td>0.441</td>
<td>0.424</td>
</tr>
<tr>
<td>Adj. R-Squared</td>
<td>0.403</td>
<td>0.407</td>
</tr>
<tr>
<td>F- statistic</td>
<td>11.610</td>
<td>26.266</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
</tbody>
</table>
Cross sections Effects

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI</td>
<td>-0.008</td>
<td></td>
</tr>
<tr>
<td>KEN</td>
<td>-0.019</td>
<td></td>
</tr>
<tr>
<td>RWA</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>TZA</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td>UGA</td>
<td>0.012</td>
<td></td>
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</tbody>
</table>

Hausman test

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DW</td>
<td>2.304</td>
</tr>
<tr>
<td>Hausman test</td>
<td>0.433</td>
</tr>
</tbody>
</table>

*** ** * represent significance at 1%, 5% and 10% significance levels respectively.

According to the empirical results in Table 3, model 1 for fixed effects model shows that the constant term and gross fixed capital formation had positive coefficients while Labor force and external debt had negative coefficients. All the coefficients of explanatory variables are thus in line with expectations according to economic theory (Clements, Bhattacharya and Nguyen, 2003; Checherita and Rother, 2010; Kumar and Woo, 2010; Dragos and Dragos, 2012). However, only gross fixed capital formation and external debt were found to be statistically significant at 1% and 5% levels respectively. Labor force and the constant term were statistically insignificant since their P-values were greater than 0.05 and further their associated t-statistics was less than 2. It’s also worth noting that the standard approach to testing significance of variables is also by looking at whether their associated t-statistic values are greater than 2. That is, a variable is statistically significant if its associated t-value is greater than 2 otherwise the variables is said to be statistically insignificant in explaining the changes in the dependent variable.

Random Effects (Model 2) in Table 3 also showed that Labor force and gross fixed capital formation (0.088 and 0.162 respectively) had positive effects on Economic growth while the constant and external debt were negatively related to economic growth at -0.037 and -0.057 respectively. However, only gross fixed capital formation and external debt were found to be statistically significant at 1% and 5% level in influencing economic growth. On the other hand labor force was found to be insignificant in influencing GDP per capita. In addition the constant term for the random effects model was also statistically insignificant in explaining changes in GDP per capita.

In summary, the results across all models indicated a statistically significant effect of external debt and gross fixed capital formation only on economic growth at 5% and 1% significant levels respectively. It’s worth noting that gross fixed capital formation positively influences economic growth while external debt negatively influences economic growth. Further both the F-statistics probabilities for both FEM and REM were statistically significant at 5% level implying that the independent variables can be jointly regressed. The REM had an R-squared of 0.441 meaning that the variations in independent variable (GDP Per Capita) is 44.1% explained by the independent variables jointly while 55.9% of the variations are not explained by the independent variables.

Random effects model had also an R-squared of 0.424 meaning that the independent variables jointly explain 42.4% changes in the dependent variable GDP per capita, 57.6 % of the variations in GDP per capita are not explained by the independent variables. The Durbin-Watson (DW) test statistics for both models also depicted that both models did not suffer from autocorrelation problems, i.e. the DW for both FEM and REM are 2.305 and 2.265 respectively.

4.3.1 Interpretation and Discussion of results

According to the Hausman test, the random effects model was found to be appropriate. Therefore the random effects regression model for the study was as per (5).

\[
GDPPC_t = -0.037 + 0.088LF_t + 0.162GFCF_t - 0.057ExtDebt_t + \epsilon_t \quad (0.549) \quad (1.057) \quad (8.110) \quad *** \quad (2.890) **
\]

Note: The values in brackets are the t-statistics and *** ** * represent significance at 1%, 5% and 10%

From (5) we deduce that a percentage change in labor force participation rate causes 8.8% change in GDP Per Capita growth. The coefficient of the labor force was positive, thus in agreement with the economic theory. This positive relationship is further supported by (Lucas, 1988; Hasan and Butt, 2008). The positive relationship...
Therefore implies that labor force is positively related to economic growth in EAC. However the labor force participation rate was found to be insignificant in explaining the changes in GDP per capita annual growth rates at 5% level of significance. This finding is in agreement with Atique and Malik (2012) finding that labor force participation rate was positively related to economic growth but insignificant for Pakistan Economy.

Further we can observe that gross fixed capital formation (GFCF) has a positive effect on economic growth. The relationship is significant and at 1% level of significance. According to the results, each 1% increase in GFCF will cause a 16.2% increase in economic growth for EAC countries regardless of change in other independent variables (holding all other independent variables constant). AL-Refai (2015) in his study for the period 1990 to 2013 also found out that gross fixed capital formation had a positive and significant relationship with economic growth in Jordan hence this study is in one accord with his. In addition, this finding is in accordance with theory that investment (gross fixed capital formation annual growth) enhances economic growth and is supported by numerous studies on the subject, such as Pattillo, Poirson and Ricci (2002), Mankiw, Romer and Weil (1992) and Abbas and Christensen (2007). Hence, gross fixed capital formation should be enhanced since it has a positive and significant effect on economic growth in EAC region.

On the other hand, external debt according to (5), showed a negative relationship to GDP per capita annual growth in the EAC region. This implies that external debt is inversely related to economic growth. The results confirm that a 1% increase in external debt causes a 5.7% decline in economic growth while a 1% decline in external debt will result to an increase in economic growth by 5.7%. This result is in accordance to those obtained by Chowdhury (2004) and Clements, Bhattacharya and Nguyen (2003) findings that external debt had significant negative effect on economic growth. Further, the finding is similar to AL-Refai (2015) research findings that External debt negatively influences economic growth; however it was insignificant for Jordan economy.

The implication of these findings is that the significant effect of external debt on economic growth is country specific and may further depend on the level of external borrowing. In this case external debt was found to have significant negative effect on economic growth hence is one of the major determinants of economic growth with a negative impact on EAC member countries growth. Promoting the adoption of debt reduction strategies especially by the heavily indebted countries in the EAC will aid in the avoidance of large and unsustainable external debt stocks that have been found to negatively affect economic growth in the region. Furthermore, if the debt levels by EAC partner states continue to go unchecked, they might have adverse effects especially on the regions macroeconomic stability as well as discourage capital inflows while favoring the flight of capital that is needed for development. In addition, EAC countries should employ the use of avenues such as debt restructuring as well as debt rescheduling in their efforts to reduce the debt stocks among partner states. Governments in the EAC also need to consider reform measures such as domestic revenue enhancement in order to promote economic growth rather than having policies that will increase their external debt to GDP ratios. It’s of utmost importance to have and follow an effective economic reform program which takes into consideration the allowed level of external borrowing that will not hamper economic growth.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study set out to investigate the relationship between public debt and Economic growth in the EAC. Public debt was further subdivided into domestic and external debt to further check on the specific effects of public debt on economic growth. However, due to the constraints of data availability for domestic debt for most countries in the EAC for the required period, the model consisting of domestic debt variable could not be estimated and thus external debt only as part of public debt was estimated. GFCF and external debt were the only variables found to be positively and negatively significant respectively in influencing economic growth for EAC member countries at 5% level of significance. Labor force was insignificant. This meant that the EAC nation’s economic growth was affected by gross fixed capital formation and external debt burden together with any policies that influence these two variables. Thus the implication is that there is some existence of debt overhang effects in the region and hence the need to have proper policies on regulating external debt burden to ensure economic growth in the region.

Finally debt management and debt reduction strategies should be adopted by EAC member countries so as to boost economic growth. Public debt sustainability policies should be formulated and adopted as they will help facilitate economic growth. Governments should also monitor external borrowing to ensure sustainable debt levels that can be managed in the region. On the same note, Gross fixed capital formation should be promoted by ensuring political stability for investors to be able to freely invest. Furthermore savings should be mobilized by increasing savings interest rates so that external debt is not relied on for investments of projects that need huge capital outlays as is the custom for most developing countries when they want to finance projects that require huge capital outlays.
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