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The impacts of inflation to economic activities performance of East Africa countries

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Abstract: *This paper analyzed the secondary data from the World Bank economic growth indicators to determine the impact of inflation measured by GDP deflator to economic activities productive structure performance of the East Africa countries expressed by their gross domestic product. The panel data were developed from the world bank economic growth indicator for five East Africa countries from 2000 to 2018 which were analyze using fixed effect model and random effect model to determine the impact of inflation (INF) measured by GDP deflator to performance of East Africa countries economic structure specified by different economic activities that include agriculture (AGR) value added (% of GDP), industry (IND) value added (% of GDP), trade (TRA) value added (% of GDP), and Imports (IMP) of goods and services (% of GDP) on economic performance or GDP growth (annual %) using the multiple regression model. The Hausman test revealed that random effect model was suitable to accept. The results show that inflation has negative impact on economic structure activities performance of East Africa countries.*

Keywords: Inflation; GDP deflator; Economic structure activities; Economic performance

1. INTRODUCTION

The aggregate measure of the outcome of economic activities in an economy is Gross Domestic Product (GDP) which focuses on transactions involving final output of goods and services produced in the current year and within the geographical border of a country. The measurement of economic performance or Gross Domestic Product (GDP) can be done using value added approach and expenditure approach or income approach which all give the same results (Saviotti and Pyka, 2004).

The value added approach computes the difference between the value of output and the value of intermediate consumption (i.e. inputs) used in the production of that output at each stage of production in which the total production cost or market value of final product form the gross domestic product (GDP). Expenditure approach involves measuring the value of expenditures by the households and other economic sectors such as the government and the business firms. In other words, the dollar value of total expenditures from all economic sectors is equal to the dollar value of final goods and services. The country economic performance measured by gross domestic product (GDP) in terms of expenditures can be obtained by sum of four components which are: personal consumption expenditure (C) plus gross domestic capital formation or business investment (I), plus government expenditures (G) plus net exports (NX) which is export minus import. Hence the country's gross domestic product using expenditures approach can be obtained by standard formula: GDP=C + I + G + NX

Private consumption expenditure (C) refers to the spending by households on goods and services, with the exception of purchases of new housing. Gross domestic capital formation or business investment (I) refers to the spending on capital equipment, inventories, and structures (e.g. factories), including household purchases of new housing. Government consumption expenditure (G) refers to the spending on goods and services by governments. For example, salaries of civil servants are counted as part of the government purchases of services (e.g. labour) from the market, which is a component of GDP. Net exports (NX) refer to spending on domestically produced goods by foreigners (exports) minus spending on foreign goods by domestic residents (imports). Simply speaking, net exports are equal to the value of domestic exports minus the value of imports (Wade, 2004).

According to Wade (2004), the income approach is used to measure GDP by computing the total factor income in which the money spent by one person must be money earned or received by another. For example households buy goods and services from firms; firms use this money to pay for resources purchased from different resources owners such as households, landlords (land owners) and capital owners. The firms (the businessmen or entrepreneurs) pay wage to households to buy labor, pay rent to landlords to buy or rent land, and pay interest to capital owners to buy or rent capital. After these payments, the residuals go to the entrepreneurs as profits. Wage, rent, interest and profits are factor incomes received by the factor owners (labors, landlords, capital owners and entrepreneurs).Therefore, disregarding statistical discrepancies, the expenditure on goods is equal to total factor income received by different factors owners.

The growth rates of GDP for a particular country can be measured by the following equation:

$$GDP\ growth\quad rate = \frac{Current\ year\ GDP - Last\ year\ GDP}{Last\quad year\quad GDP} \times 100\%$$

The GDP Deflator can be considered the most comprehensive measure of inflation because of its wide array of goods and services included in its construction. GDP

Deflator is the ratio of the value of aggregate final output at current market prices (Nominal GDP) to its value at the base year prices (Real GDP). In effect the basket of goods for the construction of this price index includes all the final output produced within the geographic boundaries of the country.

The Economic indicators help us to analyze various aspects of both national and global economic activity. The countries produce goods and services, and consume them domestically or trade internationally; economic indicators measure levels and changes in the size and structure of different economies, and identify growth and contractions. The study used some of the economic growth indicators to analyze the impacts of inflation to economic structure activities for East Africa countries economic performance.

2. LITERATURE REVIEW

This study analyses the impact of inflation measured by GDP inflator to performance of the East Africa countries economic structure described by some economic activities such as agricultural, industrial, trade, gross capital formation, export and import of goods and services for each of the East Africa country. Different scholars have come out with different theoretical framework that demonstrates how production structures activities affect the labor market or more concretely, the allocation of resources. A given economic structure gives allocation of the income earned by key players. The political institutions are used to reinforce the economic structures activities in which the performance of institutions is determined by a country's economic structure but many developing countries the primary problem is that they have law which are hardly or only selectively enforced.

Hartmann et al (2015) argued that some countries are rich while others are poor due to differences in capital accumulation and technical change. Solow theory failed to explain what accounts for these differences. Also the differences in research and development as well as human capital lead to differential growth in technical change and accumulation. The new institutional economists argue that the differences in economic performance in different countries across time space are due to economic structure and political institutions (Acemoglu and Robinson, 2013).

According to Schumpeter (2008), the economic activities normally reflect country's economic structure and the aggregate representation of its technological capabilities. Robust growth can be realized when a country acquires an increased returns economic structure, while economic stagnation and sporadic growth are observed otherwise. High value added and technologically complex goods are produced in market structures that are conducive for innovation. The increasing returns economic activities provide longer career ladders and these serve as an important labor to climb across social classes which improves the distribution of income. The growth enhancing structural changes are observed when institutions of production are adequately enforced by the state (Khan, 2010).

Hidalgo et al. (2007) argue that a country's position in the product space is a good predictor of economic performance. The product space which means the network representation of the relatedness or proximity between products traded in the global market show that a country produces a commodity that is located near the center of the product space in which many other related products can also be produced with given technology. Growth is likely to be volatile for countries that produce commodities located at the periphery of the product space, where natural resources are abundant and commodities are produced with rudimentary technology. In contrast, growth is expected to be robust for countries that produce goods located near the center of the product space.

The economic activities with increasing returns are so important because they are produced under varying degrees of imperfect competition which has a number of growth enhancing effects. Prices, wages and profits are elevated for longer periods when compared to economic activities produced in highly competitive industries. The imperfectly competitive market structures are more conducive for innovation and technical progress who explains that the process of structural learning and technical change are determined by the type of economic structure (Andreoni, 2014).

The economic activities with increasing returns are also important because they serve as a proximate source of innovation and economic diversification. Unlike the technical knowledge at the periphery of the produce space, the technology at the center can be readily applied to a wide range of commodities and lead to diversification and further growth which is an important source of economies of scale and scope and is absent in activities located at the periphery. The economic activities with increasing returns enjoy higher income and price elasticity of demand in export markets this make them ideal growth propellers for highly open economies (Reinert 2008).

According to Saviotti and Pyka (2004), the state is the institution of all institutions which have responsibility for the role of institutions structural change and growth. Good institutions like property rights can only produce structural changes if they are adequately enforced depending on the type of economic structure. Industrial polices such as tariffs, subsidies and so on are institutions of production that create growth promoting structural transformations. The theory of economic structures argue that differences in economic performance lie in the different patterns and rates of structural change, not in the differences in institutions (Reinert 2008)

Khan (2010) argue that there exists institutional inertia because the distribution of benefits derived from the institutions which are underpinned by production structures, thus, the equilibrium is among economic structure, political power and institutions. There can be great political interest in creating structural rigidities in economic systems as long as this is beneficial to powerful groups. Economic structures determine the pre-tax income from various economic activities though the distribution of income across sectors and

occupations affect economic performance, to the extent that these reinforce the economic structure (Hartmann et al. 2015).

The Political Economy is to emphasize the importance of politics for economic outcomes. The theory of democratic transition and consolidation based on a country's economic structure in which either land or capital intensive can be easily reconciled. Among the economic activities located at the periphery of the product space are natural resources like oil, gold and land. Also, it is not incorrect to say that the goods or services located at the center of the product space are capital intensive. Whether a country transitions to or consolidates democracy depends on whether the source of income of the elites is easily taxed (Cingano, 2014).

When a country's economic structure is land intensive, a democratic transition imposes significant redistributive costs to the landlord elites since the newly empowered masses can easily impose high land taxes. Elites in these economic structures choose repression instead of democracy to forgo the redistributive burden. In contrast, industrial elites facilitate a democratic transition since it is harder to tax capital income and entrepreneurship in capital intensive economic structures. The country's economic activities structure is the fundamental cause of long run growth (Hartmann et al. 2015).

Acemoglu and Robinson (2013) on theory of economic growth argue that inclusive political institutions (democracy) and inclusive economic institutions (property rights, etc.) are the fundamental causes of economic growth. An increasing returns economic structure produces commodities with longer career ladders and creates a mechanism to climb the ladders across social classes. This provides the means to larger lifetime earnings for an individual, which can improve the distribution of income. A fairer distribution of income is the anti-thesis to "extractive" institutions, and this makes it easier for "inclusive" political institutions to be enforced.

Khan (2013) argues that democratic transitions become more likely when private sector production to GDP expands in which entrepreneurs pay more taxes, and thus as an economy transitions to an increasing returns production structure, democratic transitions are more likely. The necessary conditions for democratic transitions which include: a rule of law for elites, civil society organizations and a centralized and consolidated control of violence are necessary, though not sufficient prerequisites for democratic transitions (North et al. 2007).

Acemoglu and Robinson (2013) highlights the political origins of technological change in less democratic societies, political elites create entry barriers into different economic activities (oligarchic property rights), but in democratic societies, there is free entry and exit (democratic property rights) in which democratic or "inclusive" political institutions promote innovation and long run growth. While democratic property rights may diffuse the technical knowledge across society, these democratic property rights are irrelevant in diminishing returns production structures with a low technological base. Just as private property rights in the absence of productive capabilities are insufficient to increase production; democratic institutions without a technological base can hardly diffuse or promote technological progress (McMillan and Rodrik 2012).

The observation by Acemoglu and Robinson (2013) reflect differences in economic structures, and this explains the different political institutions and rate of technical progress through which economic structures determine the rate of technical change and economic growth. During this transformation, manufacturing, construction and trade services were the newly emerging sectors, which demonstrated a structural change towards the center of the product space or to an increasing returns production structure. The transformation was not complete and could not have been completed under market institutions alone. In other words, labor market forces alone were insufficient to facilitate the necessary rural to urban migration. There were specific labor market rigidities that prevented rural labor from migrating to the cities and sufficient technological bottlenecks that stymied manufacturing growth (Gatti et al. 2012).

3. STUDY METHODOLOGY

The study methodology on impact of inflation measured by GDP inflator to performance of the East Africa countries economic activities structure by analyzing some economic activities such as agricultural, industrial, trade and import of goods and services for economic performance of each of the East Africa country include sources of data, variables and data analysis methodology.

3.1 DATA

The data used in this study that analyses the impact of inflation measured by GDP deflator on performance of economic activities for each of the East Africa country countries for their economic performance are secondary data accessed from the world development indicators https://databank.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/Popular-Indicators

3.2 Economic Structure Activities and Variables Used

This study analyzed the impact of inflation (INF) measured by GDP deflator to East Africa countries economic activities structure specified by different economic activities which include agriculture (AGR) value added (% of GDP), industry (IND) value added (% of GDP), Trade (TRA) value added (% of GDP), Gross capital (CAP) formation (% of GDP), Exports (EXP) of goods and services (% of GDP) as well as Imports (IMP) of goods and services (% of GDP) for East Africa countries economic performance or GDP growth (annual %)

3.3 Data Analysis Methods

The panel data were developed from the world bank economic growth indicator for all years from 2000 to 2018 which were analyze using fixed effect model and random

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effect model to determine the impact of inflation (INF) measured by GDP deflator to East Africa countries economic structure specified by different economic activities that include agriculture (AGR) value added (% of GDP), industry (IND) value added (% of GDP), trade (TRA) value added (% of GDP), as well as Imports (IMP) of goods and services (% of GDP) for East Africa countries economic performance or GDP growth (annual %) using the multiple regression model equation below:

$$GROW = \alpha_0 + \alpha_1 AGR + \alpha_2 IND + \alpha_3 TRA + \alpha_4 IMP + \alpha_5 INF + \varepsilon$$

The fixed effect model allows for heterogeneity or individuality among the five countries in which each country has its own intercept value. The term fixed effect is due to the fact that although the intercept may differ across countries, but intercept does not differ over time. In the random effect model, the five countries have common mean value for the intercept.

4. EMPIRICAL RESULTS

The STATA software analyzed the panel data using the fixed effect model and random effect model which distinguish various countries, the following results were obtained:

4.1 The Fixed Effect Model

The probability values of all independent variables except agriculture are less than 5 percent showing that all independent variables except agriculture are significant in explaining the economic growth (GDP) of East Africa Countries which include Burundi, Kenya, Rwanda, Tanzania and Uganda.

Table 1: Fixed Effect Regression results

```
. xtreg GDP AGR IND TRA  IMP INF, fe

Fixed-effects (within) regression               Number of obs      =        85
Group variable: Ccode                           Number of groups   =         5

R-sq:  within  = 0.3100                         Obs per group: min =        17
       between = 0.2680                                        avg =      17.0
       overall = 0.2800                                        max =        17

                                                F(5,75)           =      6.74
corr(u_i, Xb)  = -0.2351                        Prob > F          =    0.0000

------------------------------------------------------------------------------
         GDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         AGR |  -.0150347   .0827275    -0.18   0.856    -.1798262    .1497569
         IND |   .5063458   .1463381     3.46   0.001     .2148253    .7978663
         TRA |  -.1826939   .0635602    -2.87   0.005    -.3092123   -.0561755
         IMP |    .21472   .0687069     3.13   0.003     .0778488    .3515912
         INF |  -.0977301   .0306422    -2.86   0.005    -.1587725   -.0366876
       _cons |  -2.634161   3.589571    -0.73   0.465    -9.784353    4.516032
-------------+----------------------------------------------------------------
     sigma_u |  1.8033279
     sigma_e |   1.917758
         rho |   .46927725   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(4, 75) =     8.90                 Prob > F = 0.0000
```

From table (1) above, the probability values for agriculture (AGR) is 85.6 percent which is greater than 5 percent showing agriculture is not significant in explaining the economic growth (GDP) of East African countries. Despite of fact that Agriculture employ more than 70 percent of population of the East Africa Countries, it contribute little to their National income because the exported agricultural products are mostly raw products and few. The probability for other independent variables; Industry (IND) with 0.1 percent, trade (TRA) with 0.5 percent, Imports (IMP) with 0.3 percent and inflation (INF) with 0.5 percent are less than 5 percent showing they are significant in explaining the East Africa country economic growth.

Looking on coefficients of independent variables; the negative coefficient of inflation (INF) shows that inflation has negative impact on economic growth meaning that as inflation increases, the economic growth rate decreases and vice versa. Agriculture (AGR) and trade (TRA) have negative coefficient meaning increase in agriculture or trade incomes causes decrease in economic growth and vice versa which is against the economic curies, but industry (IND) and import (IMP) have positive coefficients showing they have direct relationship to East Africa countries economic growth rate. The positive coefficient of imports is against the economic curies.

4.2 The Random Effect Model

For the random effect, all the probability values for all independent variables are less than 5 percent showing all the independent variables are significant in explaining their impact to East Africa countries economic growth.

Table 2: Random effect regression results

```
. xtreg GDP AGR IND TRA  IMP INF, re

Random-effects GLS regression                   Number of obs      =        85
Group variable: Ccode                           Number of groups   =         5

R-sq:  within  = 0.2359                         Obs per group: min =        17
       between = 0.7267                                        avg =      17.0
       overall = 0.3958                                        max =        17

                                                Wald chi2(5)      =     51.76
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =    0.0000

------------------------------------------------------------------------------
         GDP |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         AGR |  -.1437099   .0606434    -2.37   0.018    -.2625688   -.0248509
         IND |   .237601   .0872891     2.72   0.006     .0665174    .4086846
         TRA |  -.2893801   .060959    -4.75   0.000    -.4088575   -.1699027
         IMP |   .3330915   .072597     4.59   0.000     .1908039    .4753791
         INF |  -.1178173   .0357373    -3.30   0.001    -.187861   -.0477735
       _cons |   6.549114   3.429138     1.91   0.056    -.1699109    13.26814
-------------+----------------------------------------------------------------
     sigma_u |         0
     sigma_e |  1.917758
         rho |         0   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

From table (2), the probability values for all independent variables; Agriculture (AGR) is 1.0 percent, Industry (IND) is 0.6 percent, trade (TRA) is 0.0 percent, Imports (IMP) with 0.0 percent and inflation (INF) with 0.1 percent are less than 5 percent for the random effect model, showing that all independent variables are significant in explaining the economic growth (GDP) of East African countries.

Also the random effect coefficients of independent variables; Agriculture (AGR) and trade (TRA) are negative

coefficient meaning increase in agriculture or trade incomes causes decrease in economic growth and vice versa which is against the economic curies. The negative coefficient on inflation (INF) shows that inflation has negative impact on economic growth meaning that as inflation increases, the economic growth rate decreases and vice versa. For random effect model also industry (IND) and import (IMP) have positive coefficients showing they have direct relationship to East Africa countries economic growth rate. The positive coefficient of imports is against the economic curies.

4.3 The Hausman Test

Hausman test was used to check which model (Fixed effect or random fixed model) is suitable to accept by testing the following hypothesis;

Null hypothesis: Random effect model is appropriate

Alternative hypothesis: Fixed effect model is appropriate

If the statistically significant P-value obtained is less than 5 percent, then we use the fixed effect model otherwise random effect model. If the P-value is less than 5 percent we reject the null hypothesis and accept the alternative hypothesis meaning that fixed effect model is appropriate. If the P-value is greater than 5 percent we cannot reject the null hypothesis rather we accept the null hypothesis meaning that random effect model is appropriate.

The Hausman test revealed that random effect model was suitable to accept.

5. CONCLUSION

The economic activities structures of East Africa countries are the fundamental cause of long-run economic growth or stagnation. Different economic activities structures have different scopes for structural learning, innovation and various effects on their contribution to gross domestic products, which are key determinants of economic performance. Some theory from literatures explains that liberal democracies and its implication in technical change is an important cause of economic growth.

The results of analyzed data revealed that inflation (INF) has negative impact on performance of economic structures activities for the East Africa countries. The negative coefficient on inflation shows that inflation has negative impact on economic growth meaning that as inflation increases, the economic growth rate decreases and vice versa. The coefficients of some of independent variables such as Agriculture (AGR) and trade (TRA) are negative coefficient meaning increase in agriculture or trade incomes causes decrease in economic growth and vice versa which is against the economic curies. This result is due to the fact that the agriculture and trade are not effectively utilized for the East Africa countries economic performances. The country economic structures activities explains why different countries perform differently across time space.

This paper enhances theoretical understanding of how economic activities structure determines the country economic performance. The study determines the impact of inflation to performance of the country economic activities structures for their economic growth. Future study needs to integrate theories of economy with the theory of structural change, and in-depth research is needed for a complete understanding of how economic activities structures affect the distribution of income. Finally, since the theory of economic structures and structural change remain underdeveloped, there is need of studies on economic structures in relation to industrial and technology policy for the country economic performance.

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