



The Relationship between Inflation and Economic Growth in East African Community Countries

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Abstract: The relationship between inflation and economic growth has been of great concern to most countries and regions across the world. Several studies have attempted to explain the linear association, long run and causal relationship between inflation and economic growth however their findings have been somewhat inconsistent. For East African Community (EAC) countries, studies on the linear association, long run and causal relationship between inflation and economic growth have also been done although mainly dwelling on time series analysis. Coincidentally, their results have also shown inconsistent findings. The community being a trading block and in pursuit of regional integration, available studies have failed to explain the exact relationship that exist between inflation and economic growth in the region. In this regard, the study sought to establish the exact relationship that exists between inflation and economic growth in the community for the period (1990-2014) using panel time series approach. The study objectives were to determine the linear association between inflation and economic growth, establish the long run relationship between inflation and economic growth and determine the causal relationship between inflation and economic growth in EAC countries. The study presented panel data for 5 countries in the community and applied Robust Least Square estimation technique with fixed effects. The study was anchored on Solow growth model and employed correlation research design. Structural breaks at entry point to the community were accounted for by introducing a dummy variable in the model. Stationarity test was carried out on variables and found that GDP and inflation were stationary at level. Estimation results showed that inflation had a negative (-0.1341) and significant effect on economic growth at 5% significance level and the effect remained negative (-0.1129) but statistically insignificant after introducing a dummy variable to the model. Considering the objectives of the study, Correlation analysis showed that there exist a weak negative (-0.0067) linear association between inflation and economic growth in EAC countries. Co-integration results revealed that there exist a long run relationship between inflation and economic growth in EAC countries while result for causality analysis showed that there exists a uni-directional causal relationship from economic growth to inflation at 5% level of significance although the effect would be effective after 2 years. In conclusion, inflation negatively and significantly affect economic growth however, considering the structural breaks in EAC, the negative effect inflation reduces and becomes statistically insignificant to economic growth. That is, the time of entry to EAC has positive effect and thus reduce the negative effect inflation has on economic growth. In this regard, policies need to be put in place to keep inflation rate moderate and stable to ensure that the negative effect inflation has on economic growth is minimized in these countries.

Keywords: Inflation, Economic Growth, East Africa Community.

1. Introduction

1.1. Background of the Study

Inflation emerged as a global phenomenon in mid-2007 in the face of high oil and food price shocks. There were concerns that inflation in many emerging market and developing economies were reaching high levels that, if uncontained, would undermine economic growth by raising inflationary expectations. Thus heading off inflationary pressures while preserving economic growth became a policy priority for many countries. Some of the underlying inflationary challenges that were facing these global economies for a number of countries include; a combination of strong capital inflows, rapid credit growth, tightened labor markets, and widening current account deficits all pointing to evidence of overheating. Secondly, many commodity-exporting countries recorded rising export earnings, pushing up aggregate demand and facilitating domestic credit growth. Third, surging commodity (food) prices boosted inflation

across the global economy. High food and fuel prices led to substantial increases in inflation, particularly in emerging markets and low-income countries (Espinoza *et al.*, 2010).

In this regard, the controversial issue about the relationship between economic growth and inflation became of great concern to most countries and regions across the world. Notably, to have sustainable output growth and low inflation was listed among the central objectives of most macroeconomic policies. At the operational level, there is a recognition that economic growth-inflation relationship depends on the level of inflation. That is, at some low levels, inflation may be positively correlated with economic growth, by greasing the wheel of the economy or as a signal of overheating, but at higher levels inflation is likely to be harmful to growth (Bertola and Caballero, 1994; Edey, 1994).

Theories and previous studies about the relationship between inflation and economic growth have shown that there might be no relationship (Sidrauski, 1967), negative relationship (Fischer, 1993) or positive relationship (Mallik and Chowdhury, 2001) between these two variables. Oner (2010) noted that most economists tend to believe that low, stable and most importantly predictable inflation is good for an economy. This is because it is easier to capture it in price-adjustment contracts and interest rates hence reducing its distortionary impact. He perceived high inflation to be bad for the economy since it affects economic performance, whereas moderate inflation is perceived to distort investment and consumption decisions. Contrary, Ayyoub *et al.* (2011) argues that the effect of inflation on economic growth of any given economy will specifically depend on the state of the economy of that particular country or region. Barugahara (2014) argues that although some African countries (those in the franc zone) have experienced low and stable inflation rates since 1980, their economic growths have been very slow. This arguments clearly show that the exact relationship between inflation and economic growth is still not clear since it varies in countries and regions hence the need for the study to be done in EAC countries whose macroeconomic policies are quite similar.

The causal relationship between inflation and economic growth in any economy is also critical in establishing how to balance the two variables and attain the desired economic performance. Studies have been done to determine the causal effect of inflation and economic growth although these studies also portray mixed results. For instance Paul *et al.* (1997) established that the causal relationship between inflation and economic growth is usually non-uniform across countries. Their finding was that 40 percent of the total 70 countries studied revealed no causality, one-third exhibited unidirectional causality and about one-fifth of countries showed bidirectional causality. In addition, a vast majority of countries that showed either unidirectional or bi-directional causality belonged to the industrial group, and the low world inflation regime could on balance redistribute real growth opportunities away from the developing countries towards the industrialized countries. However, this study randomly combined countries and failed to consider categorizing regions pursuing similar economic policies such as EAC. This then make it difficult to conclude that the results of this study could apply for countries in EAC. In this regard, there was need to conduct another study to establish the causal relationship between inflation and economic growth in the region.

Global trends on inflation and economic growth between the years 2010-2014 have been varying regionally. In Central America, inflation rate increased up to 2011 then began decreasing while economic growth continued to increase upto 2012 then reduced and remained constant. Its evident that its effect was coming the following year which could be explained as a lagged effect of inflation on economic growth. The situation of inflation and economic growth in Middle East and North Africa is that inflation increased up to 2012 and later began declining whereas economic growth was highest when inflation rate was high.

In sub Saharan Africa, inflation rate increased upto 2011 then declined in 2012 and remained constant through 2014. Economic growth however continued to decline until when inflation rates were stable at 6.3% when it increased in 2014. Table 1.1 reveal that Sub Saharan Africa has shown a consistent pattern of decline in economic growth even when inflation is declining (until it reached 6.3%). However, what remains to be established is if that decline in economic growth could be attributed to the high inflation rates of over 6.3% experienced during the period and if the 6.3% inflation rate could be established as the threshold rate, the rate below which the Sub Saharan Africa and EAC countries in particular could experience robust economic growth as postulated by Fischer (1993). The study intended to establish the linear association, long run and causal relationship between inflation and economic growth in these countries using a panel study since the observed fluctuations are seen to be taking little time.

In addition, studies done in EAC to establish the relationship between inflation and economic

growth are mostly time series. For instance, [Kasidi and Mwakanemela \(2013\)](#) found that the correlation between inflation and economic growth is negative in Tanzania and Uganda respectively whereas [Wambui \(2013\)](#) established that inflation has a positive linear relationship with economic growth in Kenya. Evidently, while these studies show a similar relationship between inflation and economic growth in Tanzania and Uganda, it differs in a Kenyan scenario despite these countries operating in the same economic block with similar macroeconomic policies. With such unity, it is therefore apparent that macroeconomic policies in one country (or entire region) are likely to affect the entire region or other individual member countries. It is against this background that the study was done to establish the relationship between inflation and economic growth across the entire region rather than each country in isolation. The study intended to establish the relationship by using a panel approach to cover all the EAC countries in the region.

1.2. Statement of the Problem and Objectives of the Study

In East African Community, where countries integrated to achieve sustained economic growth rates of above 7% and single digit inflation rates of below 5%, countries have continued to experience fluctuations in their annual inflation and economic growth rates. Previous studies conducted to establish the linear association, long run relationship as well as the causal relationship between inflation and economic growth have portrayed mixed findings. In addition, majority of these studies were conducted on individual countries thus failed to explain the exact relationship that exist between inflation and economic growth in EAC as a regional economic block of countries with similar macroeconomic structures. In this regard, what remains to be established is whether findings of time series studies conducted on these countries reflect the relationship that exists between inflation and economic growth in the Community as a whole. The study therefore sought to address this issues using a panel data estimation approach. The broad objective of the study was to assess the relationship between inflation and economic growth in East Africa Community countries. Specifically the objectives of the study are to determine the linear association between inflation and economic growth; establish the long run relationship between inflation and economic growth and determine the causal relationship between inflation and economic growth in East African Community countries.

1.3. Theoretical Framework

The study was anchored on Solow growth model which represent the seminal contribution to neoclassical theory of economic growth. It is an extension to Harrod-Domar model that added labor as a factor of production and that capital-output ratios are not fixed as they are in the Harrod-Domar model. Solow's growth model exhibit diminishing returns to labor and capital separately and constant returns to both factors jointly. Technological progress became the residual factor explaining long-term growth, and its level was assumed by Solow and other growth theorists to be determined exogenously, that is, independently of all other factors. Solow's growth model uses the standard aggregate production function represented as follow;

$$Y = AK^\alpha L^{1-\alpha} \tag{1.1}$$

Where Y is the output, K is the stock of capital, L is labour, and A is the technical factor productivity which grows at an exogenous rate. Since growth in productivity and population (AL) is assumed to grow exogenously and at a constant rate,

Then,
$$L(t) = K \tag{1.2}$$

This is the compound rate of growth in labour force from the period (0) to period (t) which amounts to capital stock thus capital stock becomes the major determinant of output growth. This then allows us to concentrate on accumulation of capital over time. Meanwhile, whereas only a fraction of output (cY_t) is consumed leaving a saved share (sY_t) as capital, capital stock depreciates at a constant rate “ d ”

Thus
$$K_t = sY_t - dK_t \text{ where } K_t = \frac{dK_t}{d_t} \tag{1.3}$$

Then output that is neither consumed nor used to replace worn-out old capital goods is net investment. Considering production function in Solow model has constant returns to scale, for long run analysis, it can therefore be written as output per effective unit of labour.

Such that
$$Y_t = \frac{K_t^\alpha A_t L_t^{1-\alpha}}{A_t L_t^{1-\alpha}}$$

Thus
$$Y_t = K_t^\alpha \tag{1.4}$$

Considering our economic theory, rate of inflation directly determines net investments (capital accumulation) such that when inflation rate is high, investment is inhibited and when inflation rate is low, investment is encouraged hence economic growth. Integrating inflation into the model, the model is then modified as follows

$$Y = f(\pi_t^\alpha) \tag{1.5}$$

Where; Y is the output and π is the rate of inflation. We then transform the model into a logarithmic function as follows

$$\ln Y = \beta_0 + \alpha \ln \pi + \mu_t \tag{1.6}$$

Where; α measures the elasticities of output with respect to π while μ is the error term.

Therefore the model in equation (1.6) was therefore used to explore the relationship between inflation and economic growth in East African Communities.

2. Research Methodology

This section highlighted a detailed description of the research design, model specification, area of study, data type and sources, analysis and presentation techniques that were employed to assess the relationship between inflation and economic growth.

2.1. Research Design

The study employed correlation research design since it provides a rigorous and replicable procedure for understanding relationships. The design also determines whether and to what degree the relationship exists between the quantifiable variables. Being a panel-time series study, measurements of same variables were also taken in a cross- section at different points in time.

The study is a panel study comprising of annual data aggregates of inflation and economic growth for a period of 25 years (1990-2014) for each country (a sample of 125 observations). The period of study was of importance since it's during this period that most of these countries were implementing structural adjustment programmes that included liberalisation of their respective financial sectors to promote economic performance.

2.1.1. Model Specification without Structural Breaks

This study was anchored on Solow growth model which allowed the study to concentrate on accumulation of capital over time. Since rate of inflation determines net investments (capital accumulation) such that when inflation rate is high, investment is inhibited and when inflation rate is low, investment is encouraged hence economic growth, we integrated inflation into the model thus giving us a new model as was elaborated in the theoretical framework.

$$\ln Y = \beta_0 + \alpha \ln \pi + \varepsilon_t \tag{2.1}$$

Where; Y is output, π is rate of inflation while α measure the elasticity of output with respect to inflation.

2.1.2. Model Specification with Structural Breaks

Since East African Community collapsed after its establishment and was later re-established in 1999, member East countries rejoined the community at different times, considering all that, a dummy variable was introduced into the model to account for these breaks. The model was thus modified as shown below;

$$\ln Y_{it} = \beta_0 + \alpha \ln \pi_{it} + \lambda D_{it} + \varepsilon_{it} \tag{2.2}$$

Where;

Y_{it} = economic growth rate of country i in year t.

π_{it} = inflation rate of country i in year t.

$D_{it} = 1$ (if the country had joined EAC) and 0 (if the country had not joined EAC).

μ_{it} = the error term of country i in year t . ($\mu_{it} \sim N(0, \sigma^2)$).

α = Measures the elasticities of output with respect to K and π respectively.

2.2. Data Type and Sources, Analysis and Presentation

The study use secondary annual data aggregates of inflation and economic growth for the countries within the community. The data was collected from the world bank database.

The study applied panel data cointegration test to determine the long run relationship, panel data granger causality test established the causal relationship between inflation and economic growth whereas panel data correlation analysis determined the strength of linear association between inflation and economic growth at 0.05 level of significance. The study was quantitative and employed inferential statistics in data analysis. The data was presented in tables and graphs.

2.2.1. Testing for Unit Root

A unit root is a situation where data is non-stationary and this data needs to be transformed to stationarity to avoid the spurious problems that arise from regressing non-stationary data on one or more non stationary data, (Gujarati, 2004).

The purpose for conducting unit root test is to check their stationarity properties. If we use the data without checking this property, results derived from these regression models would produce spurious results (Datta and Kumar, 2010).

This study adopted Levin and Lin (1992) tests as proposed by (Chen, 2013) and the model is given as;

$$y_{it} = \rho_i y_{it-1} + z_{it} \gamma + \varepsilon_{it}, \quad (2.3)$$

Where; z_{it} = deterministic component,

ε_{it} = stationary process.

$I = 1, \dots, N$, and $t = 1, \dots, T$

Levin and Lin assumed that $\rho = \rho_i$ for all i and are interesting in testing the hypothesis such that;

When $H_0 : \rho = 1$, There exists a unit root

$H_0 : \rho < 1$. There exists no unit root

2.2.2. Testing for Cointegration

Variables are said to be cointegrated if they have a long term or and equilibrium relationship. If two variables, dependent and an independent, are individually non-stationary but their residual (combination) is stationary, those variables are co-integrated on the long run Therefore, testing for cointegration helps determine if one is modeling empirically meaningful relationships (Gujarati, 2004). This study adopted residual based econometric model proposed by Pedroni (1999) to test for cointegration regression in panel data. According this model, cointegration between economic growth and inflation involves testing for the stationarity of the the residuals (ε_{it}) in equation (2.4). This was tested by estimating the regression shown below;

$$\varepsilon_{i,t} = \rho \varepsilon_{i,t-1} + \mu_{i,t} \quad (2.4)$$

Where; $\varepsilon_{i,t}$ = the error term for estimated model in equation (2.4)

$\varepsilon_{i,t-1}$ = the error term for estimated model (2.4) for the previous year.

$\mu_{i,t}$ = error term for the model

Such that when $\rho = 1$, then ε_{it} has a unit root hence no cointegration.

2.2.3. Testing for Causality

Causality test assumes that the information relevant to the prediction of the respective variables is solely in the time series data of these variables, (Gujarati, 2004). The study adopted the Granger-causality panel data approach with fixed co-efficients as proposed by Hurlin and Venet (2001) and (Hurlin, 2004). The test relied on the use of F-tests to analyze

the existence of causality amongst variables. To test the causal relationship between economic growth (GDP) and inflation (INF), we first considered the following equations

$$GDP_{it} = \alpha_{1i} + \sum_{k=1}^{P_{1i}} \gamma_{1i} GDP_{it-k} + \sum_{k=1}^{P_{2i}} \beta_{1i} INF_{it-k} + \varepsilon_{1it} \tag{2.5a}$$

$$INF_{it} = \alpha_{2i} + \sum_{k=1}^{P_{1i}} \gamma_{2i} INF_{it-k} + \sum_{k=1}^{P_{2i}} \beta_{2i} GDP_{it-k} + \varepsilon_{2it} \tag{2.5b}$$

Where; i = the country, t = the period and k = the lag.

α_{1i}, α_{2i} = intercepts

P_{1i}, P_{2i} = longest lags in the system.

$\varepsilon_{1it}, \varepsilon_{2it}$ = residuals (are independently and normally distributed such that they have zero mean, constant variance and are individually serially uncorrelated).

3. Results and Discussions

This section presents the findings and discussions of the study by presenting a comprehensive assessment of descriptive statistics, trends, correlation analysis, long run relationship and causal relationship between inflation and economic growth in EAC countries and later discusses these results.

3.1. Descriptive Statistics

The overall outlook of data (inflation and economic growth) for these countries in EAC has been analyzed as shown in the table below.

Table 3.1. Descriptive Statistics

	GDP	INFLATION
Mean	4.378487	13.51985
Median	4.933800	10.90940
Maximum	35.22410	115.4467
Minimum	-50.24810	-9.187600
Std. Dev.	6.876465	13.96521
Skewness	-3.449526	3.599989
Kurtosis	36.14766	24.55642
Jarque-Bera	5970.647	2690.204
Probability	0.000000	0.000000
Sum	547.3109	1689.982
Sum Sq. Dev.	5863.435	24183.37
Observations	125	125
Sample: 1990 2014 for EAC		

Source: Eviews Version 8-Output

Table 3.1 above reveal that maximum economic growth and inflation rates recorded during the period were 35.22% and 115.45% respectively whereas minimum economic growth and inflation rates were -50.25% and -9.19% respectively. These results also show that average economic growth and inflation rate for countries in EAC were 4.38% and 13.52% respectively. This is against the targets set by countries in EAC of achieving sustained economic growth rates of above 7% and single digit inflation rates of below 5%. Value for Skewness, Kurtosis and Jarque-Bera for inflation and economic growth in these countries indicate that data for the variables is not normally distributed.

3.2. Unit Root Test

In order to determine if data for economic growth and inflation is non-stationary, Levin and Lin test for panel data as shown in equation (2.4) were conducted. According this test, when the P-value is less than 5%, then we reject the null hypothesis whereas when the p-value is greater than 5%, we accept the null hypothesis.

Table 3.2. Panel Unit root test

GDP		
Method	Statistic	Prob.**
Levin, Lin & Chu t*	-5.02942	0.0000
INFLATION		
Method	Statistic	Prob.**
Levin, Lin & Chu t*	-8.14740	0.0000

Source: Eviews Version 8 output

Results in Table 3.2 indicate that we reject the null hypothesis of non-stationarity in GDP and inflation series at 5 percent significance level since their p-values are less than 5%. This means that GDP and inflation are stationary at level and thus have no trend. These results imply that economic growth in EAC countries experienced economic cycles during the study period hence the stationarity. The existence of no unit root in GDP was unexpected since economic growth is expected to go upward hence have trend. However, existence of no unit root in inflation was expected and is encouraging thus implying that policies put in place by these countries in the community are indeed trying to stabilize inflation levels to achieve the set target of below 5%.

3.3. Correlation Analysis.

In order to identify if there exist a linear association between inflation and economic growth, the study used co-efficient of correlation (r) by Greene (2002) as shown in equation (2.3).

Table 3.3. Panel Correlation Analysis

Variable	GDP	INFLATION	P-Value
GDP	1.000000	-0.006671	0.00000
INFLATION	-0.006671	1.000000	0.00000

Source: Eviews Version 8 Output

Table 3.3 indicate that there is a significant weak negative linear association between inflation and economic growth in EAC countries since $r = -0.0067$. With this result, the study thus rejects the null hypothesis of no correlation at 5 percent significance level. This results conform to economic prior of inflation having a negative association with economic growth. The study thus concur with scholars such as Barugahara (2014) who found that inflation reduces economic growth although the negative effect on economic growth is quite small. Similarly a study by Bittencourt *et al.* (2014) also affirmed that inflation had a detrimental effect on economic growth.

3.4. Robust Regression Analysis

Examining the relationship between inflation and economic growth, the model formulated in equation (2.2) was regressed and results are as shown below.

Table 3.4. Regression Analysis without Dummy Variable (Without structural Break)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
LOGINFLATION	-0.134129	0.057550	-2.330675	0.0198
C	1.967815	0.140593	13.99654	0.0000
Robust Statistics				
R-squared	0.024592	Adjusted R-squared		0.015213
Rw-squared	0.059335	Adjust Rw-squared		0.059335
Akaike info criterion	140.9239	Schwarz criterion		147.5210
Deviance	34.68905	Scale		0.501016
Rn-squared statistic	5.432047	Prob(Rn-squared stat.)		0.019770
Non-robust Statistics				
Mean dependent var	1.491196	S.D. dependent var		0.799253
S.E. of regression	0.818047	Sum squared resid		69.59687

Dependent Variable: LOGGDP

Method: Robust Least Squares

Source: Eviews Version 8 Output

According to Table 3.4, the coefficient of inflation is negative (-0.1341), this indicate that inflation discourages economic growth in EAC countries. That is, inflation rates present detrimental effects to

economic growth in EAC countries. The coefficient also implies that 100% increase in inflation results to 13.41% decrease in economic growth. These results therefore mean that GDP in EAC countries is inelastic on inflation because the value of estimated coefficient is less than one. Since the p value for inflation is 0.0198 (1.98%) and is less than 5%, then the effect of inflation is statistically significant to economic growth at 5 percent significant level. Thus, we can conclude that inflation is significant in determining economic growth of countries in EAC. The value for R^2 in the model is 0.0246 implying that inflation explains 2.46% of systematic variation on economic growth over the observed years while the remaining variation is explained by other determining variables outside the model. In a nutshell, inflation increases macroeconomic uncertainty which leads to reductions, in the much needed, economic activity. Ultimately, inflation is potentially responsible in terms of economic welfare, say, reductions in economic growth usually have an effect on the poor via higher unemployment, and subsequently increased poverty and inequality.

Table 3.5. Robust Regression Analysis with Structural Break

Variable	Coefficient	Std. Error	z-Statistic	Prob.
LOGINFLATION	-0.112895	0.058761	-1.921265	0.0547
DUMMY	0.198430	0.100862	1.967347	0.0491
C	1.801923	0.166588	10.81665	0.0000
Robust Statistics				
R-squared	0.043849	Adjusted R-squared	0.025283	
Rw-squared	0.112026	Adjust Rw-squared	0.112026	
Akaike info criterion	153.3834	Schwarz criterion	162.8514	
Deviance	30.89641	Scale	0.455579	
Rn-squared statistic	10.65625	Prob(Rn-squared stat.)	0.004853	

Dependent Variable: LOGGDP

Method: Robust Least Squares

Source: Eviews Version 8 output

The model in [Table 3.5](#) included the dummy variable that accounted for structural breaks in EAC. Results from this model show that the coefficient of inflation is negative (-0.1129). These results show that GDP in EAC countries is inelastic on inflation because the value of estimated coefficient is less than one 1. This means that 100% increase inflation discourages economic growth in EAC countries by 11.29%. Since p value for inflation is 5.47% and is greater than 5%, then its effect is statistically insignificant to economic growth. On the other hand, the dummy variable has a positive coefficient (0.1984) and its p value is 0.0491 (4.91%). Since the value is less than 5%, then the effect by the dummy variable is statistically significant to economic growth at 5 percent significant level. Thus, we can conclude that the time a country joins the community is significant in determining economic growth of the country. The value of R^2 is 0.0438 implying that inflation and the dummy explain 4.38% of systematic variation on economic growth over the observed years while the remaining variation is explained by other determining variables outside the model.

Notably from these results, with the dummy variable, the negative effect inflation has on GDP decreased and became statistically insignificant compared to the model without the dummy variable. However, value of R^2 increased in the model implying that the dummy variable also explain variation on economic growth. Basing on these results, it is evident that structural breaks encountered in EAC countries did affect their economic performance positively as far as inflation is concerned.

3.5. Cointegration Analysis

The study used residual based econometric model proposed by [Pedroni \(2004\)](#) for panel studies to test for cointegration as shown in equation (3.6). According to this test, when

Rho-statistic is equal to one ($\rho = 1$) then we accept null hypothesis of no long run relationship between the variables whereas when the rho-statistic is less than 1 ($\rho < 1$), then we reject null hypothesis of no long run relationship. Alternatively, when the p value is less than 5% we reject the null hypothesis of no long run relationship between the variables whereas when the p value is greater than 5%, we accept the null hypothesis of no long run relationship between the variables.

Table 3.6. Panel Cointegration Analysis

Alternative hypothesis: common AR coeffs. (within-dimension)				
Weighted				
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	-2.725170	0.9968	-2.412329	0.9921
Panel rho-Statistic	-4.829922	0.0000	-3.060356	0.0011
Panel PP-Statistic	-7.583151	0.0000	-5.879175	0.0000
Panel ADF-Statistic	-7.564316	0.0000	-5.957170	0.0000

Pedroni Residual Cointegration Test

Series: GDP INFLATION; Null Hypothesis: No cointegration

Source: Eviews Version-8 Output.

3.6. Causality Analysis

Since cointegration tests do not confirm channels of interaction between variables, the study used the Granger-causality panel data approach with fixed co-efficient as proposed by [Hurlin and Venet \(2001\)](#) and ([Hurlin, 2004](#)) to determine the causal relationship between inflation and economic growth. The study estimated a bivariate regression as shown in equations (2.6) and (2.7). The null hypothesis was that there is no causal relationship between inflation and economic growth in EAC countries. Such that, inflation does not granger cause economic growth in equation (2.6) and economic growth does not granger cause inflation in equation (2.7). According the test, when the P-value is less than 5% then we reject the null hypothesis whereas when the p-value is greater than 5% we accept the null hypothesis.

Table 3.7. Panel Granger Causality Analysis

Pairwise Dumitrescu Hurlin Panel Causality Tests			
Lags: 2			
Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
INFLATION does not homogeneously cause GDP	3.11005	0.75379	0.4510
GDP does not homogeneously cause INFLATION	5.70966	3.03224	0.0024

Source: Eviews Version 8 Output

Results summarized in [Table 3.7](#) indicate that we accept the null hypothesis inflation does not granger cause economic growth at 5% significance level. This is because the p-value is greater than 5 percent. However, the null hypothesis economic growth does not granger cause inflation has been rejected at 5% significance level since the p-value is less than 5%. In this regard, there is a uni directional causality from economic growth to inflation however the effect will be effective after 2 years. This study confirmed a study by ([Behera, 2014](#)) which revealed a unidirectional causality between CPI and GDP however, the study failed to specify the direction of the causality. Studies such as [Christopoulos and Tsionas \(2004\)](#) and [Mamo \(2012\)](#) also revealed a unidirectional causal relationship although for these studies, inflation granger caused economic growth rate instead.

Table 3.8. Pairwise Granger Causality Test

Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATIONKE does not Granger Cause KENYA_GDP	23	0.11531	0.8917
KENYA_GDP does not Granger Cause INFLATIONKE		0.07936	0.9240
Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATIONUG does not Granger Cause UGANDA_GDP	23	0.46660	0.6345
UGANDA_GDP does not Granger Cause INFLATIONUG		0.20393	0.8174
Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATIONTZ does not Granger Cause TANZANIA_GDP	23	3.83560	0.0410
TANZANIA_GDP does not Granger Cause INFLATIONTZ		0.81995	0.4562
Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATIONRW does not Granger Cause RWANDA_GDP	23	0.28318	0.7567
RWANDA_GDP does not Granger Cause INFLATIONRW		12.5736	0.0004
Null Hypothesis:	Obs	F-Statistic	Prob.
INFLATIONBR does not Granger Cause BURUNDI_GDP	23	3.07442	0.0710
BURUNDI_GDP does not Granger Cause INFLATIONBR		0.59731	0.5608

Source: Eviews Version 8-Output

Considering the decision rule, when the p-value is less than 5% we reject the null hypothesis while when the p-value is greater than 5% we accept the null hypothesis, results in [Tables 3.8](#) revealed that there is no causal relationship between inflation and economic growth in Kenya, Uganda and Burundi whereas there is unidirectional causal relationship between these two variables in Tanzania and Rwanda that runs from inflation to GDP and from GDP to inflation respectively. However, these causal effects will be effective after 2 years. Just like the other test results, causality analysis also show that causal relationship between inflation and economic growth in EAC individual countries also varies depending on the country.

4. Conclusions and Recommendations

4.1. Introduction

This section highlights conclusions, emerging policy implications and recommendations of the study and areas suggested for further research.

4.2. Conclusion

Correlation analysis showed that inflation had a weak relationship between inflation and economic growth. Cointegration analysis found that there exist a long run relationship between inflation and economic growth whereas causality analysis found that economic growth causes inflation however the effect was effective after 2 years for all countries in the sample. This means that economic growth can be used to predict inflation for all countries in the community.

Estimation results showed that inflation is detrimental since it negatively and significantly affected economic growth. That is, inflation increases macroeconomic uncertainty which leads to reductions, in the much needed economic activity. Ultimately, this potentially affect economic welfare since reductions in economic growth usually have effect on the poor leading to high levels of unemployment and subsequently increased poverty and inequality.

However, considering structural breaks in EAC that was accounted for by the dummy variable, results showed that inflation had a negative but statistically insignificant effect on economic growth. This means that the time of entry to EAC does influences how inflation relates with economic growth amongst EAC countries.

Since inflation rate in EAC countries has been on the rise yet these countries are still in the process of regional integration to achieve a common monetary policy, the study is a good contribution by showing the exact relationship between economic growth and inflation in EAC countries. Moreover, testing the causal relationship between economic growth and inflation was important since it would help these countries balance these variables in their economies.

4.3. Policy Implications/Recommendation

The study found out that an increase in the general price level (inflation) has been detrimental to sustainable economic growth in EAC countries. These results have important policy implications for governments and policy makers of EAC countries who should concentrate on options that keep inflation rate moderate and stable which would be helpful in minimizing fluctuations and uncertainties in financial sector of these economies. These efforts would eventually boost capital formation activities hence improve economic growth.

As for cointegrating relationship, where findings have shown that inflation has a longrun relationship with economic growth, policies need to be put in place separately on this variables to ensure that the negative effect inflation has on economic growth is minimised. This will be of help to economies in EAC countries since inflation and economic growth will be able to move together in the longrun steadily and the negative effect will be quite minimal on economic performance.

In addition, factors such as money supply and exchange rates that affect inflation rate which inturn affect economic growth need to be controled through policies that appropriately address the risks posed by this factors. This will eventually promote stability between these variables and minimised chances of economic growth granger causing inflation in these countries thus improve economic performance. It could therefore be recommended that both supply-side policies and demand management policies such as a reduction in real broad money supply should be adopted to reduce inflation in the short-run and in the long-run.

4.4. Areas for Further Research

Regarding further research, there is need for other studies to be done to help identify the optimum inflation level that would promote economic growth for countries in EAC. This area is of interest and practical importance that deserves some attention and could complement the present study. This would make it possible for these countries to pursue improved economic performance strategies that would reduce the negative effect inflation has on economic growth.

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