A G-Ppp Analysis to the Eac Monetary Integration Process

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Abstract

The five East African Community (EAC) states have stepped up the push for the formation of a Monetary Union, following establishment of a Customs Union and Common Market in 2005 and 2010, respectively. In 2013, the EAC heads of states signed the Monetary Union Protocol signaling the final step towards a single currency in the region. Policy analysts have long criticized the move towards monetary integration on the grounds that the EAC economies are too dissimilar and that integration at this stage would disadvantage other partner states. Empirical results remain mixed on whether the EAC does in fact constitute an Optimum Currency Area (OCA) and thus ready for formation of a monetary union. This paper seeks to evaluate recent evidence to analyze the viability of the proposed monetary union. The paper employs the Generalized Purchasing Power Parity approach to investigate the optimality of the EAC as currency area. The study results indicate that there is co-integration between the real exchange rates in East Africa for the period 1996 to 2014. The findings suggest that the EAC states do not constitute an OCA and should hence not form a monetary union.

Keywords: Optimum Currency Area, Cointegration, Purchasing Power Parity, East African Community (EAC), Monetary Integration.

JEL-Codes: C32; F15; O55.

Introduction

Since independence, African countries have shown interest in regional integration, including monetary integration, and various regional groupings have been formed. Given the general small size of individual economies, there has been a desire to promote economies of scales in production and distribution. Existing monetary integrations in Africa include: the CFA franc zones (UEMOA and CEMAC) and the Common Monetary Area (CMA) in South Africa. Several regional monetary union initiatives are also underway such as ECOWAS, COMESA, SADC and EAC, with a common currency for Africa being a long-term goal of the African Union.

The revival of the East African Community (EAC) in 1999 brought to the fore, besides the old idea of a political federation in East Africa, the possibility to reintroduce a common currency in the region. Article 94 of the EAC Treaty states that partner states will 'cooperate in monetary and financial matters and maintain the convertibility of their currencies as a basis for the establishment of a monetary union.' Further, Article 97 provides that 'there shall be a unit of account of the Community to be known as the East African Currency Unit (EACU).' The East African Monetary Union (EAMU) is the third stage in the EAC integration process – after formation of the Customs Union in 2005 and a Common Market in 2010 - and will ultimately lead the five-member bloc adopting a single currency regime. The Protocol establishing the East African Monetary Union was signed by the EAC Heads of State in 2013. The protocol, to be implemented over the next ten years provides for a wide scope of co-operation in monetary and financial sectors among EAC members.

Under the protocol, the EAC states are expected to surrender monetary and exchange rates policies to one authority leading to a single currency regime within the region. The Protocol will ultimately lead to the creation of a regional central bank akin to the European Central Bank.

Despite the push towards full monetary integration, debate and criticisms abound amongst policy makers regarding the viability and likely gains for each partner state. At the heart of the criticisms are the potential hindrances and downsides to formation of a monetary union especially drawing on the experiences and lessons learnt from the European Union. Some scholars such as Bagumhe (2013) argue that, challenges experienced in Europe are the inevitable consequence of imposing a single currency on a very heterogeneous group of countries. Within the EAC, there is growing concern that not enough litmus test has been done to determine the feasibility of the monetary union in the region. The Customs Union and the Common Market protocols have both run into implementation challenges. In the opinion of some policy analysts, the debate on the benefits and costs of a regional monetary policy framework has been clouded by the excitement of potential political federation. As such, the EAC states should cautiously weigh the benefits and costs of membership in a monetary union.

This paper seeks to examine recent developments in the march towards the EAC Monetary Union in order to establish its feasibility and implications for the partner states. As evident from the experience of the European Monetary Union (EMU), formation of a monetary union is a complicated initiative, with non-negligible risk of failure. It is therefore important for EAC countries to ensure that the pre-conditions for forming the EAMU are adequately met in order to avoid a second-round collapse of the Community.

The contribution of this paper to the existing literature is two-fold: first is to augment the literature on the use of the G-PPP technique especially as it applies to African studies and secondly, to update and extend the analysis carried out by Mkenda (2001) and Falagiarda (2010). The rest of the paper is organized as follows: The second section discusses the theory of optimum currency areas followed by review of selected empirical studies in section three. Section four provides some background information on the regional integration attempts in the EAC while section five provides the empirical analysis. The conclusion is given in section six.

The Theory of Optimum Currency Areas

The theory of Optimum Currency Areas (OCA) was first put forward by Robert Mundell in 1961 as an evaluation of how countries engaged in cross border trade could benefit from being part of a monetary union. Other researchers, such as McKinnon (1963) and Kenen (1969), further modified and extended the theory of optimum currency areas. Despite the refinements, however, the basic tenets of the optimum currency areas theory can be summarized into two issues namely: the advantages and disadvantages of adopting a common currency, and the characteristics that are desirable for countries to consider in the monetary integration process. In terms of advantages of joining a currency union, it is argued that a common currency leads to gains in economic efficiency emanating from two fronts. First, a common currency can eliminate the transaction costs that are incurred when converting currencies. Second, a common currency can help to eliminate risk from uncertainty in the movements of the exchange rates (Mkenda, 2001). A further advantage of a common currency is that it provides potential for reinforcing the discipline and credibility of monetary policy (Dupasquier and Jacob, 1997).

The main disadvantage of a common currency is the loss of independence over monetary and exchange rate policy. Within a currency union, a country relinquishes the exchange rate as an instrument and thus loses a mechanism for protecting itself from economic shocks. However, the costs are less severe if countries face symmetric shocks as a common policy response would be appropriate. If the countries face asymmetric shocks, e.g. different industrial structures, then a common policy might not be appropriate in which case the inability to use the exchange rate to make the required adjustments could result in greater volatility in output and employment. The disadvantage attributed to a common monetary and exchange rate policy is however reduced if prices and wages are flexible and also, if labor is sufficiently mobile. In terms of the characteristics relevant for choosing likely candidates for a currency union, literature identifies *inter alia*, the following factors: factor mobility, degree of openness, degree of product diversification, flexibility of prices and wages, similarity in industrial structure, high co-variation in economic activities and political factors. These are discussed below.

Factor Mobility

If the degree of factor mobility between the potential members is high, then the countries can consider joining a currency union.

This is because the mobility of factors provides a substitute for exchange rate flexibility in undertaking adjustment when a disturbance occurs (Mundell, 1961). According to Mundell (1961), if a negative asymmetric demand shock hits one of the members of an optimum currency area, the labor will move from this country to other member countries. With high labor mobility, the labor migration between member countries will equalize wages as well as labor demand and supply in all member countries. As a result, a common monetary or fiscal policy can be used to stimulate the economies of all member countries.

Degree of Openness

Within an optimum currency area, countries maintain an irrevocably fixed exchange rate between each other and an individual country cannot unilaterally devalue its currency. For the individual country therefore, the nominal exchange rate becomes redundant as a policy instrument. McKinon (1963) maintains that the more open an economy is, the less effective is the nominal exchange rate as a policy instrument for adjustment. Therefore, if an economy is more open, it makes sense for a country to enter into a currency union arrangement since the nominal exchange rate is already redundant as a policy instrument. For a small open economy, entering into a currency union with trading partners is beneficial in that it reduces transaction costs and exchange rate risk that would be suffered if a flexible exchange rate were to be maintained against each other.

Degree of product diversification

Kenen (1969) observes that, a more diversified economy is more suitable for a currency union than a less diversified one. If an economy is more diversified in the goods it produces, it can forgo the need to frequently change its nominal exchange rate in case of an external shock. This is because an economy producing a wider variety of products would also export a wider variety of goods. In that case, if a fall in the demand occurred for some of its products, the effect of such a shock would not create a large fall in employment. However, if an economy is less diversified, a shock that can affect one sector would necessarily have a bigger effect on the economy. Moreover, in a more diversified economy, if independent shocks affect each of the products, the law of averages would ensure that the economy remains stable. This is more so if sufficient occupational mobility exists to re-absorb labor and capital, which are rendered idle by the shocks.

Flexibility of prices and wages

The need for using the exchange rate for adjustment is diminished if prices and wages are flexible between and among countries. This is because the transition towards adjustment between regions is not likely to be associated with unemployment in one region and inflation in another.

Similarity in Industrial Structures and Co-variation in economic activities

Bayoumi and Ostry (1997); Jonung and Sjöholm (1999) maintain that countries with similar industrial structures are more suitable candidates for a currency union because they are affected in a similar way by sector specific shocks. Such a situation negates the need for undertaking a unilateral adjustment in the exchange rate in response to terms of trade shocks. Countries may have different industrial structures but if they exhibit a high co-variation in their economic activities, they will still be candidates for a currency union because it would imply that they are likely to experience similar economic shocks. This reduces the significance of exchange rate policy autonomy for making necessary adjustments (Bayoumi and Ostry, 1997; Jonung and Sjöholm, 1999).

Political factors

For countries considering entering into a monetary union, political factors are an important consideration. Specifically, a strong political will by the leaders in government is needed, in addition to strong public support. Political will is especially important because belonging to a currency union involves agreeing to, for example, coordination of policies with members, changes to particular laws etc. Some of the proposed changes may not be popular with the public but strong will by political leaders may assist in swaying the public, especially the business community.

Selected Review of Empirical Literature

Several studies have been conducted to evaluate whether the EAC countries constitute an optimum currency area and whether the EAC states should form a monetary union, all with mixed results. Bagumhe (2013) employs the Bayoumi and Eichengreen's (1997) OCA Index methodology to examine the feasibility and implication of the EAC Monetary Union to Partner States economies.

The study constructs an OCA index based on empirical specification that summaries country readiness for Monetary Union. The study concludes that the EAC is not an optimum currency area hence forming a monetary union is not feasible. The main factors highlighted by paper are that business cycles are divergent among the EAC member states, and the intra-trade between the EAC member states is very low, at 11.4 percent (compared to 70 percent in European Union and 50 percent in ASEAN). The study also suggests that smaller countries such as Burundi and Rwanda are unlikely to benefit from the stability of a single currency area. Plans to create a single currency in the EAC have also been considered by Rusuhuzwa and Masson (2013). Using time series data from 1995 to 2009, the study evaluates various criteria for a monetary union and further conducts business cycle correlation by decomposing GDP into trend and cyclical components for the countries. The findings suggest that the benefits of the EAC common currency in terms of reduction of transaction costs may be limited. The authors recommend that the EAC may consider introducing a common basket currency to circulate in parallel with national currencies.

Using the Generalized Purchasing Power Parity (G-PPP) cointegration analysis, Falagiarda (2010) investigates the suitability of a common currency in the EAC using a handful of traditional OCA criteria. The study suggests that a monetary union in East Africa could be a viable option. However, some country-specific and statistical anomalies emerge, casting doubts on the results. Mburu (2006) assesses the political and economic feasibility and desirability of an East African monetary union. The study develops a wide range of OCA indices for the EAC and a comparison is made between the EAC and Europe. The study concludes that the EAC countries are not a feasible monetary area. Specifically, the study finds no evidence of long term macroeconomic convergence among the EAC countries.

Buigut and Valev (2006) use VAR techniques to investigate the potential for forming monetary unions in Eastern and Southern Africa. The study samples countries that are members of various regional economic organizations, some with monetary union as an immediate objective and for others monetary union being a possibility in the more distant future. The study seeks to sort out which countries are suitable candidates for a monetary union based on the synchronicity of demand and supply disturbances. The study finds that although economic shocks are not highly correlated across the entire region, three sub-regional clusters of countries are identified that may benefit from a currency union. In a similar study on the EAC, Buigut and Valev (2005) employ a simple two-variable VAR model to assess the suitability of the East African Countries (EAC) in forming a monetary union. Initial results point to the fact that due to high trade link with euro zone, pegging a common EAC currency to the euro can be beneficial. The results of the VAR analysis however indicate that the shocks among EAC are asymmetric. This implies that the EAC countries are poor candidates for the formation of a monetary union.

Mkenda (2001) investigates whether the EAC constitutes an optimum currency area or not. The paper employs the G-PPP method, and various criteria suggested by the OCA theory to investigate the optimality of the EAC as a currency area. While the various indices calculated give mixed verdicts, the G-PPP methods finds cointegration between the real exchange rates in East Africa for the period 1981 to 1998 and supports the formation of a currency union.

The East African Community (Eac) Economies

This section provides some historical information on regional integration initiatives in the EAC. The section also provides a brief overview of the EAC economies with specific focus on some OCA criteria necessary for the formation of a monetary union.

A Brief History of Regional Cooperation in the EAC

The Treaty establishing the initial East African Community was signed in June 1967 by the heads of state of the three partner countries. Although the EAC was formalized in 1967, the conditions for its establishment had been developed during the colonial era. In 1917, a customs union was established between Kenya and Uganda which Tanganyika joined 10 years later. In the union, the three countries jointly administered customs, excise and income tax, and other services such as, medical and industrial research, education, transport and communication, and agriculture. Besides the services that were jointly run, a monetary union and a high degree of fiscal integration existed. Labor was also fairly mobile within the region.

In 1919, an East African Currency Board was established, with a single currency in use until 1966. The EAC countries belonged to the Sterling Exchange System, where the external reserves were held in sterling securities. The Currency Board, among other things, was responsible for issuing and redeeming local currency for sterling. There was a high degree of monetary integration, such that there were no restrictions on the movement of capital between the countries. Nevertheless, by 1967, separate central banks were created in each of the countries because the countries felt that a monetary union limited their discretion in relation to monetary policy (Robson, 1968).
Some of the reasons attributed to the collapse of the old EAC include perceived differences in economic benefits, ideological differences and differences in levels of industrial development which left some member states feeling disadvantaged. Kenya's industrial sector was relatively more developed than in the other member states which meant a trade imbalance in favor of Kenya with Tanzania and Uganda remaining deficit countries in East African trade.

Following the dissolution of the Community in 1977, the Member States negotiated a Mediation Agreement, which provided for the three States to explore areas of future co-operation and to make concrete arrangements for such co-operation. Subsequent meetings led to the signing of the Agreement for the Establishment of the Permanent Tripartite Commission for East African Co-operation in 1993, paving way for the Treaty for the Establishment of the East African Community signed in 1999.

An Overview of the EAC Economies

Similarity of economic structures

The EAC economies share several similarities but there are also some differences. Kenya's economy is the largest in the region and better linked to the other economies in terms of investment flows and trade. Kenya enjoys more advanced human capital base, and a more diversified economy. In terms of GDP at current market prices, the World Bank estimated Kenya's 2013 GDP at $55 billion, well ahead of the closest rival economy, Tanzania, with a GDP of $44 billion. Figure 1 compares the GDP of the EAC economies for the period 2000 – 2011.

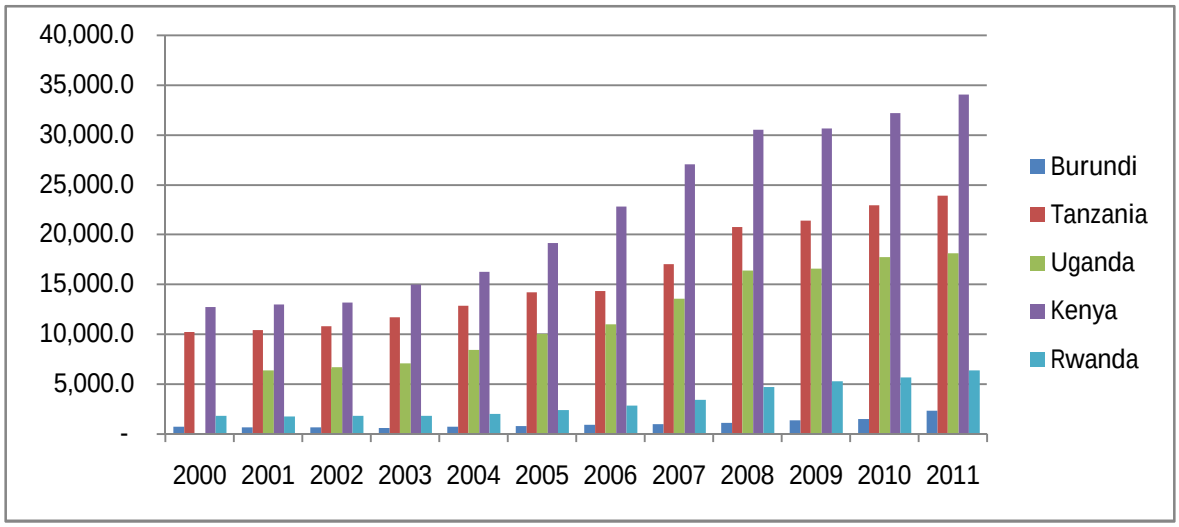

Figure 1: GDP at Constant Market prices for the EAC countries
Source: EAC statistics

GDP per capita is similar in EAC countries; except for Burundi whose GDP per capita was relatively low at 264 USD in 2011. For the other countries, GDP per capita varies between 553 USD in Tanzania and 836 USD in Kenya in 2011 as shown in Figure 2.

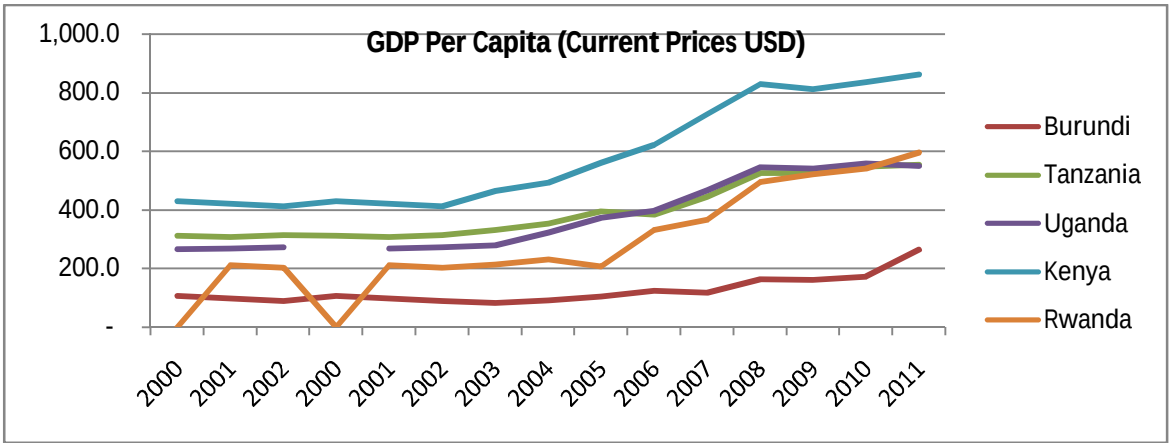

Figure 2: EAC Countries' GDP Per Capita
Source: EAC Statistics

The structure of GDP in terms of contributions of different sectors of the economy is also quite similar. The EAC economies are still largely agriculture based. Value added agricultural contribution to GDP is highest in Burundi and least in Kenya as shown in Figure 3.

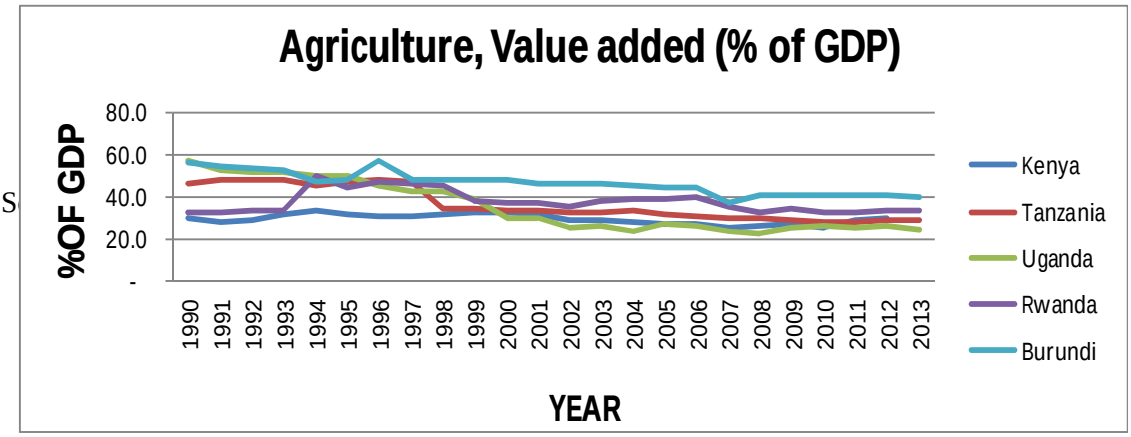

Figure 3: Agriculture (% GDP)
Source: EAC statistics

The East African Community (EAC) countries' economic growth performance during the past decade has been impressive: at 6.2 percent, the EAC's (unweighted) average growth rate in 2004–13 is in the top one-fifth of the distribution of 10-year growth rate episodes experienced by all countries worldwide since 1960. Wang et. al. (2014) project that prospects for sustained growth in the region remain positive if macroeconomic stability is maintained and further progress in deepening the financial sectors and improving the business climate, infrastructure, and human capital is made.

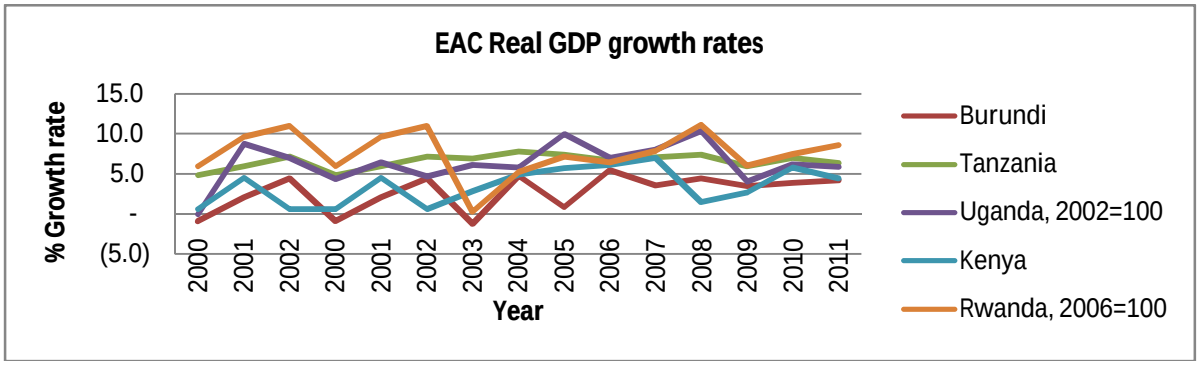

Figure 4: EAC Countries Growth Rates
Source: EAC Statistics

An analysis of the composition of output by sector over the past decade shows that economic growth has been generally broad based: all sectors experiencing positive growth rates on average during the period, ranging from 3.2 percent in agriculture to 10.8 percent in transport and communications. The share of agriculture in total output declined from 36 percent in the year 2000 to 28 percent in 2010. This decline is mirrored by small gains in shares by several other sectors—especially subcomponents of the service sector (Wang et. al., 2014).In order to test if EAC countries are affected by common fluctuations, Rusuhuzwa and Masson (2013) examine the cyclical behavior of economic aggregates over time. Business cycle synchronization is widely used in the OCA literature to determine whether countries that are candidates to form a monetary union face correlated trend and cyclical components of their macroeconomic indicators such as GDP. One of the most widely used methods is the Hodrick-Prescott (1997) decomposition of GDP into trend and cyclical components. Their study finds that correlations are high and positive between the original members of EAC (Kenya, Tanzania and Uganda), but low or even negative with Burundi and Rwanda.

Trade Interdependence and Degree of Openness

Measured by the sum of exports and imports as a percentage of GDP (Figure 3), the level of economic openness differs substantially among the five countries. Kenya is the region's major exporter and importer with the rest of the world. In terms of intra-East African trade, Kenya is the most open economy in the region (61%) followed by Tanzania (50%), Uganda (41%), Rwanda (35%) and Burundi (29%)(Ruhusuzwa and Masson, 2013). However, economic openness has been increasing in all countries except Burundi, where the measure declined between 2006 and 2010 (Ruhusuzwa and Masson, 2013). These differences in openness imply that EAC economies may face shocks whose amplitude differs, a situation which does not support the EAC monetary union. However, the observed increase in economic openness is a trend which, if sustained, would help enhance the viability of a common EAC currency.

Capital Mobility

Capital is relatively immobile in the EAC. Wang (2010) finds that an aggregate measure of financial barriers differs significantly across Kenya, Tanzania, and Uganda; while an econometric analysis also suggests important differences in the extent of short-run capital mobility across EAC countries (Adam et al., 2011). Yabara (2012), using price-based measures, concludes that capital market integration is limited in the EAC. There is a plan to integrate capital markets in the EAC by removing all controls on capital transactions among the member countries and harmonizing capital market infrastructure—including regulations, taxation, accounting, trading systems, and cross listings of securities (EAC Capital Market Protocol, article 85). However, there is still much to do to achieve this objective.

Empirical Analysis

The main focus of this section is the estimation of the G-PPP model.

The G-PPP Approach

The Generalized Purchasing Power Parity (G-PPP) approach for assessing the suitability of forming a currency union was developed by Enders and Hurn (1994). The methodology uses cointegration analysis to test the level of similarity in the movements of the real exchange rate against a central anchor currency. The approach works on the assumption that if two countries qualify for creation of a currency union, then they must experience symmetric shocks to their macroeconomic variables. The fundamentals in the two countries must accordingly, on average, move together. Therefore, G-PPP postulates that the real exchange rates between two countries comprising the domain of a currency area should be cointegrated (Enders, 1995).

G-PPP has been found to be relevant in a multi-country setting. In such a setting, a currency area is such that the fundamentals that drive the real exchange rates will exhibit common stochastic trends. Thus the real exchange rates in the currency area will share common trends. Within the currency area therefore, there should be at least one linear combination of the various bilateral real exchange rates that is stationary. In other words, the real exchange rates will be cointegrated. This methodology builds on the fact that real exchange rates are often non-stationary (fact consistent with the failure of the PPP) because the fundamental macroeconomic variables that determine real exchange rates are also non-stationary.

Indeed, the basic assumption of this approach is that real exchange rates depend on non-stationary macroeconomic fundamentals (i.e. the "forcing variables"), such as output level, long run productivity growth, terms of trade, technology transfer, capital movements, government consumption, etc.

The G-PPP test involves establishing whether there is cointegration in the following equation:

$$r_{12t} = \beta_0 + \beta_{13} r_{13t} + \beta_{14} r_{14t} + \cdots . + \beta_{1m} r_{1mt} + \varepsilon_t \quad (1)$$

Where:

r_{1it} are the bilateral real exchange rates between country 1, the base country, and country *i* in the period *t*,
β_0 is an intercept
β_{1i} are the parameters of the cointegrating vector, and
ε_t is a stationary stochastic disturbance term.

Falagiarda (2010) reports that the G-PPP approach has been used by several scholars to test for OCA, but it has not grown as popular as other empirical methods. Enders and Hurn (1997) examined the G7 countries. (Antonucci & Girardi, 2005)Antonucci and Girardi (2005) applied the G-PPP approach to the Euro area, whereas Liang (1999), Gao (2006), Ahn, Kim and Chang (2006) and Kawasaki and Ogawa (2006) focused on East Asia; Lee (2003) looked to Australia, Japan and New Zealand. Recently, Neves, Stocco and Da Silva (2008) used this methodology for an analysis on Mercosur.

The technique has not been widely used in studies on Africa. Mkenda (2001) and Bigsten and Mkenda (2002) use the G-PPP to assess the suitability of a currency union in East Africa. Grandes (2003) also applied the G-PPP approach to the Common Monetary Area (CMA) in Southern Africa.

Analysis of Stationarity

Quarterly data on price indices and nominal exchange rates were obtained from the Kenya National Bureau of Statistics (KNBS) and the Central Bank of Kenya (CBK) for the period 1990 to 2014. The data was used to construct bilateral exchange following the methodology of Mkenda (2001) as follows:

$$r_{1it} = S_{1it} \frac{P^*_{it}}{P_{iy}} \quad (2)$$

Where r_{1it} is the bilateral real exchange rate index between country 1 (the base country) and country *i*. Kenya will be used as the base country because, of the five countries, it trades more with the other East African countries as elaborated by Mkenda (2001) and Falagiarda (2010). S_{1it} is the nominal exchange rate between the base country and country *i* at time *t*, and P^*_{it} is the base country's price index. Here we use the consumer price index for Kenya, and P_{it} is the domestic price index for country *i*, proxied by the consumer price index for each country i. The study by Mkenda used data from 1981 (q2) to 1998 (q4) and only covered three East African countries but noted that no cointegration was found between the real exchange rates in the period 1981 - 1990. For this reason the analysis in this review will begin in 1990, and the data set updated to cover the period up to 2014 (q4) and also cover Rwanda and Burundi in addition to Kenya, Uganda and Tanzania.

The resulting exchange rates for Uganda and Tanzania are given below and by visual inspection, we find that they are not stationary.

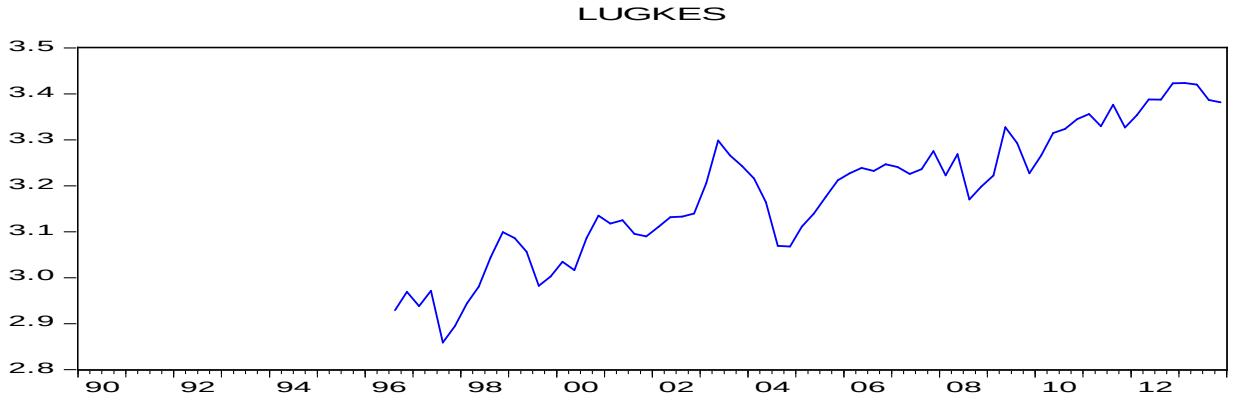

Figure 5: Evolution of the log of real exchange rate KSHS/UGSHS

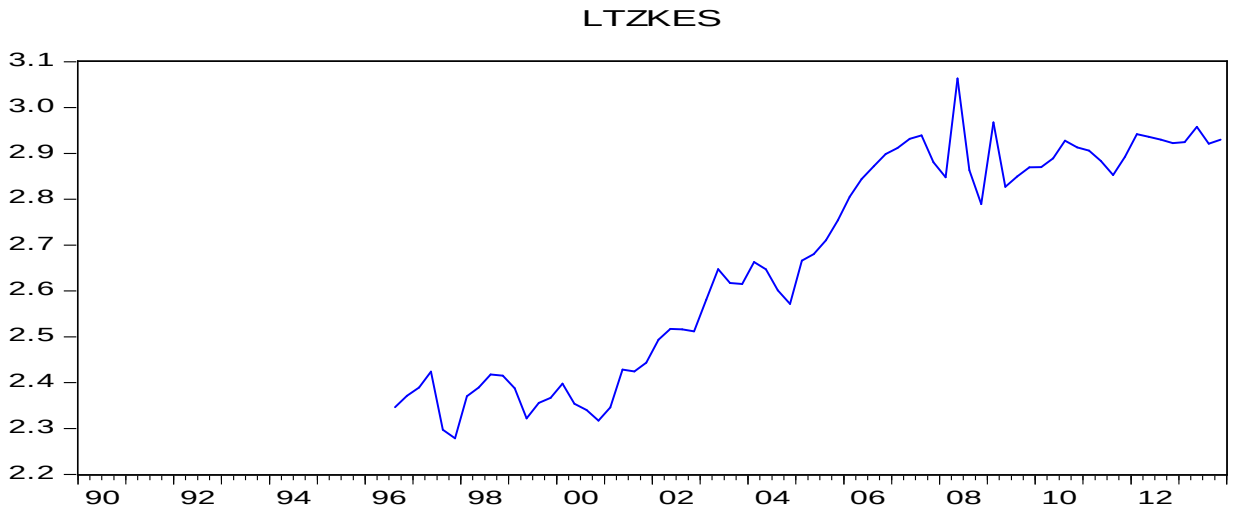

Figure 6: Evolution of the log of real exchange rate KSHS/TZS

Cointegration Analysis

The model assumes that for the five EAC countries, there exists a long run equilibrium relationship between their bilateral exchange rates with respect to the common base country, in this case Kenya, such that:

$$rer_{11t} = \beta_0 + \beta_{12t} rer_{12t} + \beta_{13t} rer_{13t} + \beta_{14t} rer_{14t} + \beta_{15t} rer_{15t} + \varepsilon_t \quad (3)$$

Where $rer_{11t}$is the logarithmic bilateral real exchange rate for Kenya and country *i* in period *t*. β_0 and β_{it} are the parameters of the cointegrating vector (representing the degree of co-movement of the real exchange rates, and ε_t is the error term). G-PPP holds when there exists at least one linear combination of such bilateral real exchange rates. The smaller the cointegrating coefficients (β_{it}) are, the more similar are a country's real fundamental macroeconomic varialbes (forcing variables) vis-à-vis those of Kenya.

Empirical Results

Empirical analysis used two sets of data. First, quarterly data from Kenya, Tanzania and Uganda from September 1996 to December 2014 was used for analysis. Data from Burundi and Rwanda were excluded from analysis due to asymptotic requirements. Second, monthly data from January 2011 to December 2014 was used for analysis. Data capturing price levels (Consumer price Index (CPI)) had to be extrapolated from quarterly to monthly data with the assumption that CPI did not change in every quarter. This section is presented as follows: guided by the methodology, the result from quarterly data are presented and interpreted. Thereafter, results from monthly data were analyzed and interpreted. Lastly, the results from the two data sets are compared and inferences drawn based on the findings.

5.3.1 Quarterly Data Results

Formal test for unit roots was conducted using the Augmented Dickey Fuller (ADF) test and the results are reported in Tables 1 and 2. Table 1 show the results when individual time series are considered while Table 2 shows panel unit root test after accounting for individual heterogeneity. Initially, Rwanda and Burundi were left out of the analysis due to the short nature of the data on exchange rates for these two countries. The stationarity test results reveal that the real exchange rate between Kenya and Tanzania (TSH/KES) and Kenya and Uganda (USH/KES) are not stationary at levels.

Table 1: Unit Root Tests for Real Exchange rate among East African Countries

		ADF Test		Result
		Test statistic	Critical value	
Real Exchange Rate (TSH/KES)	At level	-0.4887	-2.906	Not stationary
	1st Difference	-4.6829**	-2.906	Stationary (intercept no trend)
Real Exchange Rate (USH/KES)	At level	-1.0884	-2.905	Not stationary
	1st Difference	-8.9586**	-2.905	Stationary (intercept no trend)

***** Shows that it was significant at 5 percent level***
Source: *Authors*

Table 2: Panel Unit Root Test for Stationarity

Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.58690	0.2786	2	135
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.16341	0.8777	2	135
ADF - Fisher Chi-square	0.90973	0.9232	2	135
PP - Fisher Chi-square	1.00924	0.9084	2	138

***Signifies significance at 5 percent level*
Source: *Authors*

Both individual unit root and panel unit root tests show that at 5 percent significance level, real exchange rate among East African countries was non stationary. Next, cointegration analysis was applied to establish whether there is a long run relationship between the real exchange rate between Kenya and Tanzania (TSH/KES) and Kenya and Uganda (USH/KES). Johansen co integration test was used and results are presented in Table 3.

Table 3: Co integration test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.174343	15.27951	25.87211	0.5514
At most 1	0.035820	2.443945	12.51798	0.9350

Trace test indicates no co integration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
Source: *Authors*

Johansen results presented in table 3 are based on the successive hypotheses stating that there are no cointegrating relationships. The null hypothesis is rejected if and only if the trace statistics is greater than the critical values. From the above results, the study concludes that there is no cointegrating relationship.

5.3.2 Monthly Data Results

Further analysis using monthly data was carried out to accommodate Rwanda and Burundi as members of the EAC. For consistency, the analysis covers the period January 2011 to December 2014. Table 4 shows the results from Stationarity test.

Table 4: Stationarity Test for Real Exchange rate among EAC members

		ADF Test		Result
		Test statistic	**Critical value**	
Real Exchange Rate (BFR/KES)	At level	-0.839	-3.175	Not stationary
	1st Difference	-2.4839	-1.982	Stationary (no trend or intercept)
Real Exchange Rate (RWF/KES)	At level	-0.4412	-3.000	Not stationary
	1st Difference	-4.261	-2.951	Stationary (intercept)
Real Exchange Rate (TSH/KES)	At level	-2.276	-2.948	Not stationary
	1st Difference	-5.427	-2.954	Stationary (intercept no trend)
Real Exchange Rate (USH/KES)	At level	-3.764	-3.549	Stationary (Trend and intercept)

Source: *Authors*

Results from the monthly data analysis show that real exchange rate for Burundi, Rwanda and Tanzania were non stationary at 5 percent significance level. However, the real exchange rate for Tanzania was weakly stationary while real exchange rate for Uganda was stationary with a trend and intercept.

Cointegration test was applied to establish whether a long run relationship exists among the four members of East African Community. Initially, real exchange rate for Uganda was excluded because co-integration can only exist among variables integrated in the same order. The results of the Johansen co integration test are presented in Table 5.

Table 5: Co integration test Results (KE, BU, RW and TZ)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.342538	21.30690	35.01090	0.6214
At most 1	0.176982	7.048367	18.39771	0.7774
At most 2	0.012449	0.425930	3.841466	0.5140

Trace test indicates no co integration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

Source: Authors

From the above results, we do not reject the null hypothesis and conclude that there is no co integrating relationship. Mkenda (2001) also finds that the real exchange rate for Uganda for the sample is barely stationary. The study includes the variable in the cointegration test quoting Harris (1995), for justification of occasional inclusion of a stationary variable in a vector of non-stationary variables for the purpose of conducting cointegration. In our case, the test results are no different from those found in Table 5. The trace test indicates that there is not cointegration.

Conclusion

Since the revival of the EAC in 1999, several milestones have been achieved. Following implementation of a customs union and thereafter, common market, the EAC countries now have their eyes set on the East African Monetary Union which is expected to be fully implemented by 2024. Already the Protocol establishing the Monetary Union was signed by the EAC Heads of State in 2013, signaling the commitment that the member states have towards achieving a single currency regime.

This paper sought to investigate whether the EAC countries constitute an optimum currency area and hence feasible for formation of a monetary union. The G-PPP approach was used to conduct cointegration analysis of the real exchange rates of the EAC countries. The approach works on the premise that within a currency area, there should be at least one linear combination of the various bilateral real exchange rates that is stationary. In other words, the real exchange rates will be cointegrated. The study results indicate that the real exchange rates of the EAC countries are not cointegrated. This outcome is not entirely surprising bearing in mind cautions raised by policy makers on the need to tread with reservation towards full monetary integration. The results are consistent with the findings of Bagumhe (2013) and Mburu (2006) and confirm that even though the volume of trade within the countries has improved in the recent past signaling increased openness, there remain specific challenges that need to be ironed out before full monetary integration.

Full implementation of the customs union and common market faces minor challenges such as the (still) limited mobility of factors within the region. While the region has witnessed relative political calm in the recent years, recent events including an attempted coup in Burundi point that all may not be well settled yet on the political front. Periodic friction has been witnessed among members; Kenya and Tanzania, for example, recently had a spat over guidelines on the management of tourism vans into respective borders; this was followed by an attempted ban of a Kenyan newspaper in Tanzania and restriction of flights by the Kenyan national carrier, Kenya Airways. While these have now been ironed out, it is an indication that there is more work to be done by the EAC states in order to ensure better cohesion.

In conclusion, empirical studies have yielded mixed results: while some studies support the case for monetary integration, greater evidence seems to suggest that the apparent speedy race to create the East Africa Monetary Union (EAMU) and the associated loss of monetary policy independence could be too costly for the EAC countries. All in all, the EAC countries should tap on the apparent political enthusiasm for economic union and hope that political leaders can learn from the outcome of studies such as this to better inform the integration process.

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