

**DISCUSSION PAPER:**

Feasibility and implication of the East African Community Monetary Union:  
An Application of Optimal Currency Area Index Methodology

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## **1.0 INTRODUCTION**

The push towards greater integration within the regional trading blocs has shifted into high gear in recent years. After the birth of the Euro in 1999, interest in economic and monetary integration has increased and several regional blocks around the world have been assessing the possibility of establishing common markets and monetary unions. In the East African Community (EAC), the desire for and the thinking on monetary union have strongly been influenced by experiences of Europe's integration and the eventual introduction of the euro. The year 2013 marks the thirteenth anniversary of the Euro, which has rapidly established itself as an enduring symbol of a harmonious economic integration. This experience and the resulting success of the Euro have served as a role model and development that can be replicated in the East Africa Community, and reap the benefits of a single regional currency, encapsulated in the special contribution it makes to the reduction of transaction costs on trade and investment.

The envisaged single currency is not only motivated by its benefit, but it is also a medium term goal which is stipulated in the East African Community treaty of 1999. 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 of reintroducing a common currency in the region. The EAC has now concluded the protocol for the establishment of the East African Community Monetary Union (EAC-MU), awaiting signatures of the Head of States scheduled on November this Year. On top of that, ten years has been defined as a roadmap for the macroeconomic convergence as the necessary milestone for the proper functioning of the monetary union and as the pre-requisite for the optimal currency area.

At the heart of this aspiration within the EAC, there is a concern that, the Euro should now be recognized as an experiment that has failed. The failure which has come just after over a dozen years since the euro was introduced in 1999. Some scholars are of the view that, the failure of Euro is not an accident or the result of bureaucratic management, but rather the inevitable consequence of imposing a single currency on a very heterogeneous group of countries. The adverse economic consequences of the Euro included the sovereign debt crises in several European Countries, the fragile condition of major European Banks, a high level of

unemployment across the Euro zone, and the large trade deficits that now plague most Euro zone Countries. Even within the East African Community, there is a growing concern that not enough litmus test has been done to determine the feasibility of the Monetary Union in the region.

This paper examines the feasibility and implication of the EAC Monetary Union to Partner States economies; hence it is albeit important to trace the origin of this integration process. The East African community (EAC) is the regional intergovernmental organization of the Republics of Kenya, Uganda, the United Republic of Tanzania, the Republic of Rwanda, and the Republic of Burundi whose headquarters are in Arusha, Tanzania. The Treaty that came into effect in 2000 guides the EAC. According to Article 5 of the EAC Treaty, the EAC Partner States shall undertake to establish among themselves a Custom union, a Common Market, and subsequently a monetary union and ultimately Political Federation. In this regard, the Protocol for the establishment of the EAC custom Union was signed in 1999, followed by the Common Market Protocol in 2009, and the protocol for the establishment of the EAC Monetary union is expected to be signed in November 2013.

Despite the fact that the EAC custom union was signed in year 2005. It is a custom union with Common external tariff and zero tariffs charged for the movement of goods, but without a single custom territory. Currently, efforts are underway to establish the EAC single Customs territory with a single customs authority. On top of that, the Common Market Protocol, which was signed in year 2009, has not well pronounced on the ground. When fully implemented the four freedoms will be realized including free movement of people and capital, which are critical for full realization of Common Market and for Monetary Union among others. The Process of establishing the EAMU is on progress in line with the Summit directive of signing the EAMU Protocol by the end of 2013.

This paper therefore, seeks to employ the Bayoumi and Eichengreen's (1997) OCA Index methodology as a framework of analysis to examine this objective of EAC, with particular reference to the branch of economic theory that has become known as Optimal Currency Area (OCA). The paper will proceed by providing a brief historical background of monetary and economic arrangements in East African Community. Part two of this paper will extensively review both the theoretical and empirical literature with a view of understanding the theoretical prediction towards the OCA. The main objective of this paper is to

operationalize the theory of OCA in EAC, by constructing an OCA index based on a particular empirical specification that summaries country readiness for Monetary Union. The specific objective of this paper is to answer four policy questions; first, Will individual countries increase their welfare when they abolish their national Currency and adopt some currency of a wider area, second what is the ideal arrangement of forming regional currency blocs before reaching a complete monetary integration? Thirdly, what is the similarity of output movements of the EAC partner's states? Fourthly, Does the EAC Partner states meet the convergence criteria as proposed by OCA theory.

### **1.3 The Optimum Currency Area Theory**

The main questions which East African Countries need to pose and make a systematic analysis include, Will individual countries increase their welfare when they abolish their national Currency and adopt some currency of a wider area?.When should the process of monetary integration stop? And, Should there be one currency for just five countries of the present EAC, or for the whole of African Continent? This problem leads us into an analysis of what constitute an optimum currency area. Robert Mundell first put the Optimum Currency Area theory forward in 1961 as an examination of how countries engaged in cross border trade could benefit from being part of a monetary union. Literature defines an optimum currency area in a number of ways; generally, in order for the country or region to qualify for the establishment of the monetary union it (the region) must be an optima currency area. This theory has remained a workhorse of analyzing the feasibility of a monetary union since the seminal work of Mundell (1961), Mckinnon (1963) and kenen (1969).

According to Mundell (1961), an optimum currency area is a region, which is economically preferable to have a single official currency rather than multiple official currencies.<sup>1</sup> This theory put more emphasis on asymmetric shocks, labour mobility and the transactions value of a single currency. Additional theories in this area have been developed from the seminal work of Mundell (1961) and related to the generalised concept of an “Optimal Currency Area” (OCA). Mundell’s (1961) work was further supplemented by important offerings from McKinnon (1963) and Kenen (1969).

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<sup>1</sup> Carbaugh R.J., *International Economics* 10<sup>th</sup> Edition, 2005, U.S.A.

According to Mundell (1961), if a negative asymmetric demand shock hits one of the members of an optimum currency area, the labour will move from this country to other member countries. With high labour mobility, the labour migration between member countries will equalize wages as well as labour 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. Hence, migration is a channel through which adjustment to asymmetric shocks can take place, and flexible exchange rates between the member countries are no longer necessary for restoring fundamental balances.<sup>2</sup>

In the ideal scenario discussed in Mundell (1961), countries in monetary union enjoy two major competitive efficiencies: wage flexibility and labour mobility. This allows economies to re-equilibrate almost automatically to offset the effects of asymmetric shocks. For example, if a rise in one country's exports boosted aggregate demand at the expense of another exports, the two economies AD curve would shift to the opposite directions. The equilibrium could be restored if workers in the depressed economy lowered their wage claims, allowing a downward shift of aggregate supply curve hence raising the equilibrium employment back to what it was previously. Additionally, the subsequently lowered price level in country B means that its exports become more competitive relative to country A, leading to a downward shift in the latter's AD curve (with regards to domestically produced goods) restoring its initial position. Similarly, with full labour mobility, the unemployed workers in country B would be able to find work in Country A. This re-equilibrates both economies as the current account surplus created in the booming economy via the saving of its citizens is offset by the expenditure of the new migrant workers. Conversely, the country with the smaller relative export base would not reduce their spending by an amount equal to the loss in the exports as social security mechanism like unemployment benefits would mean that their income would remain high enough for them to consume more than they otherwise would have, creating a current account deficit. However, since the workers are expected to have emigrated immediately upon dismissal, no unemployment benefits would be paid out, meaning that aggregate consumption remained commensurate with the drop in the exports eliminating the deficit.

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<sup>2</sup> McKay J., et.al, *Regional Economic Integration In a Global Framework*, 2004, European Central Bank.

Since neither of the above conditions exist to any considerable degree in practice, particularly in the developing economies of East Africa, it would be difficult to solve the asymmetric shock problem of OCA in a monetary union. Since the booming economy no longer has a sovereign currency that it can allow to appreciate relative to the depressed economy to restore equilibrium, it must choose between lowering inflation and reducing the current account surplus. Lowering inflation would involve contractinary fiscal and/ structural policy, which would harm the growth prospects and cut into spending while increasing the current account surplus further. Conversely, spending the current account surplus would feed in to higher price levels.

As Kenen (1969) observes further, 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. 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 labour and capital, which are rendered idle by the shocks.

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

As Bayoumi and Ostry (1995); Jonung and Sjöholm (1998) maintain, countries that have similar industrial structures are more suitable candidates for a currency area 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, 1995; Jonung and Sjöholm, 1998).

As Jonung and Sjöholm (1998) argue, if countries are to be good candidates for a currency union, the patterns of inflation should be similar as this can make the convergence in inflation rates easier once they belong to a currency area. If countries have different inflation rates, this would imply that they are different in the way they conduct their economic policies, and also that their economic structures is different.

In a nutshell, what might be termed as traditional OCA theory and which have be judged from the main factors that the theory highlights should be considered when planning monetary integration between two or more countries. According to this theory, the critical factors in determining an optimum currency area include the following:

- **Asymmetry of Shocks.** Relating to other points summarized here, increased asymmetry of shocks increases the cost of giving up the dual adjustment mechanisms of exchange rate movements and interest rate changes. However, these costs can be reduced as shall be summarised below.
- **Factor Mobility.** Increased movement of factors within the area reduces the inflation-unemployment trade-off that would otherwise be eliminated through adjustments in the exchange rates or interest rates.
- **Price and Wage Flexibility.** Increased flexibility of nominal prices and wages reduces the need for exchange rate adjustment to restore external balance, reducing the loss created by a move to monetary integration.
- **Size and Openness of Countries.** Increased openness, relating the proportion of non-tradable to tradable goods in the economy, increases the variation of the domestic price under flexible exchange rates, reducing liquidity and the possibility for money illusion. Clearly, smaller economies, having less diversified structures and higher external reliance are necessarily more open.
- **Source of Shocks.** The preceding argument holds, unless the exchange rate is adjusting to shocks of an external nature. Where this occurs, exchange rate flexibility is said to “insulate” the domestic economy from foreign instability.



- **Product Diversification.** Increased diversification, particularly in the tradable sector reduces the effect of negative asymmetric shocks through offsetting positive changes in other industries.
- **Production Structures.** Similar production structures between economies reduce the likelihood of asymmetric shocks, reducing the need for exchange and interest rate movements and thus reducing the loss from losing such instruments.
- **Inflation Convergence.** Reduces the need for exchange rate movements that would be unavailable under monetary integration.
- **Fiscal Integration.** Not discussed explicitly here, increases in fiscal integration may be able to smooth out the effects of asymmetric shocks through fiscal transfers.

Clearly, as Tavlas (1993) points out in his summary of traditional OCA characteristics, what becomes increasingly obvious in the European Union is that political factors are also important in determining the formation and success of a single currency area. However, for the purposes of this literature review, the researcher will confide himself to economic factors<sup>3</sup>.

Given that the costs of undergoing monetary integration consist of losing the ability to adjust to asymmetric shocks through exchange rate movements (or adjustments given a more rigid but none-the-less flexible exchange rate system) or interest rate movements, much of the early literature seems focused on the reduction of losses rather than a discussion of benefits. The above characteristics relate largely to the effectiveness of exchange rates and the possibility for adjustment through alternative means. Thus, the reduction of losses seems to have been the main area of concern during the early development of OCA theory. The benefits were assumed implicitly: reductions in transactions costs and exchange rate uncertainty, increased liquidity and trade, economies of scale concerning currency reserves, and the general notion that monetary integration should improve allocative efficiency. New OCA theory, using theoretical developments from various economic branches, both reduced the two main costs of monetary integration and highlighted other important benefits to be gained.

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<sup>3</sup> Tavlas (1993) suggests Mintz (1970) and Cohen (1993) as insightful readings on the political aspects of monetary and economic integration.

Bayoumi and Eichengreen (1980) supplement the traditional OCA theory by suggesting what it has come to be known the New OCA theory. The new theory produces very little academic literature concerning OCA theory, but provides important theoretical developments in other areas of economics. The broad ranging nature of work contributing to “New” OCA theory necessitates some elements of separation which include: The Monetarist Critique, the disputed role of the exchange rate, Credibility, time consistency and policy rules, and endogeneity of OCA criteria.

### **1.1 Advantage and Disadvantage of Monetary Union**

The advantage and disadvantage of joining a monetary union may arise at the micro or macro level. Although these advantages accrue mostly at the microeconomic level, Monetary union is a deeper stage of integration; hence, it leads into a gain in economic efficiency emanating from two sources: first is the fact that Common Currency can eliminate transactions costs that are incurred when converting currencies; second a common currency can help to eliminate the risks from uncertainty in the movement of the exchange rates (De Grauwe 2000). Likewise, common currency tends to provide potential for reinforcing the discipline and credibility of monetary policy (Jacob, 1997). Additionally, it may potentially make businesses and investments as well as movements of people and capital within the bloc much easier.

The other side of the coin is that Common Currency tends to create loss of independence over monetary and exchange rate policy. When a country relinquishes the exchange rate as an instrument, it loses a mechanism for protecting itself from economic shocks. This cost would be less severe if the shock affects all the members of the currency union. But if the shocks affect the members differently due to for example different industrial structures, then a common policy might not be appropriate; in which case the inability to use the exchange rate to make the needed adjustments could result into greater volatility in output and employment. As Dispasquier and Jacob (1997) observe, the disadvantage of a common monetary and exchange rate policy might be reduced if prices and wages are flexible and if labour is sufficiently mobile. The flexibility of prices and wages and the mobility of labour allow adjustment to a shock to occur more promptly. The above disadvantages of a common currency may be tricky in the event of financial and economic crisis; thus, the feasibility of Monetary Union in the EAC needs further research.

As evident from the experience of the European Monetary Union (EMU), forming a monetary union is a complicated project, and there is a non-negligible risk of failure. It is therefore necessary to ensure that the pre-conditions for forming the EAMU are adequate. This entails making sure that economic, political, and institutional requirements are in place, since the benefits are likely to be less visible than the short term costs. Despite the importance of this initiative and the steps already taken by the EAC, and whereas the political will continue to gain momentum, there is concern that not enough empirical economic research has been done on this issue.

## 2.0 Methodology

There are several key methodologies for testing OCA criteria on a broad scale. There are also multitude possibilities of testing the individual hypotheses postulated in the literature. Indeed, Mongelli (2002) is “struck by the very high number and diversity of studies making reference to the OCA theory”. Other authors have employed Macroeconomic modelling to determine an optimal policy strategy. However, it is the paper by Harris (1991) which paved the way for the use of simulation exercises in assessing the trade impact of varying degrees of economic integration. Accordingly, Harris (*Ibid*) uses several different economic simulations to assess the medium and long run impacts of the US-Canada Free Trade Arrangement. Recently, adopted by Debrun, Masson and Patillo (2002), with specific reference to Africa, this methodology involves the adoption of several key assumptions in the construction of an appropriate economic model. These assumptions are with regards to the supply function of the economy as well as government budget and objective functions. Importantly, the Debrun-Masson-Patillo (DMP) Model identifies not only the asymmetry of shocks but also the asymmetry of political distortions affecting fiscal policy. Therefore, the Central Bank’s preferences represent a weighted average of all members of the currency union, depending on the economic size. The economic model is then calibrated according to empirical evidence and simulations were run to determine the costs and benefits of monetary union. Masson and Patillo (2005) relate this model directly to Africa thus, the model seems relevant to this discussion; however the development of such a value laden modelling process is both non-trivial and overly complicated for the purposes of this study.

The Generalized purchasing power parity analysis has also been employed whereby co-integration analysis has been employed to assess the level of similarity in the movements of the real exchange rate (in terms of a Generalized Purchasing Power Parity) relative to a central dominant country. This method was developed by Enders and Hurn (1994) and assesses the extent to which a group of countries exhibit integration of their real exchange rates. Real exchange rates, which are assumed dependent on economic fundamentals, are able to show the similarity of economies and therefore their suitability for monetary union.

This paper has confined to broader based studies which have been used in the past to conclude for or against membership within a monetary union. The key methodologies which become evident in the literature are detailed in the application of the OCA index which is

employed in this study, and the correlation and co-integration test of the convergence criteria's is identified in the Optimum currency area theory. Bayoumi and Eichengreen (1997) construct an "OCA Index" on the basis of the following equation:

$$SD(e_{ij}) = \alpha + \beta_1 SD(\Delta y_i - \Delta y_j) + \beta_2 DISSIM_{ij} + \beta_3 TRADE_{ij} + \beta_4 SIZE_{i,j} \dots\dots(1)$$

Where subscripts i and j denote the two countries in the pair and the variables are defined as:  $SD(e_{ij})$ , which is the standard deviation of the change in the logarithm of the end-year bilateral exchange rate between countries i and j; The expectation here is that, the estimation of change rate volatility should decline over time as the result of fiscal and macroeconomic policy coordination and provide a yard stick to measure the suitability of the OCA.  $SD(\Delta y_i - \Delta y_j)$  is the standard deviation of the difference in the logarithm of real output between the country pair;  $DISSIM_{ij}$  is the sum of the absolute differences in the shares of agricultural, Mineral and manufacturing trade in a total merchandize trade;  $TRADE_{ij}$  is the average value of bilateral trade, weighted by GDP, between countries i and j;  $SIZE_{ij}$  is the mean of the logarithm of the real GDPs of the country pair.

## 2.1 Model Description

This model relates the variability of the nominal exchange rate with several independent variables associated with OCA theory as noted above the main assumption of the model is that, it relates the variability of the nominal exchange rate with several independent variables associated with OCA theory as follows: the differences in the output disturbances and dissimilarity of commodity compositions of the exports to capture asymmetry of shocks and therefore the costs of monetary union;

In our model output disturbances( $SD(\Delta y_i - \Delta y_j)$ ) is measured as the standard deviation of the change in the log of relative output in the two countries. Thus for countries in which business cycle are symmetric and national outputs move together the value of this measure will be small. We also add the dissimilarity of the commodity composition of the export of the two countries ( $DISSIM_{ij}$ ) as the second proxy for the symmetric of shocks. The assumption here is that Industrial specific shocks will be more symmetric when two countries have revealed comparative advantage in the same export sector.

Trade linkages was measured using bilateral trade data, measuring the average value of trade (both imports and exports) between any two pair of countries, scaled by GDP of the two Countries

$$\text{TRADE}_{ij} = \frac{T_i \text{GDP}_i + T_j \text{GDP}_j}{\text{GDP}_i + \text{GDP}_j}$$

$T_i$  stands for the exports of country  $i$  to country  $j$ ;  $\text{GDP}_i$  stands for the real GDP of country  $i$ ;  $T_j$  stands for the exports of country  $j$  to country  $i$ ;  $\text{GDP}_j$  stands for the real GDP of country  $j$ . Where bilateral trade is high, the variability of nominal exchange rates between those two countries is expected to be low. The benefit of the more stable currency is measured by including the arithmetic average of the log of real GDP of the two countries in the country pairs.

$$\text{SIZE}_{ij} = \frac{\log \text{GDP}_i + \log \text{GDP}_j}{2}$$

Bayoumi and Eichengreen (1997) anticipate this to be positively related to exchange rate variability, to reflect the concept that smaller countries will benefit more from the stability of a single currency area.

Variables were taken as averages over successive 10 year sample periods from 2001 to 2010; the regressions were estimated and assessed for continuity with the theory. Given intuitively consistent results, the most significant estimation period was used to predict bilateral values for the dependant variable within a pre-existing REC.

These predicted values are termed the ‘‘OCA Index’’. Where the index is relatively low, OCA characteristics predict a low level of bilateral exchange rate variability and therefore a high suitability for monetary integration. This was conducted for the five regional blocs already appearing in the East Africa Community to assess their current levels of convergence.

Equation one above is estimated and then compared against a base or a ‘‘centre’’ country, which is in line with Bayoumi and Eichengreen’s (1997) assessment of EMU is Germany (In this a centre country is the most performing country in the region) over a number of different time periods hence in our case this country will be Kenya. We then compared the movement of the dependant variable, the so-called OCA index, over time, using forecasts to project into the

### **3.0 Convergence of Macroeconomic variable of in EAC**

The theory of OCA focuses on the characteristics, which make stable exchange rates and monetary unification more or less desirable. The most important factors are, asymmetrical disturbances to output, Trade linkages, the usefulness of Money for transactions, the mobility of labour and the extent of automatic stabilizers. Moreover, the OCA stresses the need to have labour market flexibility and labour mobility, and labour mobility as an important requirement for successful monetary union. According to this theory, if these conditions are satisfied, there is no need to wait for more than ten years to for countries to enter into monetary union (Frankel and Rose, 1997). An important question to be posed at this point is, why then did the designer of the monetary union stresses so much on the macroeconomic convergence, while the theory stresses on the microeconomic conditions. This part will descriptively assess some of these factors within the EAC and examine the likely hood of convergence.

### **3.1 Correlation of Inflation Rate for EAC Countries from 2000 to 2010**

The Maastricht Treaty of 1991, made a historical transformation in the European Union, the treaty went well even beyond the purely monetary affairs. Two strategies were envisaged, the strategy towards the monetary union was a gradual process extending over the period of many years, and second the entry into the union was made conditional on satisfying convergence criteria. One of the criteria set was inflation rate to be not more than 1.5 percent. Regarding the envisaged EAC-MU, the study conducted by the European Central Bank recommended not more than 5 and 8 percent of core and headline inflation rate respectively as one of the precursors for any Partner State to be eligible to enter the EAC-MU. The current situation within the EAC depicts a very high divergence among the EAC Partners states. According to the EAC facts and figures (2012), Uganda has the highest inflation rate within the region of about 18.7 percent, followed by Kenya 14 percent , Tanzania has 12.7 percent and Burundi has 9.6 percent. Arguably, even the proposed roadmap towards EAC-MU, which is to be realized in ten years from the day of signature i.e. November, 2013, is somewhat unrealistic.

**Table 1, Correlation of Inflation Rate for EAC Countries from 2000 to 2010**

	KE	TZ	RW	BU	UG
KE	1.00				
TZ	0.15	1.00			
RW	0.32	0.44	1.00		
BU	0.14	0.27	0.08	1.00	
UG	0.19	0.70	0.63	0.42	1.00

**Source: EAC Fact and Figure 2012**

Table 1 above suggest that it will take a very long time for the EAC countries to converge in terms of inflation pressure, since the correlation coefficient of the four countries, namely Uganda, Tanzania, Kenya, Rwanda and Burundi is very low with the exceptional of Rwanda. This divergence of the correlation coefficient for the EAC inflation rate will increase the need for Nominal exchange rate adjustment. Since the similarities of inflation rates between Countries will ensure the stability of terms of trade and encourage current account transactions, and trade to be in equilibrium. Hence reduces the needs for nominal exchange rate adjustment.

### 3.2 Correlation of M2/GDP for EAC Countries from 2005 to 2010

The ratio of broad money, relative to National income (M2/GDP ratio) is a popular proxy measure for determining the depth of financial markets in developing countries. The measure provides a means by which the degree of monetization in the economy can be determined. Additionally, M2/GDP measures the overall size of the financial intermediary sector and it is strongly correlated with both the level and rate of change of the real GDP per capital. Although this measure may not enable us to assess accurately a country's financial development, it is the only indicator which is readily available in the monetary survey in the IMF statistics especially for developing Countries (Lynch, 1996). The effectiveness of monetary union depends also on the level of development of financial market for the country in question.



**Table 2 Correlation of M2/GDP for EAC Countries from 2006 to 2011**

	<b>KE</b>	<b>TZ</b>	<b>BU</b>	<b>RW</b>	<b>UG</b>
<b>KE</b>	<b>1.00</b>				
<b>TZ</b>	<b>0.33</b>	<b>1.00</b>			
<b>BU</b>	<b>0.71</b>	<b>0.69</b>	<b>1.00</b>		
<b>RW</b>	<b>0.85</b>	<b>0.77</b>	<b>0.82</b>	<b>1.00</b>	
<b>UG</b>	<b>0.88</b>	<b>0.55</b>	<b>0.60</b>	<b>0.90</b>	<b>1.00</b>

Source: EAC Fact and Figure, 2012

Table 3 below indicates a high degree of monetization for Burundi, Rwanda, Uganda, and Kenya, while Tanzania depicts a low level of monetized economy. However, the overall results also suggest that there has been a considerable convergence in the size of financial intermediary sectors for most of the EAC countries, which suggest the possibility of a well functioning of the envisaged EAC monetary union

### **3.3 Real GDP Growth rate**

The growth rate of the countries wishing to form a monetary Union is another important factor to be considered. The pattern of the growth rate of the countries is also used as a yardstick to encourage or discourage countries to against forming a monetary union. If countries have a very big divergence in their real growth rate, forming a monetary union is not a sound decision. Since the central insight of the theory of optimum, currency area is that countries or regions that experience a high divergence in the output and employment growth need a lot of flexibility in their labour markets, if they want to benefit from the monetary union, and if they wish to avoid major adjustment problems. The large the degree of real divergence the greater is the need for flexibility in the labour market to make a smooth functioning monetary union. Hence, these factors need to be taken into consideration within the EAC; the pattern of growth for EAC countries has a substantial difference when

compared with the original EU-15 that adopted the Euro. The EAC Countries include Kenya - ,a developing country with a substantial base of Industrial growth, and Burundi, which is one of the poorest in all development indicators with a very weak base of Industrial growth.

**Table 3, Real GDP Growth Correlation from 2000 To 2010**

	<b>KE</b>	<b>TZ</b>	<b>RW</b>	<b>BU</b>	<b>UG</b>
<b>KE</b>	<b>1.00</b>				
<b>TZ</b>	<b>0.38</b>	<b>1.00</b>			
<b>UG</b>	<b>0.37</b>	<b>0.52</b>	<b>1.00</b>		
<b>RW</b>	<b>-0.11</b>	<b>0.11</b>	<b>0.28</b>	<b>1.00</b>	
<b>BU</b>	<b>0.16</b>	<b>0.48</b>	<b>-0.02</b>	<b>0.31</b>	<b>1.00</b>

Source: EAC Fact and Figure, 2012

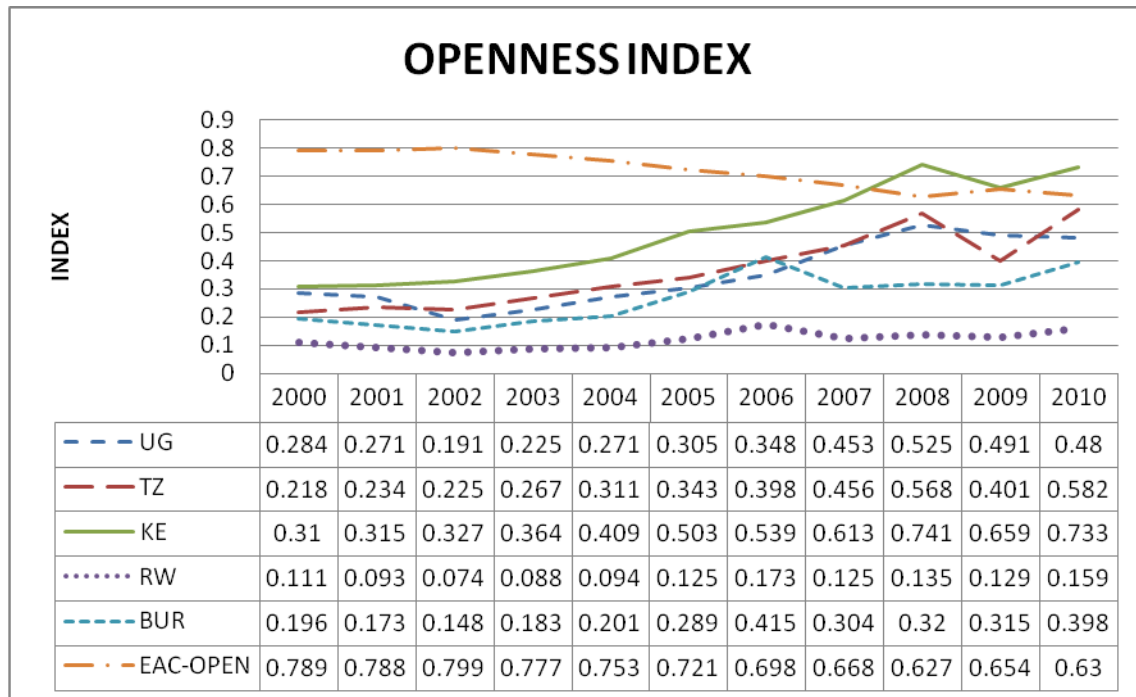
Literature reveals that, the fastest-growing Country would suffer in a monetary union with slower growing countries because the imports, of the fastest-growing Country, which are unconstrained with trade barriers, would increase faster than its exports, leaving it with a mounting current account deficit. Table 3 above suggest that the envisaged EAC-MU might work best if it starts by including only the countries with at least reasonable correlation rate in their real GDP growth rate, and these are Kenya, Uganda, and Tanzania. A reasonable correlation would mean a fair degree of convergence. Likewise, the closer the correlation coefficient of their real GDP growth rate would mean that, roughly equal measure of business cycle synchronization can possibly be adopted.

### **3.4 EAC Partner States Openness indexes for the Period 2000 to 2010**

De Grauwe (2000) maintains that there is a relationship between the benefit of a monetary union and openness of a Country. He emphasizes that welfare gains of monetary union are likely to increase with the degree of openness of an economy. The trick is that the elimination of the transaction costs will weigh more heavily in the countries where firms and consumers buy and sell a large fraction of goods and services in the foreign countries. This may happened because the consumer and the firms in these countries are more subject to decision errors because they face large foreign markets with different currencies. Hence, eliminating

these risks will lead to a large welfare gain in small and open economies than in large and relatively closed countries.

**Table 4 Correlation of Openness index of EAC Countries from 2000 to 2010**



Source: EAC Fact and Figure 2012

Table 4 above, provides a correlation coefficient of openness Index for EAC countries from 2000 to 2010. This index is calculated as the ratio which the country exports and imports to GDP. The finding indicates that EAC countries have a very low degree of openness, suggesting that EAC countries are unlikely to enjoy the welfare gain of the envisaged Monetary union. The low openness index may also suggest that firms and consumers within the EAC tend to buy and sell a very low fraction of goods and services in foreign countries.

McKinnon (1963), have also observed that the economy of the Country wishing to form a monetary union should be more open, this makes it easier for the said Countries to enter into a currency union arrangement in that the nominal exchange rate is already redundant as a policy instrument.

Moreover, finding from Table 4 has depicted a very high divergence of the Correlation coefficient among the EAC Countries, suggesting that, small country like Burundi and

Rwanda will face more challenges in terms of reaping the benefit of the Monetary Union. The proposition behind this philosophy is that, small open economy will find it beneficial to enter into a currency union with her trading partners who are equally open. This argument have been maintained by Frankel and Rose (1996) that, currency union tend to reduces transaction costs and exchange rate risk, in which countries would suffered if a flexible exchange rate were to be maintained against each other. Also, such a currency union would provide a credible nominal anchor for monetary policy in the individual countries. They further argue that to the extent that such open economies are integrated in terms of capital flows, labour mobility, or similar economic behaviour, the need to maintain the exchange rate as a policy instrument in individual countries becomes of little importance.

### **3.5 Exchange rate**

The optimum currency area between groups of countries means that individual countries maintain an irrevocably fixed exchange rate among each other. Therefore, an individual country within the union cannot unilaterally devalue her currency. In fact, with the introduction of a single currency within a currency area, individual countries completely surrender their rights of unilaterally altering the exchange rate. For an individual country therefore, the nominal exchange rate becomes redundant as a policy instrument. Thus the cost of a monetary union derives from the fact that, when a country relinquishes her national currency, she also relinquishes an instrument of economic policy. This implies that a nation joining monetary union will not be able any more to change the price of her currency by devaluating or revaluations, or to determine the quantity of the national money in circulation. This cost can be compensated in a monetary union through the reduction of transaction cost, and elimination of exchange rate volatility. In due course, countries would benefit from more trade and investment flows. This benefit will be realized only and if the convergence of the exchange rate within the union will be possible. Table 5 below provides the correlation coefficient of EAC Countries from 2000 to 2010.

**Table 5, Exchange rate correlation from 2000 To 2010**

	<b>KE</b>	<b>TZ</b>	<b>RW</b>	<b>BU</b>	<b>UG</b>
<b>KE</b>	<b>1.00</b>				
<b>TZ</b>	<b>0.89</b>	<b>1.00</b>			
<b>RW</b>	<b>0.90</b>	<b>0.95</b>	<b>1.00</b>		
<b>BU</b>	<b>0.89</b>	<b>0.96</b>	<b>0.97</b>	<b>1.00</b>	
<b>UG</b>	<b>0.75</b>	<b>0.79</b>	<b>0.80</b>	<b>0.79</b>	<b>1.00</b>

Source: EAC Fact and Figure 2012

The correlation coefficient of EAC Countries in Table 5 above depicts a very high correlation of exchange rate of EAC countries for the period from 2000 to 2010, suggesting that, the elimination of exchange rate volatility in the envisaged EAC – MU will be possible and hence EAC countries are likely to reap the benefits of monetary union in the form of high trade and investment inflows. On top of that, stable exchange rate tends to encourage trade, EAC countries need to optimize this economic advantage by addressing hard and soft impediment to trade.

#### 4.0 Findings and Interpretation of Optima currency area index

We begin by testing the stationary of variables specified in our panel output functions by running unit root tests on the variables.

**Table 6: Results of Test for Unit Roots**

	Unit Root Test		
	Levin–Lin–Chu	Harris–Tzavalis	Order
SD( $e_{ij}$ )	-2.4264**	0.2169***	I(0)
SD( $\Delta y_i - \Delta y_j$ )	-5.1951***	0.5795*	I(0)
TRADE $_{ij}$	-4.3146***	-4.4943***	I(0)
SIZE $_{ij}$	-4.8248***	0.1129***	I(0)

\*and \*\* significant at 1% and 5% levels respectively

The Levin- Lin- Chu test revealed only SD( $e_{ij}$ ) being stationary, the rest of the variables were found to be non stationary. This finding made it necessary for the researcher to difference the variables and then to conduct a Levin-Lin-Chu unit root test, whereby all the three variables were stationary at 1% level. The Harris-Tzavalis Test was also conducted to verify the findings of the Levin-Lin-Chu test. Both of these tests have the null hypothesis that all the panels contain a unit root.

#### 4.2 Research Findings

Variables were taken as averages over successive 10-year sample periods from 2001 to 2010. After running regression analysis, the researcher was able to obtain the findings as shown in Table 6.

**Table 7: Estimation Results**

<b>Time Frame</b>	<b>2001 – 2010</b>
<b>Relative GDP Volatility</b>	0.0723 <sup>***</sup> (0.2394)
<b>Variability of Output</b>	0.0612 <sup>**</sup> (0.0308)
<b>Extent of Bilateral Trade</b>	3.6365 <sup>**</sup> (1.8513)
<b>Mean of Country-Pair GDP</b>	-0.0142 <sup>***</sup> (0.0068)
<b>Number of Observations</b>	60
<b>Standard Error</b>	0.0117

(Robust Standard Errors in parentheses)

\* = significant at 10%

\*\* = significant at 5%

\*\*\* = significant at 1%

### 4.3 Interpretation

Finding from this study depict that, all the explanatory variables are statistically significant at 5% and 1% level. The coefficient of the GDP volatility is 0.072 significant at one percent level with a positive sign, This is what we would expect. This suggests that, an increased divergence in income growth will increase the volatility of bilateral exchange rates. This finding is contrary to expectation of the optima currency area, which focuses on the characteristics', which make stable exchange rate. Concisely this variable suggests that monetary unification in EAC is less desirable.

The coefficient of the Variability of output is 0.06 significant at five percent level with a positive sign. The interpretation on this variable is that a positive coefficient tells us that an increase in the dissimilarities in the structural of the EAC export portfolio would increase

exchange rate volatility. The bilateral trade variable is statistically significant at five percent level with a positive sign but with a very big coefficient of 3.63, the bigger the magnitude of the coefficient while statistically significant could be explained by the inability of the institutional efforts within the EAC to increase intra- regional trade and investment. Since where intra trade is high, the variability of exchange rates between those countries is expected to be low. However, in the case of EAC regional bloc, the variability of exchange rate is high which indicates that intra- trade between EAC member states is low.

The Country pair means GDP figures are statistically significant at one percent level, but with a negative coefficient. This suggests that an increase in the mean GDP would lower exchange rate volatility. This may be possible because increased mean GDP of Countries suggest improved institutional reform and macroeconomic stability.

### **4.3 Conclusions and Recommendation**

The finding from this paper revealed that, EAC is not an optimum currency area hence forming a monetary union is not feasible. The main factors highlighted by paper is 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 when you compared to 70 percent in European Union and 50 percent in ASEAN. The finding also has depicted that smaller countries such as Burundi and Rwanda are unlikely to benefit from the stability of a single currency area.

From the above, finding this paper concludes that: Firstly the EAC monetary union should start with Kenya, Tanzania, and Uganda, since national output in the three countries tend to move together as depicted by table 3 of this paper and the likelihood of macroeconomic convergence for the three countries is feasible.

Secondly, dissimilarities in the structural of the EAC export portfolio is also an area of concern since it increases Exchange rate volatility. All characteristics applied in the OCA index methodology to measure the suitability of Optimum currency area has not indicated the suitability of EAC as an optimal currency area, the benefits already reaped, in terms of increased trade need to be enhanced. The findings from the correlation coefficient of macroeconomic variables indicated in Tables 1 to 5, show that there is a very high divergence in most macroeconomic variables for the EAC economies. This implies that there is a



distance that needs to be travelled by EAC in terms of convergence criteria for the feasible monetary union. In this regard, deliberate efforts should be made to promote convergence of economic criteria. Although complete monetary unification may never be economically justified, it represents a good opportunity to promote the harmonization of financial, banking and political systems, which will increase efficiency and development of East African countries individually.

Lastly, East Africa countries may present unique circumstances, regarding the application of Optimum currency area theory as a yardstick for the examination of countries' qualifications for monetary union. This theory was developed and tested in developed countries. Hence, the possibility that it can work properly in developing country is an empirical question that needs to be resolved. The theory was mostly developed with the European Union as a backdrop and as such certain elements disregard the important differences that exist between African and European countries. This is perhaps the most important research gap that can be identified by this paper; what is more the research gap requires much more detailed qualitative case study approach to identify how the existing OCA theory can be adapted to suit East African monetary union.

The traditional OCA criterion may be less relevant in the EAC, and that decisions based upon this traditional theory may be misplaced. This clearly warrants further investigation into the particular economic and social criteria that may influence and affect the outcome of planned regional and continental integration. The need to streamline the current regional arrangements so as to avoid duplication of efforts and contradictory policy measures is very important as EAC enters into the consolidation phase of the integration process.

Further recommendation from the finding of this paper is that, there exist sympathetic relationship between economic integration and monetary integration. Hence, readiness of EAC Countries to Monetary union will depend on the extent of the implementation of the Common Market, as well as enhancement of the intra-EAC trade. The current 11.4 percent of intra- EAC trade provide some signal that there is a long distance that needs to be travelled for the proper functioning of the EAC monetary union. Hence, EAC Countries need to deliberately undertake systematic and painful transition period, balanced against the policy credibility, to realise the welfare gain of a Monetary Union.



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## ANNEX 1.

TABLE 4: REGRESSION STATISTICS

<i>Regression Statistics</i>	
Multiple R	0.365224562
R Square	0.133388981
Adjusted R Square	0.08696339
Standard Error	0.011666606
Observations	60

Table 2: Summary Output

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.072296819	0.023941694	3.019704	0.003806	0.024335844	0.120257795	0.024335844	0.120257795
SD(ChYi-ChYj)	0.061162434	0.030790425	1.986411	0.05189	-0.0005182	0.122843067	-0.0005182	0.122843067
trade	3.63649E-05	1.85125E-05	1.964339	0.054461	-7.20174E-07	7.345E-05	-7.20174E-07	7.345E-05
Size	-0.014234799	0.006772355	-2.1019	0.040073	-0.027801456	-0.000668142	-0.027801456	-0.000668142