The East Africa Community: How ready is it for a Monetary Union by 2012?

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Declaration

confirm that this is my original work and that it has not been presented for the award of a legree in any other university.

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This research paper has been submitted for examination with our approval as University supervisors

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Dedication

I dedicate this paper to my mum, Queen Moraa and dad, Fidelis Mose.

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Abstract

The study investigates the readiness of the East Africa Community (EAC) to form a monetary union by the end of 2012 using 1980-2010 data. The problem investigated is the fact that a monetary union is not an easy integration to manage especially if the economies do not meet preconditions for monetary integration. The warning signals on the negative externalities of a MU can be seen from the current problems of the European Union (EU). This raises justified fears on the effects of a MU. The study uses inflation rate and interest rates convergence and stationarity to assess the readiness. Augmented Dickey Fuller (ADF) test is used to test for convergence while Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test is used to test for stationarity of the inflation rates differentials and interest rate differentials. The study also uses the granger causality test to analyze the relationship between the inflation rates and lending rates for each country and further uses the correlation coefficients to detect the degree of association among the inflation rates and interest rates in the region. The study establishes that the inflation rates of the region have converged to the EAC average but the interest rates differentials have not converged. There are also low correlations among the lending rates and inflation rates in the region. Inflation rates granger cause lending rates and lending rates do not granger cause inflation rates indicating that the monetary policy is not as effective as it should be in stabilizing inflation rates in the EAC. The overall assessment shows that the community needs more time before it meets the preconditions for making a MU.

CHAPTER ONE

INTRODUCTION

1.0 Background

The East African Community (EAC) comprises of Kenya, Uganda, Tanzania, Burundi and Rwanda. According to the East Africa Community Secretariat (2011a), the EAC history dates back to 1917 when Kenya and Uganda observed Customs Union structures which Tanganyika joined in 1927. The secretariat added that the East African High Commission was established in 1948 which ran up to 1961 paving the way for the East African Common Services Organization (EACSO) which was created in 1961 and lived up to 1967. The secretariat noted that the EAC succeeded the EACSO and it existed from 1967 till 1977 when it collapsed. The collapse is attributed to structural problems in the management of the common services, political ideological differences, low involvement of people, private sector and civil society in the processes, inequalities in the sharing of the costs and benefits of integration, governance challenges, corruption, non respect for rule of law, impunity, foreign influence for economic reasons, and mistrust and suspicion amongst the member countries according to Kiraso (2009).

The integration was revived by the formation of East African Co-operation (1993-2000) after a Permanent Tripartite Commission for East African Co-operation was established in 1993. However, the East African Co-operation operations started in 1996 when the Secretariat of the Permanent Tripartite Commission was launched at the Headquarters of the EAC in Arusha, Tanzania. The Treaty for the Establishment of the EAC was signed in Arusha in 1999 and entered into force in 2000. In 2004, the customs union protocol was signed and became effective in 2005. Burundi and Rwanda joined the EAC in 2007 and the customs union arrangements were initiated in 2009 according to the EAC secretariat. This historical evidence shows that the integration has grown over time from a free trade area through the customs union which the secretariat said was signed to full-fledged status in 2010 and now common market whose protocol was signed in 2009 and came to force in 2010. The EAC intends to form an East Africa Monetary Union by the end of 2012 and a political federation by 2015.

The EAC covers a surface of approximately 1.82 million square kilometers with a total population of about 133.1 million people and has an average per capita Gross Domestic Product (GDP) of $685 as at 2010 according to East Africa Community (2012). As at 2010, Rwanda and Burundi had the highest population density of 395.9 million KM^2 and 303.4 million KM^2 respectively which means that their population exerts more pressure on resources than in Kenya, Tanzania and Uganda which have a population density of 67.6 million KM^2, 47.4 million KM^2 and159.1 million KM^2 respectively. The average EAC population density as at 2010 was 77.6/KM^2.

In the period 2005-2010, the region's average per capita GDP rose from US$402.7 to US$685.0. As at 2010 the per capita GDP per the economy were Kenya, US$833.4, Tanzania, US$546.7, Rwanda, US$540.0, Uganda, US$525.9 and Burundi, US$173.0. Figure A.1 in the appendix shows the trend of per capita GDP in the EAC for the period 1998-2010. Notable in the figure is the point of convergence in 1998 for Uganda, Rwanda and Tanzania as well as their tendency to convergence between 2005 and 2010. In addition the figure shows that between1995 and 2010 Burundi drifted way below while Kenya trended far above the trends of Uganda, Rwanda and Tanzania with respect to per capita GDP.

The intra-trade balances, trade among the five EAC countries, are summarized in table 1. Kenya emerges as the only country that has maintained positive net exports. Tanzania and Uganda have episodes of negative difference of exports and imports. Rwanda and Burundi have consistently recorded negative intra-trade balance.

Table 1: EAC Intra-Trade, Millions, US$

Country	2004	2005	2006	2007	2008	2009	2010
Burundi	-48.71	-55	-55.5	-74.2	-78.1	-123.2	76.8
Rwanda	-43.94	-64.24	-110.39	-167.07	-348	-402.31	-449.42
Tanzania	43.94	-31.63	-17.72	95.8	54.9	6.541	98.8
Uganda	-284.31	-406.76	-202.724	-83.698	37.322	68.771	-2.658
Kenya	771.68	912.78	651.65	760.63	1031.4	1005.1	1021
EAC	438.66	355.15	265.31	531.46	697.52	554.90	744.52

Source: East Africa Community Web Site (2012)

In the overall foreign trade, all the EAC members record negative trade balances as provided in table 2. For instance Kenya had the worst overall external trade balance followed by Tanzania, Uganda, Rwanda and Burundi respectively. This trend seems to follow the size of the economy and degree of openness to the extent we can hypothesize that large sized developing economies with higher the degree of openness to the global economy are likely to experience higher negative external trade balances.

Table 2: Total EAC external trade, Million, US$

Year	Kenya	Uganda	Tanzania	Burundi	Rwanda	EAC
2006	-3751.58	-1241.3	-1472.2	-181.32	-223.81	-6870.18
2007	-4908.95	-1595.1	-1864	-229.01	-424.58	-9021.63
2008	-6237.43	-2158.7	-3912	-224.91	-445.26	-12978.3
2009	-5732.82	-2801.6	-3788.5	-349.05	-676	-13347.9
2010	-6796.31	-2690	-3548.8	-400.85	-948.7	-14384.6

Source: East Africa Community Secretariat Web Site (2012)

The EAC had the highest average annual inflation rate of 17.44% in 2008 whose effect spilled over to 2009 to clock 11.05%. The average EAC annual inflation rates were 9.26%, 8.09%, 7.95%,11.05% and 4.39% for the years 2005, 2006, 2007, 2009 and 2010 respectively. Uganda experienced highest inflation rates shocks in the 1980s but recovered and sustained the shock in the subsequent two decades.

According to the East Africa Community Secretariat (2010), the common market protocol of 2009 stipulated measures which would facilitate free movement of goods, persons and labor, the rights of establishment and residence, and the free movement of services and capital. Accordingly, this required removal of barriers to free movement of people, capital, goods and services, which included common passport, currency convertibility and harmonized financial structures as well as harmonized legal system.

It is against this background that the study assesses the suitability of the EAC for the intended monetary union (MU) by 2012. The suitable economic tool for this assessment is the Optimum Currency Area (OCA) criteria. An OCA comprises of a set of economies that can increase economic efficiency if they can use a common currency or maintain their individual currencies but observe a fixed exchange rate regime like has been implemented in the Euro Zone (EZ).

1.1 Research Problem

There are mixed perceptions and reactions from technocrats, politicians and the civilian populace to the idea of forming the East Africa Monetary Union (EAMU), especially on whether the EAMU is possible, its costs and benefits, and if indeed the economies will be willing and ready for the MU implementation by the end of 2012. This can affect regional investment through uncertainty and speculation. Interestingly, some government executives' persistent persuasion to overlap the process of full implementation of common market treaty and to introduce the MU structures while planning for a political federation which is scheduled for 2015 without tangible evidence or support raise genuine fears based on the fact they may have underestimated the dynamics of a monetary union.

The warning signals on the negative externalities of a MU can be seen from the current problems of the European Union (EU). For instance, the EU experience like in the PIGS (Portugal, Italy, Greece and Spain) witnessing recessionary pressure and culminating in scores of bailouts and citizens subjected to punishing austerity measures to make them fit into the Euro Zone (EZ) scheme would not be ignored. Public unrest and leadership discomfort registered especially in Greece can as well be witnessed in the EAC if the region does not tread carefully in the MU path. Some states like France, Austria, Malta, Slovakia, Slovenia, Italy, Spain, Cyprus, Portugal and Greece have been downgraded in credit-worthiness terms in the recent past over the financial challenges the countries have faced and their limitation to undertake idiosyncratic stabilization policies. According to Kraemer and Gill (2012) the Standard and Poor's (S&P), a credit rating agency, considered that the interventions taken by European policymakers are unsatisfactory in tackling the economic challenges. Unfortunately, these countries are tied to the EZ common agreements which prevent them from undertaking independent policies to rescue themselves since those sovereign actions may aggravate the financial risk incurred by other member states. The United Kingdom (UK) besides having never joined the EZ for reasons well known to her policy experts has distanced herself from the European Union (EU) due to the absence of safeguards that would insulate her from bearing the negative externalities of the EZ.

There is no recent reliable investigation to our knowledge that assesses the EAC readiness for the MU system against the OCA criteria. Previous studies on the OCA and possibility of the formation of an EAMU, especially the studies by Mkenda (2001), Buigut and Valev (2004) and Sheikh, *et al* (2011) provide mixed results on the readiness of the EAC for a MU. These studies are not conclusive enough or unanimous in their suggestions thereby creating dilemma in decision making over the transformation of the EAC into a MU. Mkenda (2001), for example found that the EAC performs poorly on the components of the OCA criteria except for cointegration of exchange rate while Sheikh *et al* (2011) found mixed evidence on business cycle synchronization among EAC countries and Buigut and Valev (2004) concluded that the economies need some time to show symmetry in Aggregate demand and price shocks.

The risk to negative externalities of a MU emanating from a rushed implementation of single currency union is punitive and creates room for uncertainty. The motivation for a MU is based on the expectations that the cost benefit analysis is positive. This study is motivated by the need to evaluate the readiness of the EAC to ascend to a MU.

1.2 Research Objectives

The main objective of the study is to assess the readiness of the EAC to form a monetary union.

The specific objectives of the study include:

1. Assess convergence and stationarity of inflation and interest rates of EAC economies
2. Draw policy recommendations based on the findings of the study

1.3 Justification of the Study

This study uses the OCA criteria to assess the extent to which the EAC is ready to form a MU with an understanding that a MU unifies or harmonizes currencies and monetary policies of respective countries to enhance economic performance and integration. The findings of this study would be useful in informing the discussions on the establishment of an EAMU by the end of 2012. The objective of the EAC to form a MU seems unrealistic and the diseconomies the community is exposing itself to are understood to be grave and therefore there is need to assemble empirical evidence to support or disapprove these perceptions.

A report by the European Central Bank (2010), commissioned by the EAC secretariat points out that before flagging off the MU structures the degree of convergence should be assessed and be based on a suitable criteria. In response to the recommendation of this report the study chooses inflation rate and interest rate convergence which are not only major OCA criteria components but also paramount in the management of monetary policy. Therefore, these components are critical to ascertaining the degree of integration and symmetry among the EAC economies to recommend on their readiness for a MU.

The situation of the PIGS in the EZ as at 2012, motivate for an in-depth study into the minimum standards that a regional integration should meet before endorsing the MU plans. Member states of a MU require safeguards against common risks to surrender their monetary policy and exchange rate control sovereignty. The study recognizes the fact that deep integration needs careful approach in both its design and implementation. Substantive investigation into preconditions for a MU should not be overlooked.

The conclusions of (Mkenda, 2001) and (Buigut and Valev, 2004), have limitations on the basis of the time the studies were conducted or their priority variables. Mkenda (2001) relied on generalized purchasing power parity (GPPP) using co-integration of the Real Exchange Rate (RER). Buigut and Valev (2004) used Structural Vector Autoregression (SVAR) on shocks generated from GDP growth and inflation while Sheikh, *et al* (2011) adopted correlation and analysis of variance (ANOVA) on Gross Domestic Product (GDP) to assess business cycle synchronization. There is need to expand research on this area. The main contribution of this study is an empirical test on the convergence and stationarity of both inflation rates and interest rates in the EAC as critical preconditions for a MU. The study provides useful information which can inform decision making to either support or reject the formation of EAMU as at 2012.

The rest of this paper is organized as follows. Chapter 2 reviews the theoretical as well as empirical literature on this subject while Chapter 3 presents the methodology used for the study comprising of the theoretical framework and the model used. Chapter 4 discuses the data used focusing on the type, sources and description. Chapter 5 discusses the analysis of the data and the results obtained while chapter 6 summarizes and concludes the study and offers some policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Mundell (1961) stated that a currency area occurs when fixed exchange rates on the currencies of the respective countries provide greater advantage than flexible exchange rate regime in the stabilization process of the economies. Mckinnon (1963) defined the term optimum as describing a single currency area within which common monetary policy, fiscal policy and flexible external exchange rate best respond to full employment, balanced international payments and stable internal average price level. Demopoulos and Yannacopoulos (1999) described a monetary integration as the coordination of the monetary policies to support a fixed exchange rate regime or a common currency regime. The authors clarified that a monetary union is an advanced form of monetary integration where a set of independent countries have a common currency and single central bank which is what the EAC wishes to form.

It can therefore be stated that an optimum currency area (OCA) is an area where either fixed exchange rate or a single currency regimes are better than flexible exchange rate regime in meeting internal and external balance for the member states. This would be achieved in place of considerable factor mobility, openness to foreign trade, product diversification, industrial structure similarity, convergence in inflation rates and interest rates, business cycle synchronization, fiscal integration, social and political cohesion as well as mutual positive cost-benefit analysis. The theoretical literature concentrates on these components and the empirical literature zeroes on the inflation rate and interest rates convergence components.

2.1 Theoretical Literature

The groundwork of OCA can be traced back to Mundell's (1961) seminal paper as well as the contributions by McKinnon (1963) and Kenen (1969). Since these ground-breaking works a number of studies have been conducted on OCA suggesting a variety of prescriptions and criteria of ascertaining an OCA. However, Bofinger (1994) cast doubt on the OCA criteria in explaining a large currency area and that it lays more emphasis on the asymmetric shocks than necessary.

The earliest theory of an OCA is factor mobility which is attributed to Mundell (1961) who argued that high degree of factor mobility is essential in structuring a MU and defining an optimum currency area. The author stated that mobility of labor should be enhanced ex-ante but capital mobility can be stimulated by single currency policy. The cross-country negative attitudes and suspicions among the EAC citizens hinder the expected free movement of labor thus meeting this requirement in EAC soon is unlikely. Flexible exchange rates regime was recommended by the author where high factor mobility within the countries exists but low across the countries thus advocated for a fixed exchange system only in the presence of high transnational factor mobility. Fleming (1971) argued that fixed exchange rate area would increase mobility of capital. Therefore, external factor mobility mainly justifies a fixed exchange rate or single currency regime as being optimal.

In contrast, currency arrangements affect factor mobility as submitted by McKinnon (1963) and therefore the extent of factor mobility should be considered ex-post of single currency area. This divergent view opens the debate as to whether OCA conditions with respect to factor mobility should be reached before or after enactment of MU treaty. Another argument that perfect transnational labor mobility can occur only when labor is homogenous which is not possible in reality was added by Kenen (1969) who further interpreted that Mundell's (1961) approach implied that an OCA should be small and perhaps referred to a single-product region.

The degree of openness to foreign trade was introduced by McKinnon (1963) to determine an OCA. The author laid emphasis on the ratio of tradable to non-tradable goods to explain the reconciliation between internal and external balance while laying more emphasis on internal price stability. Another dimension of degree of openness is found in Romer (1993) who while relating degree of openness and inflation assumed that the degree of openness is a ratio of imports to the overall country consumption. Andres, *et al* (2003) defined degree of openness as a ratio of the weight of consumption of domestic goods to the weight of consumption of imported goods and further argued that under asymmetric shocks, differences in the degree of openness can cause sizeable effects on the variations in inflation rates. These are different interpretations whose results in a study are likely to read to different conclusions.

Economies with higher degree of openness have a higher marginal propensity to import and their nominal prices and wages are more elastic to changes of the nominal exchange rate as

argued by Demopoulos and Yannacopoulos (1999). This implies that a high degree of openness, excludes nominal exchange rate adjustment as an instrument for stabilization hence such economies incur less costs when they form a MU. We can make an assumption that countries with high degree of openness amongst themselves can easily form a MU if we believe Arribas *et al* (2009) who indicate that the more open an economy is the more integrated it will be.

The theory of degree of product diversification and/or similarity in industrial structure is attributed to Kenen (1969) who having expressed doubt in labor mobility as a determinant of an OCA thought that variety in production and consumption would explain an OCA more explicitly. The author argues that product mix can explain labor mobility and that fixed exchange rates are most appropriate for widely diversified economies since diversification settles external shocks and stabilize domestic capital formation. The point of emphasis by Kenen (1969) is that diversification helps especially when industry shocks are uncorrelated such that their effects cancel out thereby creating stability.

Inflation rate differential theory as used in explaining an OCA can be traced to the works of Fleming (1971) who indicates that under fixed exchange rate regime, countries with lower rates of inflation develop balance of payment surpluses while those with higher inflation rates develop deficits sentiments Bagnai (2010) agrees with adding that inflation rates differences cause variations of the terms of trade and Cuestas and Dobson (2011) explains that monetary authorities increase interest rates or decrease money supply to mitigate on the current account disequilibria and inflation rates deviations. This implies that those economies which show significant differences in inflation rates from the each other should not form a MU since those differences will require country specific monetary policies which may be regarded as monetary policy indiscipline in a MU setting.

It is the desire of Robson (1987) that monetary and fiscal policies should be harmonized before the creation of a MU to bring about high degree of convergence if not equalization of inflation rate. The author stated that the inflation rate target will have transitional costs regardless of whether the specific countries were on their long-run Phillips curve path. These transitional costs will depend on the short term Phillips curve differences and the magnitude of the costs will depend on time frame set for common rate adoption, speed at which expectations adjust to

actual inflation and the initial difference between the inflation target a country adopts and the union-adopted rate. This underlines inflation targeting as a central policy. It should be seen that if the economies had significantly negatively correlated inflation rates it is difficult to maintain fiscal and monetary stability with common inflation target for all member states.

If the economies are inflation targeting then an OCA exists only when the economies show asymmetric supply shocks and not in demand shocks according to Roisland and Torvik (2003). The authors argued that under country specific inflation targeting, contrary to common inflation targeting, a positive supply shock in independent inflation targeting is met by a lower interest rate thereby causing exchange rate depreciation. Inflation targeting as defined by Bernanke and Mishkin (1997) is a monetary policy undertaking where an official rate of inflation that the authority intends to achieve over a given period of time is publicly announced. Measures that will realize this target are equally designed to induce economic behavior that will produce the targeted inflation rate.

The Maastricht treaty of 1992, as demonstrated by Eichengreen (1993) was motivated by the fear of inflationary pressure that may arise from admitting countries whose monetary and fiscal performance is dissimilar to the then European community members. The author explained that under a monetary union, countries must run very similar inflation rates and unless inflation rates converge early, producers will face severe competitiveness problems in the early phases of the union. The author further states that high inflation rate erode the sustainability of fixed exchange rate.

An argument by McKinnon (1963)[1] that fiscal and monetary policies of a small economy trading with a large single currency area is ineffective since the money prices of tradable goods will be dictated by foreign prices rather than by the domestic prices of the non-tradable goods informs us that inflation control is determined by external forces for small economies since deflation of non-tradable goods will not neutralize import inflation. Therefore, small economies need to integrate to make one big economy that can withstand the external trade pressure on local prices.

Monetary transmission mechanism has been another crucial point from which an OCA is viewed. Remarkably, different transmission mechanisms among a group of countries hinder

adoption of a single currency as Barran, *et al* (1997) indicate and further explain that this difference may arise from the differences in degree of financial intermediation, degree of openness to the world economy and the competition in the banking sector. Another dimension of monetary policy transmission is found in Eichengreen (1993) who proposes that higher domestic interest rates especially those created by the increase in domestic public spending spill over into higher interest rates abroad. Further, Landon-Lane and Rockoff (2004) argue that the long run interest rate is an incentive to capital flow and market efficiency for economic growth. Therefore we can argue that an OCA should show smaller and stable interest rate differentials among the member states as an indicator of monetary policy stability and the likely discipline in the management of the MU.

The role of interest rates in the economy is also seen in Fleming (1971) where countries, especially low cost countries in production, are expected to raise their interest rates to prevent undesired inflation. This means that regions with different inflation rates will require different interest rate intervention to control the inflation. Harmonization of interest rate regimes will need acceptable criteria to arrive at a common rate and this can be based on the Matsen and Roisland (2004) four criteria which include the union rule, Bentamine rule, majority rule and consensus rule. The union rule adopts the interest rate that minimizes the loss function while the Benthamite rule is based on utility aggregation. The majority rule requires that the board votes and consensus rule builds on an equal chance of bargaining for all. The authors indicated that if there are asymmetries in the transmission mechanisms, conflicts of interest hinder rational choices and called for a high degree of transparency to overcome strategic voting. This applies to an already functioning MU.

Business Cycle synchronization (BCS) measured mainly in terms of symmetry in gross domestic product (GDP) of the economies also explains the existence of an OCA where high BCS qualifies a MU. Economies with asymmetric shocks could result in deeper recessions according to Bayoumi, *et al* (1997) which indicates that a MU will not function in such circumstances. Bergman and Jonung (2010) argue that monetary integration increases BCS especially in real GDP through increased trade a point that agrees with the sentiments of Frankel and Rose (1998) who argue that trade liberalization can be expected to result in more tightly correlated business cycles and a MU itself may lead to a further boost to trade integration. This indicates that countries can still expect more synchronization after the

implementation of the MU structures thus heightening the debate as to whether an OCA is an ex-ante or post-ante phenomena. However, it is strategically safe to motivate BCS ex-ante.

Another dimension in the OCA criteria is fiscal integration. For instance Bayoumi, *et al* (1997) argue that in the transition to a MU member states should avoid excessive fiscal deficits since in a MU limitation on fiscal policy freedom will frustrate stabilization process by individual countries. Therefore, before a MU is introduced the countries should agree on an incubation period to implement fiscal deficit reduction policies to reach manageable limits. Fiscal deficits require funding especially from domestic market and this may lead to crowding out effect hence slowing down economic activity in the economies. This is worse in cases where there are asymmetric shocks since the countries will want country specific fiscal policies. It is articulated by Mongelli (2002) that countries that share a fiscal transfer system facilitate settling of negative shocks and require less exchange rate adjustment.

Political Will and Socio-Cultural Structure cannot be left out in explaining an OCA. Fleming (1971) noted that similarity in inflation rates depends on similarity in productivity growth which would depend on political willingness to tolerate high unemployment and how timid the trade unions would be. In addition, the three arms of government, executive, parliament and the judiciary play a role in the management and overall survival of a monetary. Haberler (1970), Tower and Willett (1975), in Mongelli (2002) have argued that similarity of policy attitudes and a reasonable degree of compatibility in preferences as well as ability by policy makers to trade-off between competing objectives add strength to the survival of a MU. The author further explained that functional fiscal transfer would need a high degree of political integration as well and safeguards from moral hazard tendencies. Moral hazard may arise in occasions where a member state silently engages in activities that increase her risks that may require a bailout from the common rescue fiscal fund or reserve. Though there are steps that have been done to harmonize the political and judicial environment the constitutions of the countries are different as well as the levels of democracy.

The degree of socio-political integration of the members of a currency area must be relatively high as brought out by Demopoulos and Yannacopoulos (1999) arguing that this facilitates fiscal integration. In this context a high degree of social cohesion can act as a catalyst to the smooth functioning of the MU. Cultural and social settings connect to similar preferences and

tastes thus can encourage mobility of labor, flow of goods and services and reduce asymmetric shocks. The social setting of the EAC was highly influenced by the colonial orientation and first postcolonial governments. Whereas Tanzanians have communal background due to communism (Ujamaa), Kenyans and Ugandans are on the extreme end of individualism due to capitalism. Rwandese and Burundians are less aggressive while Kenyans are the most aggressive. The perception of Kenyans in the region is negatively skewed which makes the EAC citizens treat Kenyans with suspicion and fear. The countries have different skilled labor capacities and this has already frustrated efforts on labor mobility. In addition the region has not demonstrated common position on socio-political issues like ethnicity, human rights and freedom, gender, abortion, corruption, governance and leadership, security and impunity. One factor that is likely to drag the socio-political cohesion agenda is the literacy gaps among the member states of the EAC which by 2010 was approximated at Burundi 47% Tanzania 70% Uganda 73% Kenya 62% Rwanda 77% as presented by the East africa Community Secretariat (2011b). For instance, this limits decision making in political, investment and land transfers.

Cost benefit analysis is a common approach used in the overall discussion of a MU. According Mkenda (2001) MU are expected to bring about economic efficiency through transaction costs reduction, elimination of uncertainty and reinforcement of discipline in monetary policy. Another support to a MU is found in Madhur (2002) who saw that common currency facilitates trade and investment by removing volatility in exchange rates across the union. Ricci (1997) asserted that in a currency union the transaction costs on currency exchange disappear but in a fixed exchange rate regime they still remain.

It is hypothesized by Demopoulos and Yannacopoulos (1999) that benefits of MU depend on the size of the currency area in terms of economy. The authors explained that as the currency area is enlarged, transaction costs gradually reduce leading to an increase in trade and its benefits within the currency area. Superimposing monetary integration according to Robson (1987) boosts integration in the product and factor markets by creating exchange rate certainty and larger market size that yield operational benefits and increase in allocation efficiency by providing both lenders and borrowers a wide space.

The problem of unemployment is better solved in an OCA than individual country currencies settings and initiatives. This argument is proposed by Mundell (1961) who argues that in a

currency area comprising different countries with different national currencies, the pace of employment in deficit countries is set by the willingness of surplus countries to inflate. However, the author is convinced that in a currency area comprising many regions and a single currency, the pace of inflation is set by the willingness of central authorities to allow unemployment in deficit regions. This indicates that in dealing with unemployment in a member state monetary policy is more effective in a single currency mechanism than in fixed exchange regime of individual states' currencies.

Another advantage is that a MU is expected to increase the elasticity in means of payment. According to Mundell (1961) a single currency area implies a single central bank, with note-issuing powers, and therefore a potentially elastic supply of interregional means of payments. But in a currency area comprising more than one currency the supply of international means of payment is conditional upon the cooperation of many central banks. However, the author added that there is no central bank that can expand its liabilities faster than other central banks without losing reserves and impairing convertibility. This makes means of payment inelastic. What this brings out is the fact that a fixed exchange rate promotes stability and faster transfer of currency. Speculative behavior which either denies or overfeed the market with liquidity frustrates monetary policy outcome but large markets with single currency have potential to insulate themselves from speculation. On the part of single currency within a region, the transaction time and costs associated with exchange of currency are reduced to zero. The marginal cost of acquiring a foreign currency with a member state is zero. Therefore it can be argued that an elastic supply of means of payment reduces transaction costs since a quick system of payment reduces currency exchange queuing time, demurrage costs, speculation costs and information asymmetry. Therefore, it is good to let money do what it does better, which fundamentally remains to be a medium of exchange and store of value. The question is what role would money play if the number of currencies were equal to the number of goods? The number of prices for exchanging money would be $(n^2 - n)/2$ where n represents the number of countries. For instance in EAC the 5 countries yield 10 exchange rate prices but in a MU the number of foreign exchange prices will be zero.

In contrast, loss of independence over monetary and exchange rate policy is a major setback of a MU as advanced by Mkenda (2001). Robson (1987) submitted that a MU imposes constraints on monetary and fiscal policies which may impair the national macroeconomic objectives.

Indeed a MU denies individual countries the independent mechanism through which economic financial shocks can be controlled. It renders the individual countries unilateral monetary policy changes ineffective if not inexistent. However, it is claimed by Madhur (2002) that the economic loss from giving up an independent monetary policy by developing economies may not be very large for such countries since conducting independent national monetary policies to minimize cyclical fluctuations in economic activity by these economies is sketchy.

Another cost of a MU is the degree of severity of monetary shock in a MU depending on the degree of symmetry. According to Mkenda (2001) if the shocks affect all the members of the currency union similarly, a common policy response would be appropriate and this will limit the impact of monetary shocks to the economy. This indicates that a MU can exist in both symmetrical and asymmetrical partner economies but what separates the two is the effectiveness of common monetary policy in solving the economic dynamics. The more symmetrical the economies are the less the cost of MU and vice versa.

However, the transition into a MU and its subsequent management as Landon-Lane and Rockoff (2004) indicates is not easy. The authors state that the United States of America financial market integration neither occurred overnight nor without challenges. The authors admit that negative externalities are unavoidable in a MU and declare that in the US when Wall Street Sneezes, Main Street catches a Cold. The authors further reveal that the system of Federal Reserve district banks was designed in away to respond to individual districts challenges. This is an admission that a MU structure union that seeks to lock out the freedom of the country to implement country specific policies may cause more harm than good.

2.2 Empirical Literature

The Caribbean monetary integration is said to have inflation convergence by Cuestas and Dobson (2011) who used unit roots tests to test for convergence. The authors concluded that a common monetary policy would not have adverse implications and underlined that one of the criteria for a successful union is similarity in inflation rates across the group.

In the European Union inflation convergence has also been investigated in the period before and after the establishment of the Euro Zone. The governing council of the European Central Bank aims at maintaining inflation rate below, but close to 2% over the medium term and

according to European Central Bank (2011) and this was established in the first 12 years of the euro which the bank translated to high credibility of the euro for safeguarding purchasing power in that period. In the EU Lopez & Papell (2011) confirmed convergence among the Euro area inflations using panel unit root test on inflation differential to test for inflation convergence. They find that the average Euro area inflation rate was close to the ECB's definition of price stability since the advent of the Euro. The period of price stability corresponded to the periods of group-wise convergence and of lower levels of persistence (strong convergence) apart from when Greece and Ireland were included in the group. However, the authors note that the resulting loss in price competitiveness claimed trade imbalances and current account deficits that partly explain the 2008 financial crisis. Testing for convergence of inflation rates across the European countries using unit-root tests on inflation differentials and stability of the inflation rate using stationarity test Busetti, *et al* (2007), established that the economies had converged at the birth of the single currency however in the period 1998-2004 the economies had started diverging to form two stability clubs. The lower inflation group included Belgium, Germany, Austria, Finland and France, and the higher inflation club comprised of the Portugal, Ireland Greece, Spain, and the Netherlands.

While analyzing the readiness of the Gulf for a monetary union and using average inflation rate as one measure of monetary policy Mehanna and Hassan (2008) noted a small increase in inflation over the period 2000-2006. A mean of 2.18 over the period 1990-2006 indicated a low inflation rate and the decrease in range showed that the countries under study were converging in monetary policy as is required for a currency union. The subsequent One-Way ANOVA test results suggested, however that Gulf Cooperation Council—(GCC) countries were still not harmonized enough to depart from normality and would not be ready for a MU.

Focus on monetary policy transmission mechanism is seen in the EU Maastricht Treaty of 1992 that required convergence of interest rates especially in long-term interest rates by 2002. This was anchored on the understanding that monetary policy would only be easy to harmonize if the interest rates were close before at the point introduction of a MU.

While studying interest rate convergence in Caribbean Common Market (CARICOM) Modeste and Kendall (2003) used Augmented Dickey Fuller unit root test and found that the

CARICOM countries' deposit and lending rates had no unit root thus converging. However the study used difference in interest rates across countries as opposed to the regional average.

The first 12 members of the EU according to Miller *et al* (2011) showed no convergence in nominal and real interest rate in the period 2001-2010 except for Austria. Inflation convergence was also rejected. However, when structural breaks tests are used the results are overturned with convergence in nominal interest rates detected in 9 countries, convergence in real interest rate in 2 countries while convergence in inflation rate differential in 3 countries. Due to the effect of structural shocks on convergence the Miller *et al (2011)* proposed the use of fiscal policy mechanism through national spending controls to induce convergence.

2.3 Overview of the Literature

It is clear that there are various components in the OCA criteria that should be used to determine the readiness or preparedness of a set of economies to enter into a MU arrangement. These components encompass investigation into the degree factor mobility, openness, product diversification or similarity in industrial sector, business cycle synchronization, convergence of inflation rates and interest rates, fiscal integration, and social cohesion and political harmonization. It is expected that before a MU is introduced in the EAC these components be analyzed to establish how ready the region is to form a MU.

In addition, this study is guided by Robson (1987) argument that no single country will possess all the attributes required to make an ideal member of the MU. However, we can argue that some variables which dominate monetary policy should be given priority. The study identifies inflation rate and interest rate convergence and stability as crucial preconditions that members of any proposed MU should meet. The study can also be supported by the Maastricht treaty of 1992 where inflation and interest rates convergence conditions were preconditions that any country that intended to join the EZ by 2002 should have met conditionally. In addition monetary authorities are more often interested in and held accountable for inflation rate stability than other macroeconomic goals like economic growth, unemployment reduction and favorable balance of payment. Monetary authorities consider interest rate as a conventionally essential variable in the monetary policy transmission mechanism to control inflation which is the basis on which the study chooses inflation rate and interest rate convergence and stationarity to ascertain how ready the EAC is to form a MU by the end of 2012.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

It has been established in the literature review that inflation rates and interest rates convergence and stationarity are significant in determining suitable candidate economies for a MU. Economies whose inflation rates and interest rates have converged towards a common target trend will find it easy to adopt common monetary policies. This can be used to identify economies that are not ready to enter into a MU arrangement since lack of convergence in these variables will imply countries will need idiosyncratic policies to mitigate on their distinct trends in the economy. The following theoretical framework helps us understand why it is necessary to harmonize inflation rates and interest rates across countries before introducing a MU in addition to proving a framework for the model used in the study.

3.1 Theoretical Framework

The theory of international economic integration provides distinct stages in the process of integration which include; free trade area, customs union, common market, monetary union and political federation as discussed in Robson (1987). The quantity theory of money as well as inflation and purchasing power parity theories connect the key variables considered in the OCA criteria like inflation and interest rates.

The quantity theory of money is often traced back to the works of Fischer (1911) who connected the real/product sector and money sector using the equation of exchange as shown in equation 1. In the equation M stands for nominal money balances in circulation in the economy, V is the velocity of money in circulation in the economy, P is transaction price and T stands for volume of transactions.

$$MV = PT \qquad \text{.......} \quad 1$$

Equation 1 can be transformed to equation 2 as interpreted by Pigou (1917) in Sriram and Adams (1999) where M is nominal money demanded, M_d , and assumed to be proportional to the nominal level of income, PY, and k is the constant of proportionality. Further, Pigou (1917)

shows that $MV = PY$ where V is the inverse of k and $M = M_d = M_s$. M_s is money supply in the economy and controlled by central monetary authority.

$$M_d = kPY \quad \text{.....2}$$

In order to introduce interest rate into equation 2 the Keynesian theory of demand for money indicates that interest rate is a determinant of money demand. This emanates from the precautionary and speculative motives of holding money that Keynes (1936) postulates. Accordingly, Keynes (1936) stated that $M_d = f(Y,i)$ where Yand i are income and interest rate respectively.

Purchasing Power Parity theory which builds on the law of one price is important in linking up the economic variables across the economies. The law of one price means that the price of a product expressed in the same currency should remain the same across the borders. This is a long-run relationship and is shown in equation 3 where P_t stands for the general price level of the domestic economy, S_t is the nominal exchange rate (domestic currency per unit of the foreign currency) and P_t^* is the general price level of the foreign economy at time t

$$P_t = S_t P_t^* \quad \text{.....3}$$

In equation 4 purchasing power parity requires that at equilibrium Real exchange Rate (RER) = 1 in the in the long-run. This is explained by the law of one price for a product across the economies.

$$RER = \frac{S_t P_t^*}{P_t} \quad \text{.....4}$$

In order to capture the short-run dynamics we make some assumption from what Taylor and Taylor (2004) called the border-effect and argue that the purchasing power parity does not hold in the short run due to transaction costs like transport costs, tariffs and nontariff barriers in addition to the fact that some goods are non-tradable and others tradable. Further more information asymmetry, expectations and speculation dislocate the real exchange rate in the short-run. Therefore in the short-run equation 4 is transformed to equation 5 where β, φ and φ^*

are the elasticity of real exchange rate to changes in nominal exchange rate, general price level of the domestic economy and general price in the foreign economy respectively.

$$RER = \frac{S_t^{\beta} P_t^{*\varphi^*}}{P_t^{\varphi}} \quad \text{.....5}$$

The OCA criteria requirement that inflation and interest rates converge to their respective common trend in order to qualify a set of economies to form a MU borrows from the establishment of the money demand condition (equations 2), purchasing power parity condition (equation 5) and the Keynesian theory of demand for money. To test for inflation rate convergence we use equation 5 by linking the changes in general price levels of respective economies as shown in appendix B while expecting the short-run real exchange rates to converge over time to the long-run purchasing power parity real exchange rate. This implies that in the long run the inflation rates are expected to converge because the long-run purchasing power parity real exchange rate is expected to be established. On the other hand, following equation 2 and 5 as shown in appendix C, interest rates across the economies are linked. Interest rates are used to control the money supply in the market to manage inflation rate and therefore they are also expected to converge if the inflation rates converge. These are the conditions the study analyzes to determine if the EAC is ready for a MU by 2012.

3.2 Model Specification

Convergence of inflation rates is measured by testing for a unit root in the inflation rates differentials. The Augmented Dickey Fuller (ADF) test following equation 5 is used as applied by Kočenda and Papell (1997) to test for convergence where rejecting the null hypothesis of a unit root on the differentials imply the series are converging. Similarly interest rate convergence is tested by replacing inflation rate with interest rate accordingly in equation 6.

$$\Delta d_{i,t} = (\emptyset - 1)d_{i,t-1} - \sum_{j=1}^{k} \gamma_i \Delta d_{i,t-j} + \varepsilon_{i,t} \quad \text{.....6}$$

where ,

$d_{i,t} = \pi_{i,t} - \bar{\pi}_t =$ Differential between country inflation rate and EAC average inflation rate

$\Delta d_{i,t} = d_{i,t} - d_{i,t-1} =$ Change in the inflation rate differential between time $t-1$ and time t

$\pi_{i,t} =$ Individual country's inflation rate at time t

$\pi_{i,t-1}$ = individual country's inflation rate at the previous time t

$\bar{\pi}_t$ = Average inflation rate of the group of countries at time t

$\emptyset$ = convergence coefficient

k = lag length

$\varepsilon_{i,t}$ = stochastic error term

Stationarity of the inflation rate differentials and interest rate differentials is tested using the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test as proposed by Kwiatkowski *et al* (1992) Higher estimated KPSS statistics than the critical KPSS statistics at a given confidence level lead to the rejection of the null hypothesis that the series are stationary at that level of confidence. Kwiatkowski *et al* (1992) computed the KPSS test based on the regression of equation 7 which is an autoregression (AR) equation of order 1.

$$y_t = \omega + \beta y_{t-1} + \varepsilon_t \quad \ldots\ldots 7$$

Where

y_t = dependent variable, inflation rate differential or interest rate differential

y_{t-1} = lagged dependent variable, inflation rate differential or interest rate differential

β = convergence coefficient

ω = component to include an intercept and deterministic trend

ε_t = residual term

Accordingly, the KPSS test is calculated as shown in equation 8, see appendix D on the derivation of the KPSS test.

$$KPSS = \frac{1}{T^2\delta^2}\sum_{t=1}^{T} s_t^2 \quad \ldots\ldots 8$$

Where,

t = time

T = Maximum time of the observations

S = Sum of regression residuals (ε_t) of the dependent variable in equation 7

δ^2 = Long-run variance of the residuals (ε_t)

3.3 Definition of Variables

Buruinfl	=	Burundi inflation rate
Burulendrate	=	Burundi lending rate
DBuruinfl	=	Burundi inflation rate differential
Dburulendrate	=	Burundi lending rate differential
Dkeinfl	=	Kenya inflation rate differential
Dkelendrate	=	Kenya lending rate differential
Drwainfl	=	Rwanda inflation rate differential
Drwalendrate	=	Rwanda lending rate differential
Dtzinfl	=	Tanzania inflation rate differential
Dtzlendrate	=	Tanzania lending rate differential
Duginfl	=	Uganda inflation rate differential
Duglendrate	=	Uganda lending rate differential
EACinfl	=	East Africa Community average inflation
EAClendrate	=	East Africa Community average lending rate
Keinfl	=	Kenya inflation rate
Kelendrate	=	Kenya lending rate
Rwainfl	=	Rwanda inflation rate
Rwalendrate	=	Rwanda lending rate
Tzinfl	=	Tanzania inflation rate
Tzlendrate	=	Tanzania lending rate
Uginfl	=	Uganda inflation rate
Uglendrate	=	Uganda lending rate

CHAPTER FOUR

DATA TYPE, SOURCES AND DESCRIPTION

4.0 Introduction

Time series data from the World Bank (2012) and the East Africa Community secretariat (2012) database are used after checking for compatibility. The data covers 31 years from 1980-2010. Where some observations miss like in 1993-1994 for Rwanda due to the genocide the data is extrapolated. This helps the study to have 31 observations for all variables. The study uses EVIEWS5 in the analysis of data.

4.1 Description of Inflation Rates Data of the EAC Economies

The descriptive statistics shown in table 3 indicate that in the period 1980-2010 the EAC average inflation rate is 18.44 where Uganda experienced highest average inflation rates. Except for Uganda the standard deviations of the inflation rates for the other EAC economies show that the data points are not spread out over a large range of values.

Some data have 2 to 4 observations that are suspected as outliers as shown in figure A.7 in the appendix but most of them are near to the data set except for only 2 far outliers observed in Uganda data. It is confirmed that the suspected outliers are natural and therefore retained in the analysis. Therefore, the results of the analysis are not spurious.

Table 3: Descriptive Statistics of inflation Rates in the EAC (1980-2010)

	BURUINFL	KEINFL	RWAINFL	TZINFL	UGINFL	EACINFL
Mean	10.44399	13.07612	6.942581	19.54704	42.19499	18.44094
Median	8.996900	11.36180	6.593000	21.84680	10.03680	15.74970
Maximum	31.11160	45.97890	19.63720	36.14590	200.0260	49.97186
Minimum	-1.371000	1.554300	-2.405900	4.735800	-0.287500	1.522640
Std. Dev.	7.778637	9.213675	4.839469	11.43028	60.56241	13.04432

Source of data; World Bank

4.2 Description of Lending Rates Data of the EAC Economies

The descriptive statistics shown in table 4 indicate that in the period 1980-2010 the EAC average lending rate is 19.04%. The standard deviations of the lending rates for the other EAC

economies show that the data points are not similarly spread out with Rwanda and Burundi lending rates showing 4 to 5 points apart with Kenya, Uganda and Tanzania.

It is only Uganda lending rates that show 5 data points in figure A.8 which are suspected to be outliers but they are natural entries and are retained in the analysis. These data points coincide with the inflation rate natural outliers since high inflation rates are theoretically associated with high lending rates as a monetary measure for controlling inflation. Therefore this data does not yield false results on the EAC lending rates mean and the convergence of respective economies' lending rates to the EAC average lending rates.

Table 4: Descriptive Statistics of Lending Rates in the EAC (1980-2010)

	BURULENDRATE	KELENDRATE	RWALENDRATE	TZLENDRATE	UGLENDRATE	EACLENDRATE
Mean	14.37333	18.85065	15.45371	21.65552	23.25507	19.03757
Median	14.00000	15.83000	16.00000	19.00000	21.00000	19.67600
Maximum	19.00000	36.24000	19.00000	43.00000	40.00000	24.35000
Minimum	12.00000	10.58000	12.00000	12.00000	11.00000	11.71600
Std. Dev.	2.339101	6.989909	1.804057	8.899348	7.255853	3.185713

Source of data; World Bank

CHAPTER FIVE

ANALYSIS AND FINDINGS

5.0 Introduction

The analysis of the EAC status with respect to its readiness for a MU is presented in this chapter based on the inflation rates and lending interest rates applying the methodology specified in chapter 3 and data described in chapter 4. Convergence, stationarity, correlation and causality tests have been used in the analysis of data.

5.1 Convergence and Stationarity of EAC inflation rates

The EAC inflation rate differentials as shown in table 5 do not have unit roots at all levels of confidence except for Kenya and Uganda's inflation rate differentials only at 1% confidence level. This indicates that the inflation rates in the EAC are converging to the EAC average inflation rate at individual level. Burundi has a higher rate of convergence followed by Rwanda, Kenya and Uganda respectively. Tanzania inflation differential shows weak divergence with a coefficient of 0.1887.

Table 5: Unit root test on individual inflation rate differentials

variable	2nd Stage Coefficient $(\emptyset - 1)$	1st Stage Coefficient $(\emptyset)$	Const	Trend	lag length	Computed ADF value	Critical ADF Value			R2
							1%	5%	10%	
dburuinfl	-0.69557 (0.0000)	0.30443	0	0	8	-6.2981 (0.0000)	-2.674	-1.957	-1.608	0.798
dkeinfl	-0.227613 (0.0494)	0.772387	0	0	0	-2.0506 (0.0404)	-2.647*	-1.953	-1.610	0.12
drwinfl	-0.590146 (0.0005)	0.409854	-20.06 (0.0012)	0.8061 (0.0024)	2	-4.069288 (00177)	-2.669	-1.956	-1.609	0.43
dtzinfl	-1.1887 (0.0005)	-0.1887	13.552 (0.0009)	-0.5276 (0.0030)	8	-4.8785 (0.0040)	-4.440	-3.633	-3.255	0.89
duginfl	-0.184397 (0.0652)	0.815603	0	0	0	-1.9165 (0.0540)	-2.669*	-1.956	-1.609	0.106

No. of observations 31

(*) fail to reject the null hypothesis that the series has unit root

Further, 4 out of 6 tests of group unit root in the EAC countries' inflation differentials, as shown in table 6, confirm that there is no group unit root. The EAC inflation rate differentials thus are converging. In these tests individual effects are allowed together with linear trends. The individual effects mean that the individual series are allowed to have unique parameter estimators and the trend detects any sustained increase or decrease of the series in a given direction.

Table 6: Group unit root test on inflation rate differentials with intercept and trend

Null Hypothesis	Method	Statistic	Prob.	Cross-sections	Obs
Group unit root (assumes common unit root process)	Levin, Lin & Chu t*	-1.22919	0.1095*	5	145
	Breitung t-stat	-2.37767	0.0087	5	140
No group unit root (assumes common unit root process)	Hadri Z-stat	1.07711	0.1407	5	155
Group unit root (assumes individual unit root process)	Im, Pesaran and Shin W-stat	-2.24003	0.0125	5	145
	ADF - Fisher Chi-square	20.6012	0.0241	5	145
	PP - Fisher Chi-square	11.1023	0.3496*	5	150

(*) Group unit root detected
Results based on Newey-West bandwidth selection criteria using Bartlett kernel spectral estimation

When individual effects are allowed but without linear trend 4 out of 6 of the results also disapprove the group unit roots as shown in table 7. A remarkable result of the LLC test which rejected the group unit root when both individual effects and trend were allowed but failed to reject when the trend is dropped. The overall assessment from table 6 and table 7 suggested that the EAC inflation rates are converging which is supportive of possible feasibility of MU.

Table 7: Group unit root test on inflation rate differentials with intercept only

Null	Method	Statistic	Prob.	Cross-sections	Obs
Group unit root (assumes common unit root process)	Levin, Lin & Chu t*	-1.84507	0.0325	5	138
	Breitung t-stat	-1.34972	0.0886	5	133
No group unit root (assumes common unit root process)	Hadri Z-stat	4.01117	0.0000*	5	155
Group unit root (assumes individual unit root process)	Im, Pesaran and Shin W-stat	-1.88259	0.0299	5	138
	ADF - Fisher Chi-square	17.1857	0.0704	5	138
	PP - Fisher Chi-square	14.7083	0.1431*	5	150

(*) Group unit root detected
Results based on Newey-West bandwidth selection criteria using Bartlett kernel spectral estimation

In addition, the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test shows that the inflation rates are stationary meaning that they have converged to the EAC average rate. As shown in table 8, only the stationarity of inflation rate differential of Burundi is rejected at 1% level of confidence. This is a follow up from the previous convergence test which was supported. The evidence that the inflation rates have converged can as well be seen in figure A.4 attached in Appendix A where between the years (1990-2000) the inflation rate differentials were close and got even closer between the years (2000-2010).

Table 8: Stationarity test on the inflation rates differentials

Variable	R^2 Statistic	Band-width	Computed KPSS Statistic	Reject null at
dburuinfl	0.452367	0	0.3720	1%
dkeinfl	0.292388	4	0.0645	-
drwainfl	0.495310	7	0.0080	-
dtzinfl	0.001555	3	0.1136	-
duginfl	0.359458	3	0.0318	-

Lag length is based on the Akaike information criteria and fixed on Spectral OLS AR in computing the KPSS
The 1%, 5% and 10% KPSS critical values are 0.216000, 0.146000, and 0.119000 respectively

The overall assessment of the inflation rates in the EAC using ADF test and KPSS test support convergence and stationarity of these variables. In addition these results can be verified from figures A.2, A.3 and A.4. In figure A.2 the EAC consumer price indices of the economies though starting far apart in 1980s they become closer in the 1990s and closest in the 2000s. The trend is followed in figure A.3 where the EAC economies' inflation rates move towards the EAC average inflation rate especially between 1990 and 2010. The inflation rate differentials in figure A.4 show the convergence and stationarity since they trend close between 1990 and 2000 and show stable horizontal movement between 2000 and 2010.

5.2 Convergence and stationarity of EAC lending rates

Individual unit root tests on the EAC lending rates differentials show mixed results in table 9. Burundi and Kenya's lending rates have unit root at all levels of confidence. Rwanda's lending rate series is showing signs of convergence at all levels of confidence whereas the lending rates of Tanzania and Uganda show convergence at 5% level of confidence. The first stage coefficients which show the rate of convergence indicate that Rwanda' lending rates is converging faster than Tanzania and Uganda's lending rates.

Table 9: Unit root test on individual lending rate differentials

variable	2nd stage Coefficient $(\emptyset - 1)$	1st stage Coefficient $(\emptyset)$	lag length	Computed ADF value	Critical ADF Value			Reject the null at
					1%	5%	10%	
Dburulend	-0.023927 (0.6209)	0.976073	0	-0.49986 (0.4912)	-2.6443	-1.9525	-1.6102	None
Dkelend	-0.130162 (0.1692)	0.869838	0	-1.4099 (0.1444)	-2.6443	-1.9525	-1.6102	None
Drwalend	-0.757237 (0.0002)	0.242763	5	-4.618483 (0.0058)	-4.4407	-3.6329	-3.2547	1%
Dtzlend	-0.187332 (0.0413)	0.812668	1	-2.1434 (0.0330)	-2.6471	-1.9529	-1.6100	5%
Duglend	-0.39099 (0.0003)	0.60901	3	-4.3146 (0.0106)	-4.3393	-3.5875	-3.2292	5%

Null: Series has unit root
Figures in parenthesis are probabilities of rejection of null hypothesis

The group unit root test does not support convergence of the lending rates in the EAC. This is evident in table 10 results where 5 out of 6 tests traces group unit root thus disapproving convergence. This poses a challenge in implementing common monetary policy since the lending rates are not converging as a group. Such an outcome would imply that either the economies are facing different real shocks that induce different demand for money behavior thus affecting the money market differently or the authorities prefer different economic ideologies. In addition, other factors like different levels of fiscal deficits, domestic debt, levels of financial sector development, market liberalization and degree of openness of the economies are expected to affect the economies differently thus motivate different monetary policy interventions.

Table 10: Group unit root test on lending rates differentials

Null	Method	Statistic	Prob.**	Cross-sections	Obs	Lag Criteria
Group unit root (assumes common unit root process)	Levin, Lin & Chu t*	-1.05560	0.1456*	5	141	AIC
	Breitung t-stat	-1.63357	0.0512	5	136	
No Group unit root (assumes common unit root process)	Hadri Z-stat	3.08107	0.0010*	5	155	NA
Group unit root (assumes individual unit root process)	Im, Pesaran and Shin W-stat	-1.01157	0.1559*	5	141	AIC
	ADF - Fisher Chi-square	15.3559	0.1196*	5	141	
	PP - Fisher Chi-square	5.83442	0.8290*	5	150	

(*) Group unit root detected
Results are based on Newey-West bandwidth selection criteria using Bartlett kernel spectral estimation

Stationarity of the EAC lending rate differentials is rejected as shown in table 11 except for Uganda. This shows that the lending rates in the EAC have not converged confirming the earlier indication that they are not converging. It is noted that though inflation rates have converged the lending rates are not converging. This implies that a MU is not feasible as by the end of 2012

Table 11: Stationarity of the EAC lending rate differentials

Variable	R^2 Statistic	Lag Length	Computed KPSS Statistic	reject null at
Dburulend	0.15700	0	3.061947	1%
Dkelend	0.002755	0	1.543688	1%
Drwalend	0.068441	5	0.221709	1%
Dtzlend	0.020184	2	1.576561	1%
Duglend	0.084199	3	0.002624	-

Lag length Fixed on Spectral OLS AR based on the Akaike information criteria
The 1%, 5% and 10% KPSS critical values are 0.216000, 0.146000, and 0.119000 respectively

The overall assessment of the differentials of the EAC lending rates using ADF test and KPSS test does not support group-wise convergence and stationarity. It is Rwanda, Tanzania and Uganda's lending rate differentials whose convergence is supported at 5% level of confidence out of which only Uganda's lending rate differential is stationarity. Kenya and Burundi's lending rate differentials have not shown signs of convergence and stationarity. These results can be verified from figures A.5, and A.6. In figure A.5 the lending rates of Rwanda, Tanzania and Uganda start moving persistently towards the EAC average lending rate as from 1993, 1995 and 1989 respectively towards 2010. In figure A.6 for instance Rwanda, Tanzania and Uganda's lending rate differentials show persistent trending towards – 0.2 as from 1989, 1995 and 1989 respectively. This mixed outcome on convergence of lending rates and failure to establish stationarity reduces chances of the EAC forming a functional MU in the near future.

5.3 Performance of EAC Lending Rates as a Monetary Policy Tool (1980-2010)

The performance of the lending rates as a monetary policy instrument in the last three decades shows Uganda as the only country that follows our theoretical expectations that lending rates and inflation rates should influence each other. Monetary authorities adjust bank rates to impact on the overall lending rate in the market in the management of inflation rate. Therefore the analysis of lending rates and inflation rate reflects the performance of the monetary policy.

The granger causality test proves that Uganda's lending rate and inflation rates direct each other even though their correlation coefficient is less than 0.5 as shown in table 12. As reflected in table 12, Rwanda and Burundi's inflation and lending rates do not granger cause each other. Tanzania and Kenya inflation rates inform the direction of the corresponding country lending rates besides their correlations being 0.35 and 0.24 respectively. Burundi inflation rate has weak effect of lending rates in addition to having a correlation coefficient of 0.21 as shown in table 12. Apart from in Uganda, the lending rates in the region do not granger cause movements in the respective inflation rates registering a weak performance of monetary authorities in terms of monetary policy interventions. The overall performance of the monetary policy as reflected by the correlations and causality test in table 12 are more of curative as opposed to preventive; lending rates react to inflation rate developments and all have low correlation coefficients, below 0.5. It indicates that there exist some other factors that overshadow the expected granger causal effect between lending rates and inflation rates thus if

the monetary authorities in EAC focus on lending rates as the only monetary policy tool this will not fully effective in controlling inflation rates if a MU is formed by the end of 2012.

On the other hand it can therefore be defended that the weak granger causality between lending rates and inflation rates in the EAC attests to the fact that there are other factors beyond the control of monetary authorities that come into play in the market. Some of these factors include; currency attacks, speculation behavior, oil price and supply shocks, natural calamities, level of openness, money laundering and fiscal policies which spill onto increased money supply and consequently increased inflation. This indicates that the formation of a MU in the near future will not only be ineffective in controlling inflation rates but also insufficient in solving other macroeconomic challenges like unemployment, balance of payment and economic growth.

Table 12: Granger causality test and correlations on lending and inflation rates

Null Hypothesis	Prob.	F-stat	Lags	Correlation coefficient
BURULENDRATE does not Granger Cause BURUINFL	0.96771	0.22861	7	0.209222
BURUINFL does not Granger Cause BURULENDRATE	0.09886	2.51748		
KELENDRATE does not Granger Cause KEINFL	0.70504	0.47200	3	0.242687
KEINFL does not Granger Cause KELENDRATE	0.01812*	4.17993		
RWALENDRATE does not Granger Cause RWAINFL	0.32425	1.27747	5	0.376087
RWAINFL does not Granger Cause RWALENDRATE	0.87112	0.35496		
TZLENDRATE does not Granger Cause TZINFL	0.26880	1.27478	1	0.351927
TZINFL does not Granger Cause TZLENDRATE	0.03474*	4.94413		
UGLENDRATE does not Granger Cause UGINFL	0.00120*	9.01039	2	0.378692
UGINFL does not Granger Cause UGLENDRATE	0.00135*	8.81328		

(*) Reject null hypothesis

CHAPTER SIX

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

6.0 Summary

Though the EAC inflation rates are converging and have shown evidence of having converged (being stationary), the lending rates have not. This is a paradox of monetary policy in the sense that inflation and interest rates are expected to inform each other since monetary authorities rely on interest rates to stabilize inflation in the market. Therefore it is our expectation that if inflation rates converge then interest rates should also converge. The granger causality test on inflation rates and lending rates does not approve of a reliable granger causal effect between inflation rates and lending rates in the region. The correlation of the lending rates and inflation rate across the countries equally registers low positive degree of association. This does not assure EAC of relying on the current monetary policies in controlling inflation.

This outcome can be attributed to other factors that affect the economy and have effects on inflation and lending rate like levels of fiscal deficits, domestic debt, levels of financial sector development, market liberalization and degree of openness, fiscal deficits, degree of openness, currency attacks, speculation behavior, oil price and supply shocks, natural calamities, level of openness and fiscal policies which spill onto increased money supply and consequently increased inflation.

Most of the causes of the collapse of the EAC in 1977 have not been fully addressed. For instance, political ideological differences still exist in addition to different levels of democratic dispensation. Participation of the general public, private sector and civil society in the processes of integration is still low. Though steps have been taken on cost sharing in some sectors like infrastructure, Kenya is still feared as the greatest beneficiary. Literacy levels, social values and principles vary significantly in the region with gender bias, corruption, ethnicity and marginalization, disrespect for rule of law and impunity still dominant. Mistrust and suspicion are still rife to an extent that labor mobility, freedom of establishment and transfer of land remain major stumbling blocks. These issues need to be tackled gradually to lay a foundation for a monetary union.

6.1. Conclusion

It is established that the EAC differentials of inflation rates for 1980-2010 converge and have shown evidence of stationarity. However, convergence of lending rates has not been realized. In addition, the expected high correlation (above 0.5) and granger causality between the lending rates and inflation rates to support a MU is violated. There seems to be different monetary policy transmission directions in controlling inflation rates in the region. Therefore, a monetary policy transmission crisis or negative shock from the immediate introduction of a MU in the EAC is highly probable. Due to this contradiction the EAC may not be ready for a MU in the near future however harmonization of key policies, values and practices should continue to prepare the region for a MU sometimes later.

6.2. Policy Recommendations

Consequently, the study recommends that the economies should be allowed more time for instance, the next 10 years, to enable respective central banks realign their interest rate regimes with either the regional averages or any other common agreed rates before officially flagging off the MU structures. The period should also provide more time for the respective authorities to continue harmonizing their fiscal and monetary policies to sustain the achieved convergence of inflation rates and further motivate the convergence in interest rates.

This timeframe is arrived at given the decade based behavior of inflation rate differentials by coming close between 1990 and 2000 and even closer between 2000 and 2010 as shown in figure A.4. Coincidentally, the European Union, as reflected in the Maastricht treaty (1992), gave a decade to the member states, between 1992 and 2002 to reform their economies towards the formation of the Euro Zone where clear expectations on the rational limits of inflation and interest rates were outlined.

6.3. Areas of Further Research

The study concentrates on inflation rate and interest rates convergence and stationarity leaving the other components of the OCA unattended. These components inform need to researched on the following areas to complement the findings of this study: Assessment of the degree of capital mobility, degree of openness, degree of product diversification, degree of fiscal integration, degree of socio-political cohesion and business cycle synchronization in the EAC.

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APPENDIX A: Trends of key Economic Variables in the EAC (1980-2010)

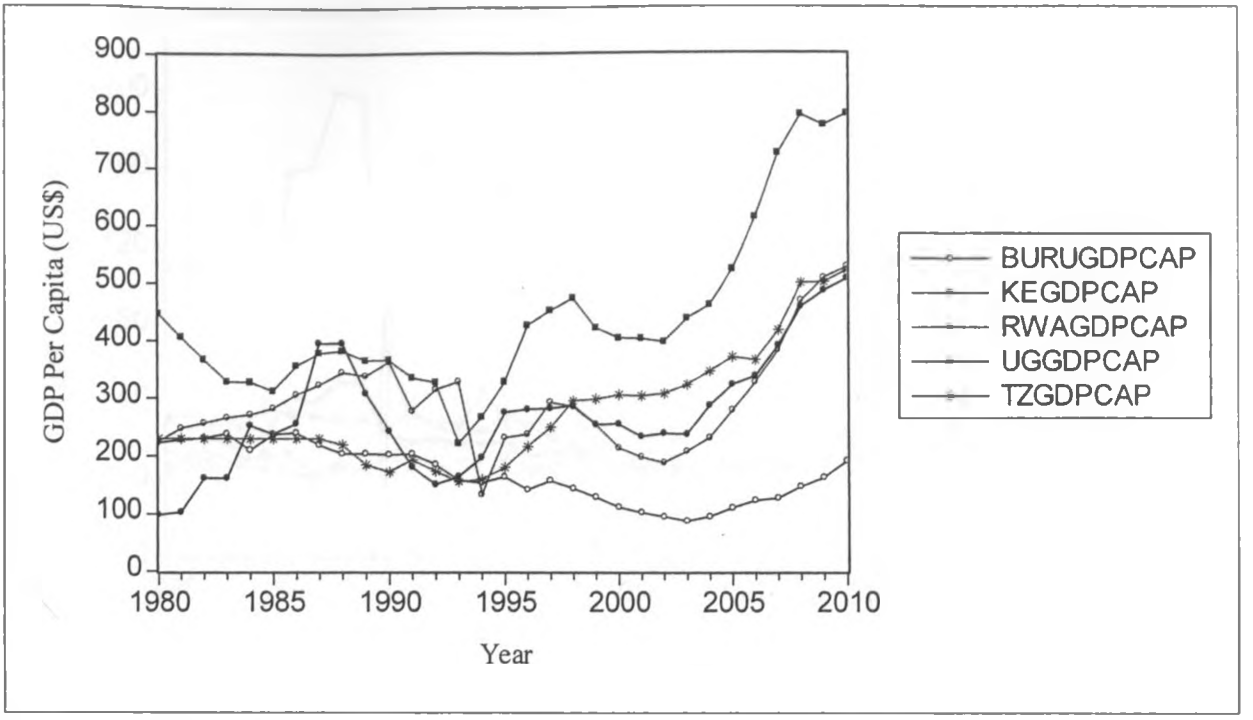
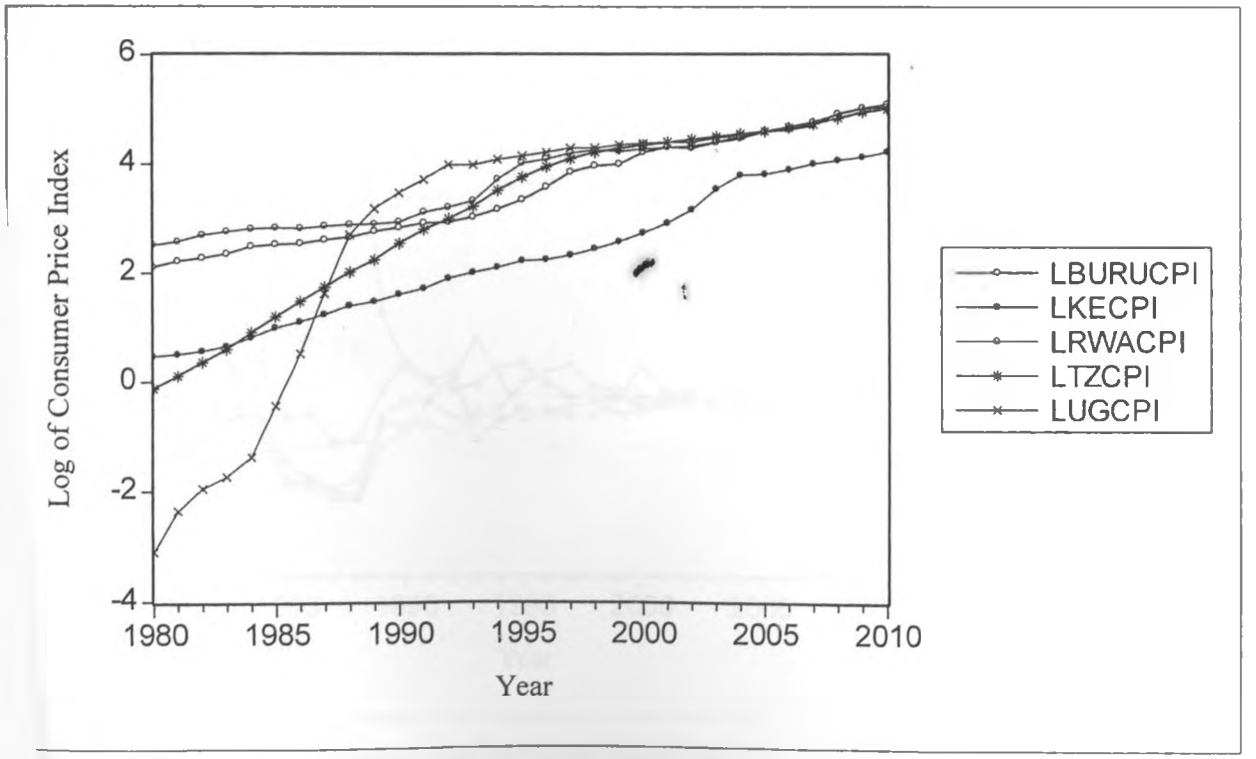


Figure A.1: Trend of Gross Domestic Product per capita in the EAC (1980-2010)



gure A.2: Trend of consumer price indices in the EAC (1980-2010)

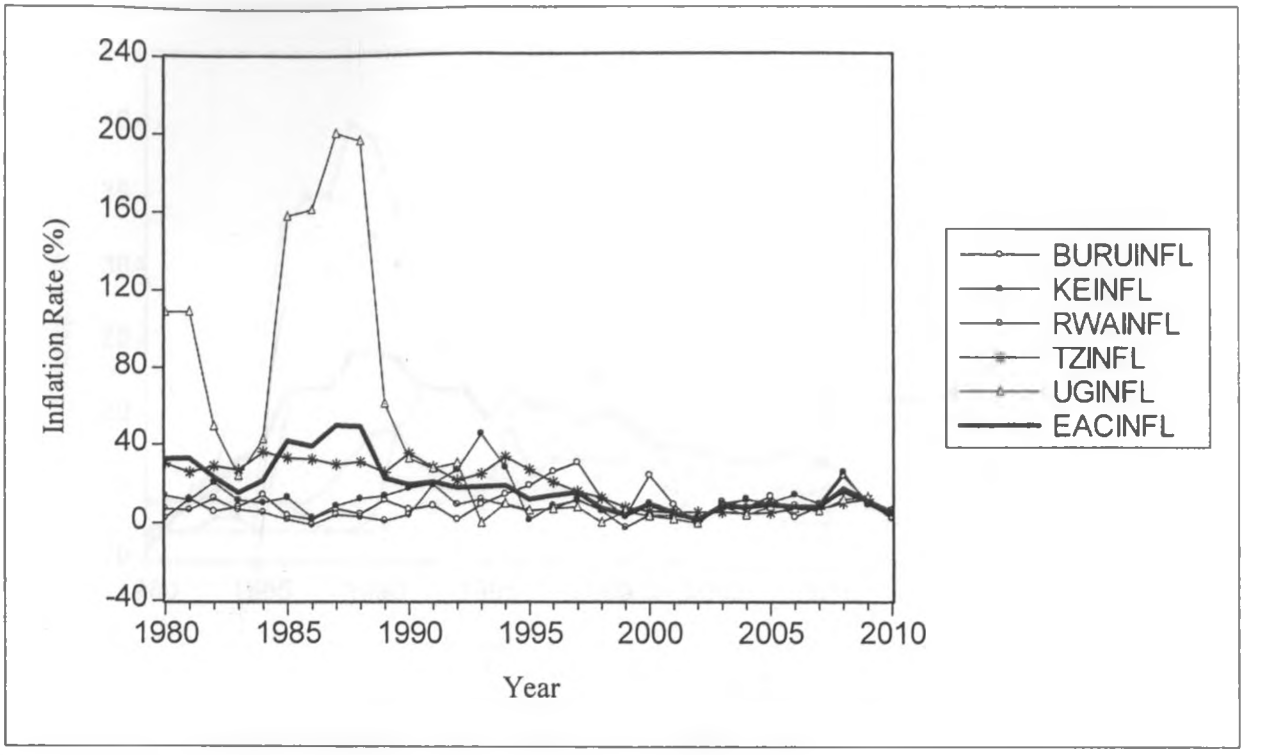


Figure A.3: Trend of inflation rates in the EAC (1980-2010)

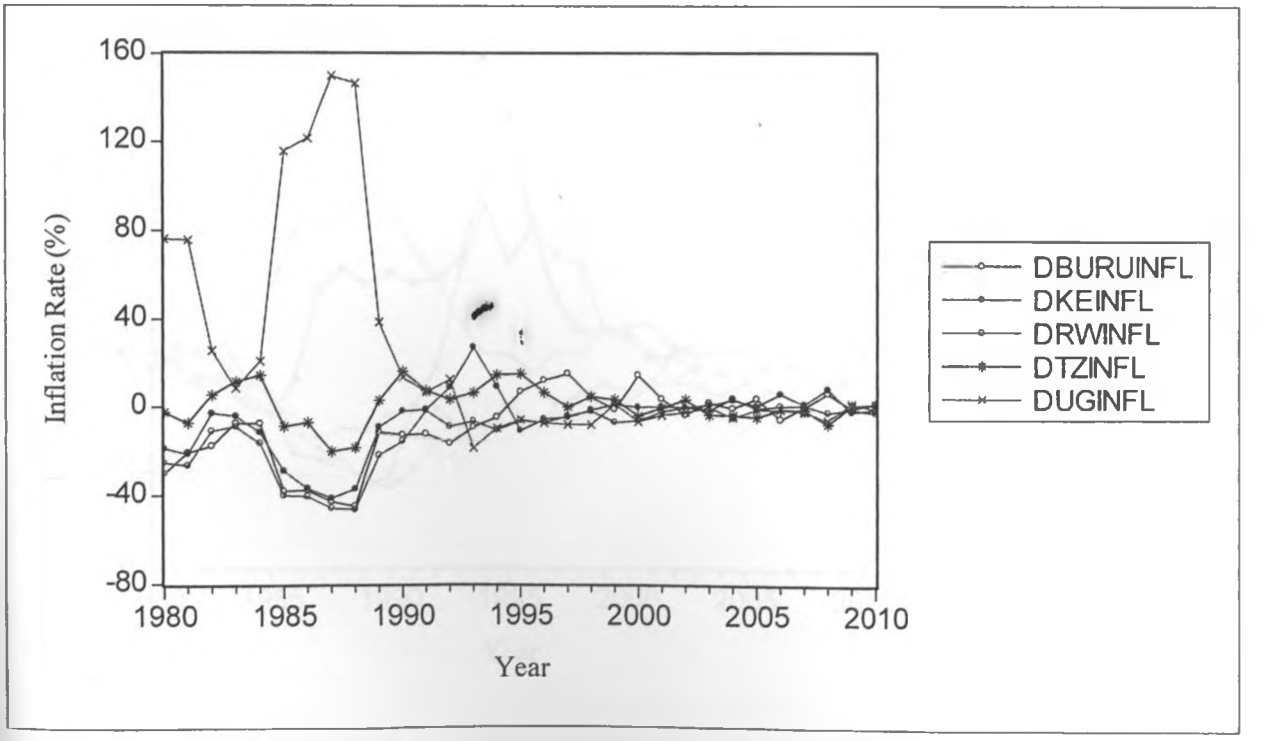


Figure A.4: Trend of inflation rate differentials in the EAC (1980-2010)

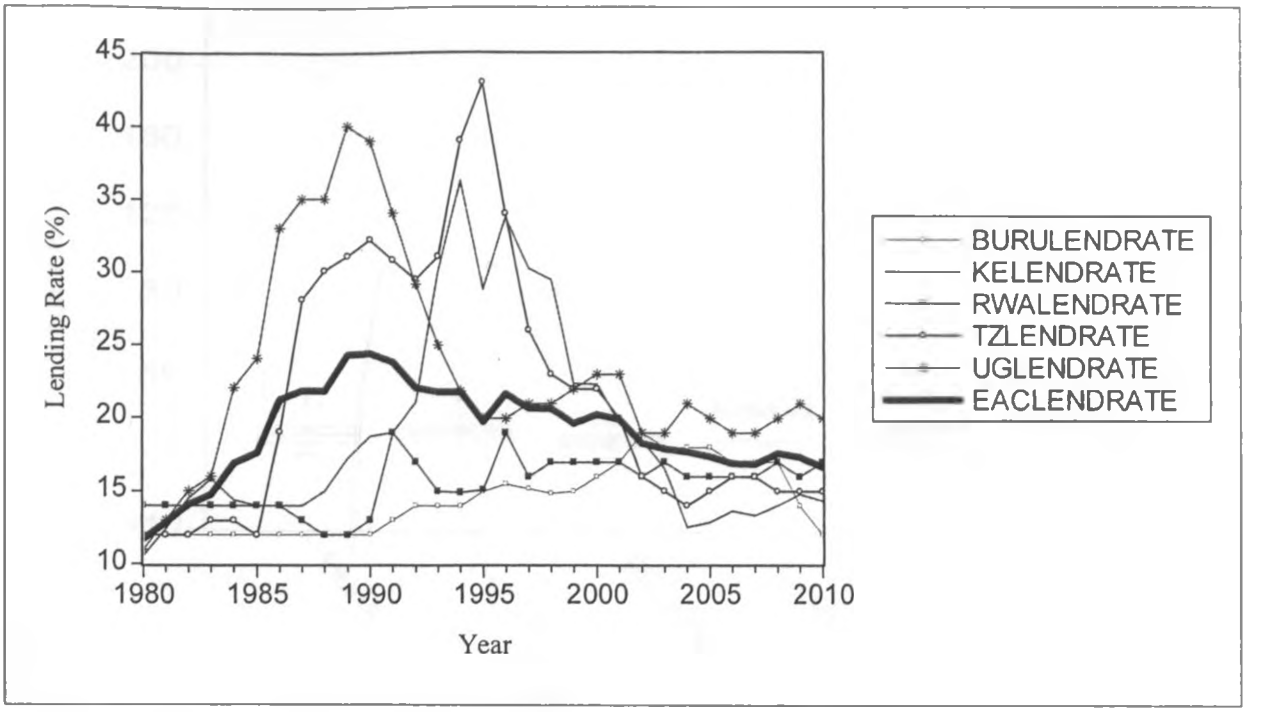


Figure A.5: Trend of lending rates in the EAC (1980-2010)

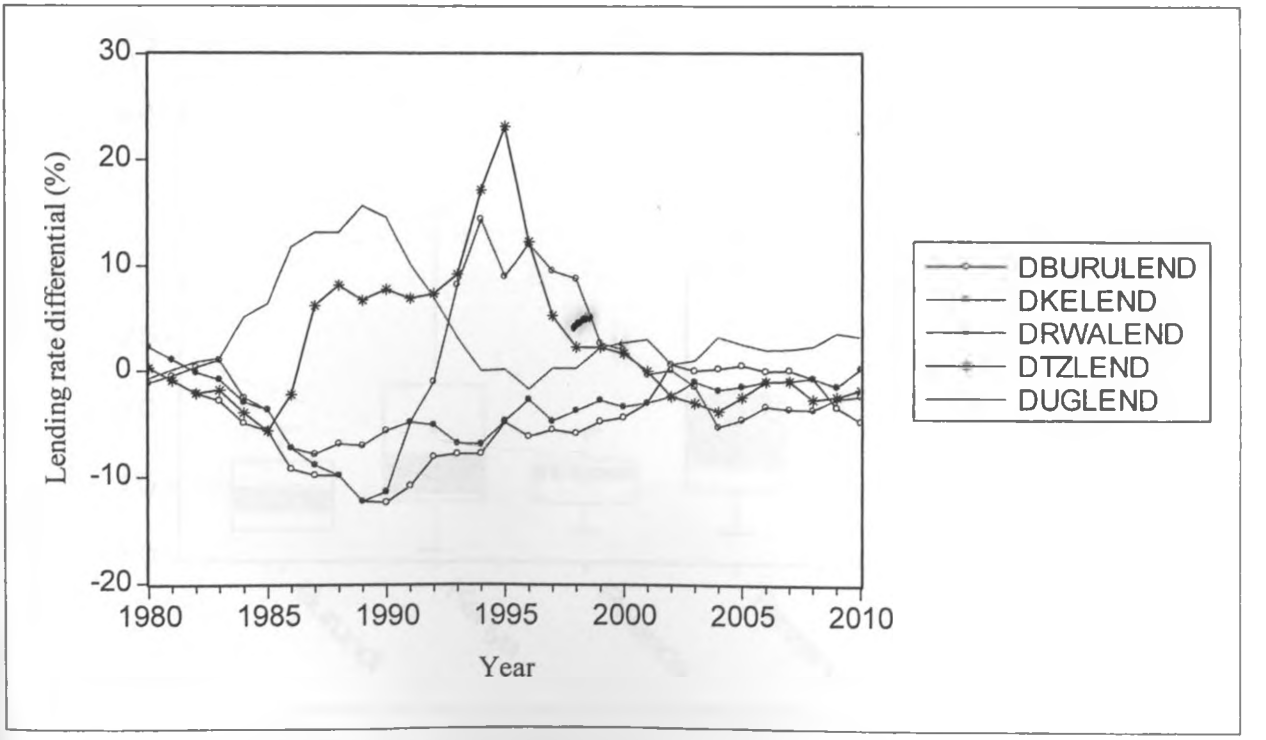


Figure A.6: Trend of lending rate differentials in the EAC (1980-2010)

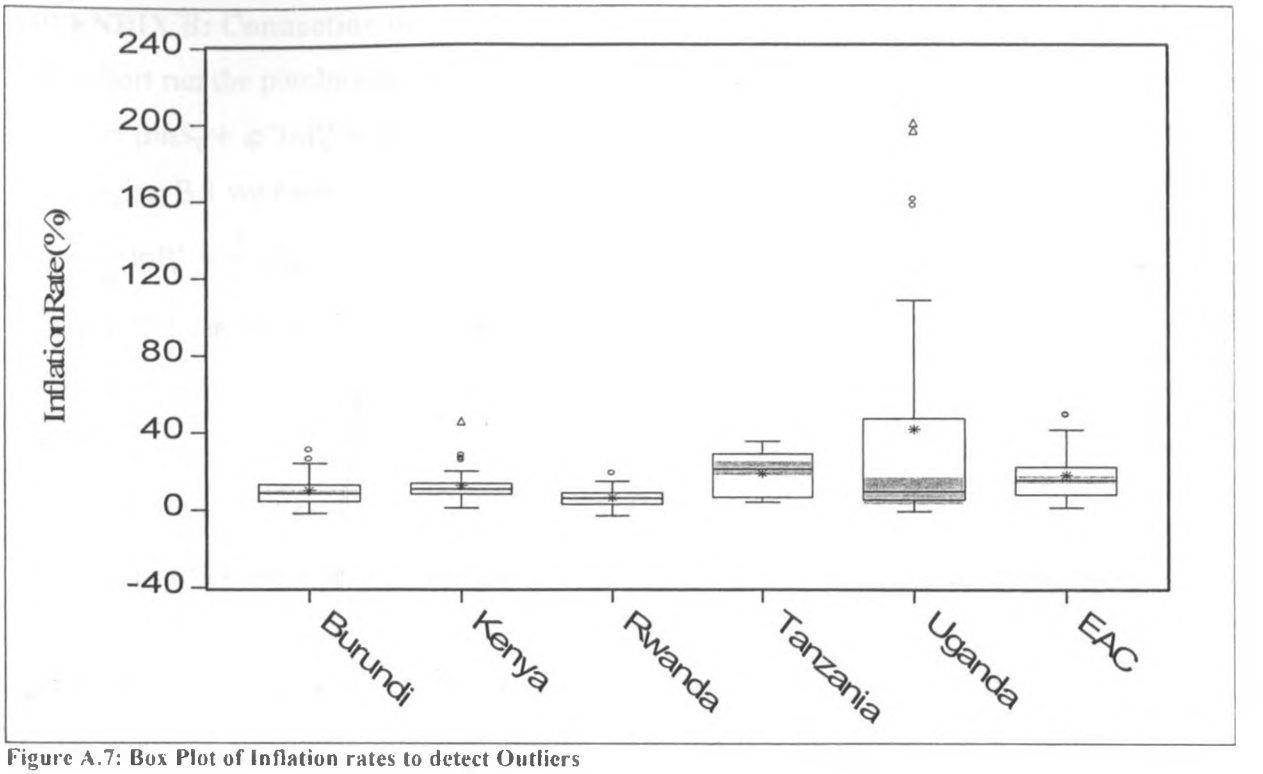


Figure A.7: Box Plot of Inflation rates to detect Outliers

Key: * = Mean, Δ = Far Outliers, O = Near Outliers – = Median Line in the Box

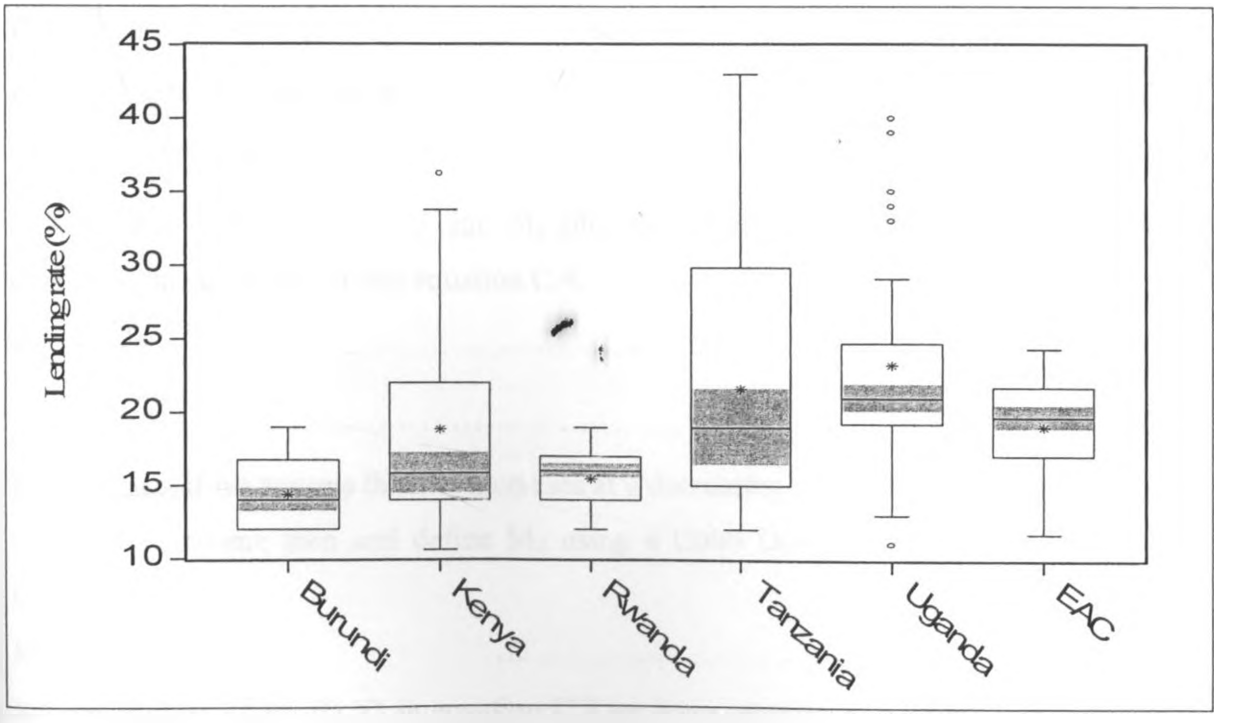


Figure A.8: Box Plot of Lending rates to detect Outliers

Key: * = Mean, Δ = Far Outliers, O = Near Outliers – = Median Line in the Box

APPENDIX B: Connecting domestic inflation rate to foreign Inflation Rates

In the short run the purchasing power parity (PPP) provides that:

$$\ln RER = \beta \ln S_t + \varphi^* \ln P_t^* - \varphi \ln P_t + \varepsilon_t \quad \text{.....B.1}$$

Rearranging B.1 we have

$$\ln P_t - \frac{\varphi^*}{\varphi} \ln P_t^* = \frac{\beta}{\varphi} \ln S_t - \frac{1}{\varphi} \ln RER + \varepsilon_t' \quad \text{.....B.2}$$

Equation B.2 can be summarized as given in equation B.3.

$$\ln P_t = \mu_0 + \mu_1 \ln P_t^* + \varepsilon_t' \quad \text{.....B.3}$$

Where,

$$\frac{\beta}{\varphi} \ln S_t - \frac{1}{\varphi} \ln RER = \mu_0.$$

Equation justifies the assessment of the relation of inflation rates across the economies

APPENDIX C: Connecting domestic interest rate to foreign Interest Rate

In the short run the money demand function is not stable thus $M_d = f(i, Y)$ which imply that the money demand, M_d, is dependent on the nominal interest rate, i, and level of income, Y. Equation 2 defining the money demand condition can be rearranged as shown in equation C.1 which is condition for domestic economy.

$$P = \frac{VM_s}{Y}, M_s = M_d, \quad \text{.....C.1}$$

Introducing the money demand condition for the foreign economy we have equation C.2.

$$P^* = \frac{V^* M_s^*}{Y^*}, M_s^* = M_d^*, \quad \text{.....C.2}$$

Substituting $f(i, Y)$ and $g(i^*, Y^*)$ for M_s and M_s^* respectively we have the following conditions in equation C.3 and equation C.4;

$$P = \frac{V \cdot f(i,Y)}{Y} \quad \text{.....C.3}$$

$$P^* = \frac{V^* g(i^*,Y^*)}{Y^*} \quad \text{.....C.4}$$

For instance, if we assume that M_d increases at a decreasing rate with an increase in interest rate and in income then and define M_d using a Cobb Douglas function as indicated in equation C.5.

$$M_d = f(i, Y) = Ai^{\theta} Y^{\vartheta}. \quad \text{.....C.5}$$

Substituting $Ai^{\theta} Y^{\vartheta}$ for $f(i, Y)$ in equation C.3 we have equation C.6 which is rearranged as shown in C.6, C.7 and C.8

$$\ln P = \ln V - \ln Y + \ln [Ai^{\theta} Y^{\vartheta}] \quad \text{.....C.6}$$

APPENDIX B: Connecting domestic inflation rate to foreign Inflation Rates

In the short run the purchasing power parity (PPP) provides that:

$$\ln RER = \beta \ln S_t + \varphi^* \ln P_t^* - \varphi \ln P_t + \varepsilon_t \quad \text{.....B.1}$$

Rearranging B.1 we have

$$\ln P_t - \frac{\varphi^*}{\varphi} \ln P_t^* = \frac{\beta}{\varphi} \ln S_t - \frac{1}{\varphi} \ln RER + \varepsilon_t' \quad \text{.....B.2}$$

Equation B.2 can be summarized as given in equation B.3.

$$\ln P_t = \mu_0 + \mu_1 \ln P_t^* + \varepsilon_t' \quad \text{.....B.3}$$

Where,

$$\frac{\beta}{\varphi} \ln S_t - \frac{1}{\varphi} \ln RER = \mu_0.$$

Equation justifies the assessment of the relation of inflation rates across the economies

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$$P = \frac{VM_s}{Y}, M_s = M_d, \quad \text{.....C.1}$$

Introducing the money demand condition for the foreign economy we have equation C.2.

$$P^* = \frac{V^* M_s^*}{Y^*}, M_s^* = M_d^*, \quad \text{.....C.2}$$

Substituting $f(i, Y)$ and $g(i^*, Y^*)$ for M_s and M_s^* respectively we have the following conditions in equation C.3 and equation C.4;

$$P = \frac{V \cdot f(i,Y)}{Y} \quad \text{.....C.3}$$

$$P^* = \frac{V^* g(i^*, Y^*)}{Y^*} \quad \text{.....C.4}$$

For instance, if we assume that M_d increases at a decreasing rate with an increase in interest rate and in income then and define M_d using a Cobb Douglas function as indicated in equation C.5.

$$M_d = f(i, Y) = Ai^{\theta} Y^{\vartheta}. \quad \text{.....C.5}$$

Substituting $Ai^{\theta} Y^{\vartheta}$ for $f(i, Y)$ in equation C.3 we have equation C.6 which is rearranged as shown in C.6, C.7 and C.8

$$\ln P = \ln V - \ln Y + \ln [Ai^{\theta} Y^{\vartheta}] \quad \text{.....C.6}$$

$\ln P = \ln V - \ln Y + \ln A + \theta \ln i + \vartheta \ln Y$ C.7

$\ln P = \ln V + (\vartheta - 1)\ln Y + \ln A + \theta \ln i$ C.8

Equation C.8 justifies the assessment of the relation between inflation rates to interest rates.

Recalling from the purchasing power parity condition we have;

$\ln S_t - \ln RER = \ln P_t - \ln P_t^*$ C.9

The domestic and foreign money demand conditions as given in equation C.10 and C.11 respectively can be linked with equation C.9 to show the relationship between interest rates across economies.

$\ln P = \ln VA + (\vartheta - 1)\ln y + \theta \ln i$ C.10

$\ln P^* = \ln V^* A^* + (\vartheta^* - 1)\ln Y^* + \theta^* \ln i^*$ C.11

Substituting equation C.10 and C.11 in equation C.9 we obtain equation C.12 which can further be rearranged to C.1, C.14 and C.15

$\ln S_t - \ln RER = \{\ln VA + (\vartheta - 1)\ln Y + \theta \ln i]\} - \{\ln V^* A^* + (\vartheta^* - 1)\ln Y^* + \theta^* \ln i^*]\}$ C.12

$\ln S_t - \ln RER = [\ln VA - \ln V^* A^*] + [(\vartheta - 1)\ln Y - (\vartheta^* - 1)\ln Y^*] + [\theta \ln i - \theta^* \ln i^*]$ C.13

$\ln S_t - \ln RER = c + \sigma \ln Y - \sigma^* \ln Y^* + \theta \ln i - \theta^* \ln i^* + \epsilon_t$ C.14

$\theta \ln i - \theta^* \ln i^* = \ln S_t - \ln RER - c - \sigma \ln Y + \sigma^* \ln Y^* + \epsilon_t$ C.15

Equation C.15 justifies assessment convergence of interest rates.

Appendix D: Derivation of KPSS test for stationarity

Consider an AR (1) as shown in equation D.1

$y_t = \omega + \beta y_{t-1} + \varepsilon_t$.....D.1

Where

y_t = dependent variable, inflation rate differential or interest rate differential

y_{t-1} = lagged dependent variable, inflation rate differential or interest rate differential

β = convergence coefficient

ω = component that can include an intercept alone or an intercept with deterministic trend

ε_t = residual term

We assume ε_t to be independent and identically distributed across and satisfy the following conditions;

$E(\varepsilon_t) = 0, E(\varepsilon_t^2) = \delta_\varepsilon^2$, t = 1, ...T

Let $\hat{\varepsilon}_t$ be the residuals from the regression of y_t.

Let $\hat{\delta}_t^2$ be a consistent estimator of the error variance from regression of equation D.1

Let s_t to be the partial sum process of the residuals of equation D.1., computed as

$s_t = \sum_{j=1}^{t} \hat{\varepsilon}_t$, which yield $s_t{}^2 = \left(\sum_{j=1}^{t} \hat{\varepsilon}_t\right)^2$ and $\sum_{t=1}^{T} s_t{}^2 = \sum_{t=1}^{T}\left(\sum_{j=1}^{t} \hat{\varepsilon}_t\right)^2$

The long run variance is δ^2 which is used in defining the null hypothesis of the stationarity test based on KPSS test, such that H_0: $\delta^2 = 0$ is defined as;

$$\delta^2 = \lim_{T\to\infty} T^{-1}E(s_T^2)$$

Following Kwiatkowski et al (1992) the KPSS test, which is a ratio of the sum of squared partial sums and an estimate of the long-term variance of ε_t is estimated as shown in equation D.3, using the Lagrange Multiplier (LM) statistic define as in equation D.2.

$$LM = \sum_{t=1}^{T} s_t^2 \Big/ \hat{\delta}_t^2 \quad \text{.....D.2}$$

$$KPSS = \frac{1}{T^2\delta^2}\sum_{t=1}^{T} s_t^2 \quad \text{.....D.3}$$