

**FINANCIAL INTEGRATION IN EAST AFRICA:
EVIDENCE FROM INTEREST RATE PASS-THROUGH ANALYSIS**

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ABSTRACT

The successful launch of the European Monetary Union (EMU) raised an already ever growing interest in the economics of monetary integration and the formation of monetary unions around the world. Following the EMU experience, countries have considered forming a monetary union amongst themselves. The East African Community (EAC), comprising the three original member countries Kenya, Tanzania and Uganda and now including Burundi and Rwanda, is an example of such a group of countries that seek to form a monetary union. This study aims to identify the current level of financial integration amongst the East African countries. In order to do so the study examines whether the pass-through of monetary policy in the five countries has become similar over time. This is to provide an indication of the extent to which the nominal convergence criteria amongst the member countries have been met. The results of the study provide an indication of whether the formation of a monetary union in East Africa is possible.

The empirical analysis used in this study included stationarity tests, four tests of cointegration and an asymmetric error correction model to investigate whether the pass-through of monetary policy transmission in the five countries has become more similar over the ten year sample period from 1999 to 2008. The analysis uses three interest rates and 6-year rolling windows to identify the extent of macroeconomic convergence that prevails within the EAC, and consequently whether the formation of a monetary union is possible.

The results suggest that the magnitude of the convergence amongst the countries remain low and there are significant rigidities in the deposit and lending rates over time, however the pass-through has improved with respect to the lending rate but not the deposit rate. The overall conclusion of the study suggests that an EAC wide monetary union is currently not possible based on the evidence provided from the pass-through analysis.

**Pencil, ink marks and
highlighting ruin books
for other readers.**

LIST OF ACRONYMS

AD-AS	Aggregate Demand and Supply framework
ADF	Augmented Dickey Fuller
ASEAN	Association of South East Asian Nations
AIC	Akaike Information Criterion
BEAC	Banque des États de l'Afrique Centrale (Bank of the Central African States)
BoB	Bank of Burundi
BoT	Bank of Tanzania
BoU	Bank of Uganda
CBK	Central Bank of Kenya
CBR	Central Bank Rate
CCB	Common Central Bank
CEECs	Central and Eastern European countries
CEMAC	Central African Economic and Monetary Community
CET	Common External Tariff
CFA	Communauté Financière Africaine (African Financial Community)
CFAF	CFA Franc
CLA	Central Legislative Assembly
CMA	Common Monetary Area
COMESA	Common Market for Eastern and Southern Africa
CRDB	Cooperative and Rural Development Bank
CRDW	Cointegrating Regression Durbin-Watson
DF	Dickey-Fuller
DFI	Designated Financial Institution
DOLS	Dynamic Ordinary Least Squares

DR	Deposit Rate
EA	East Africa
EAC	East African Community
EACSO	East African Common Services
EAHC	East African High Commission
ECB	European Central Bank
ECM	Error Correction Model
ECOWAS	Economic Community of West African States
ECT	Error Correction Term
EG	Engle-Granger
EMS	European Monetary System
EMU	European Monetary Union
ESA	Eastern and Southern Africa
EU	European Union
FDI	Foreign Direct Investment
FI	Financial Institution
FM-OLS	Fully Modified Ordinary Least Squares
GDP	Gross Domestic product
GPPP	Generalised Purchasing Power Parity
IFS	International Financial Statistics
IMF	International Monetary Fund
IOC	Indian Ocean Commission
KPSS	Kwiatkowski-Phillips-Schmidt-Shin
LR	Lending Rate
ML	Mean Adjustment Lag

MPTM	Monetary policy transmission mechanism
NBC	National Bank of Commerce
NBFIs	Non-Bank Financial Institutions
NMB	National Microfinance Bank
OCA	Optimum Currency Area
OLS	Ordinary Least Squares
OMO	Open Market Operations
PCA	Principal Component Analysis
PT	Pass-Through
RR	Retail Rates
SAARC	South Asian Association for Regional Cooperation
SACU	Southern Africa Customs Union
SADC	South African Development Community
SAD	South African Dominance
SADH	South African Dominance Hypothesis
SCU	Scandinavian Currency Union
SVAR	Structural Vector Autoregression
TB	Treasury-Bill
UEMOA	Union Économique et Monétaire Ouest Africaine (West African Economic and Monetary Union)
UK	United Kingdom
US	United States
VAR	Vector Autoregression
VECM	Vector Error Correction Model
WAMZ	West African Monetary Zone

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CHAPTER 1

INTRODUCTION

1.1 CONTEXT OF THE STUDY

The successful launch of the Euro as the single currency of the European Monetary Union (EMU) saw increasing international interest in monetary integration. Honohan and Lane (2000) note that the emergence of the EMU has also raised interest in the development of similar arrangements in various parts of the world. According to Aryeetey (2004: 1) this includes African nations who are interested in developing financial and monetary cooperation arrangements that would help strengthen their own financial institutions so as to reach out to a fast globalising world.

Moreover, integration confers benefits on members both individually and collectively, and a number of economists have evaluated the costs and benefits derived from forming monetary unions.¹ For instance, integration could assist in eliminating the transaction costs of exchanging one currency for another as well as eliminating the risk of exchange rate uncertainty amongst members. This uncertainty is with regard to the future exchange rate which could lead to uncertainty amongst firms about their future incomes (Rwakunda, 2004: 33). Exchange rate unification will reduce this source of uncertainty and therefore increase welfare. Member countries also benefit from increased scale and competition whereby the combination of markets allows firms to expand and be more competitive, leading to an increase in efficiency and productivity. An increase in investment is another advantage that may be achieved by reducing distortions, enlarging markets, and enhancing the credibility of economic and political reforms (Economic Commission for Africa, 2004: 10-15). When establishing a monetary union, member countries commit to working together, which raises the issue of the 'commitment mechanism' which is an advantage of forming a monetary union (Guillaume and Stasavage, 2000: 1393; Alesina *et al.*, 2002: 7). The idea here is that exit from monetary unions should be made costly and that other member states must be willing to oppose any attempt by their neighbours to break the rules of the arrangement. Lastly, the formation of a supranational monetary authority or a

¹ See Fielding and Shields, 1999; Grandes, 2003; De Grauwe, 2003: 78-83; Aryeetey, 2004: 6; Horvath and Komarek, 2002: 13-14). The benefits and costs of forming a monetary union are discussed in greater detail in section 2.3 of Chapter 2.

Common Central Bank (CCB) acting as an agency of restraint would enhance the credibility of monetary policy.

Though the potential benefits of forming monetary unions are numerous, they do not come without any costs. The major cost of joining a monetary union is the loss of monetary independence, which is the country's ability to implement national monetary and exchange rate policies. Further costs involved are the administrative costs of setting up a separate currency, and the fear of losing benefits in parallel regional agreements in areas such as trade, security or the technical and financial assistance of industrial countries (Oyejide, 2000: 8; Wakeman-Linn and Wagh, 2008: 3; Buigut and Valev, 2005b: 2119; Afxentiou, 2000: 251).

Despite the potential costs of forming monetary unions, regions including Africa have been attracted to the numerous potential benefits of integration and are seeking to follow the EMU example by setting up similar institutional frameworks and establishing processes of convergence so as to meet the requirements for wider monetary integration (Tsangarides and Qureshi, 2008: 1261). Consequently, the majority of sub-Saharan African countries are now members of one or more regional or sub-regional arrangements² (Maruping, 2005: 129). One of these regional groups is the East African Community (EAC) comprising Kenya, Uganda and Tanzania which has achieved a free trade area status. After its decline in 1977 and subsequent resuscitation in 2000, the member states agreed to establish the EAC and began the process by establishing a customs union which became effective from 1st January 2005. The EAC has already established institutions and has a working committee on fiscal and monetary policies. There has been progress in harmonising fiscal and monetary policies, banking regulations and pre-shipment requirements, amongst other things (Maruping, 2005: 140).

As of July 2008, Rwanda and Burundi joined the EAC after having waited for ten years, boosting the membership of the organisation to five countries (Neil, 2007: 1). Members have the goal of forming a monetary union amongst the five countries by 2012 (Edmund, 2008: 1). However, the extent to which these countries have met the pre-conditions for forming a monetary union remains doubtful. Such pre-conditions are mutually agreed upon amongst a given number of

² See World Bank (2004: 10) for the African economies that are part of regional and sub-regional integration arrangements.

countries that satisfy certain convergence criteria, like the Maastricht Criteria in the case of the EU. The traditional criteria for convergence according to Maruping (2005: 139) pertaining to East Africa include:

- A reduction of current account deficit to GDP ratio to a sustainable level;
- Reduction of budget deficit (excluding grants) to GDP ratio of less than 5 percent; and
- Maintenance of stable competitively determined exchange rates.

To date empirical studies establishing the extent of integration in the East Africa have been very limited. The few attempts that have been made include the works of Buigut and Valev (2005b) and Mkenda (2001). The former study assessed the suitability of the East African countries for a monetary union using a structural vector autoregression (SVAR) analysis to focus on shocks on aggregate output growth and inflation. They found ultimately that further integration of the economies might lead to favourable conditions for a monetary union. Mkenda (2001) employed a Generalised Purchasing Power Parity (GPPP) model to analyse the suitability of the EAC for a monetary union. He found that the real exchange rates between the EAC countries were cointegrated during the period 1980-98, suggesting that the EAC is an optimum currency area. However, these studies did not document the extent of integration among the EAC countries. In particular they did not assess the extent to which convergence in East Africa has been achieved over time. Furthermore, none of the earlier studies included Burundi and Rwanda in the analysis. Considering that these five countries are seeking to form a monetary union in a few years time, it is imperative to determine the extent of convergence over time among the countries so as to ascertain whether the countries are making progress towards monetary integration by 2012. This is where the contribution of this study lies.

In gauging the extent of integration, authors have employed different approaches. For instance Tsangarides and Qureshi (2008) made use of a cluster analysis approach to study the possibility of integration in West Africa. Nielsen *et al.* (2005) used the concept of the uncovered interest parity to study the level of financial integration within the Common Monetary Area (CMA). Aziakpono (2008a) examined the degree of financial and monetary autonomy and interdependence between South Africa and the other Southern Africa Customs Union (SACU) countries using interest rate parity analysis. The methodology employed by Aziakpono (2008)

was based on the Johansen cointegration and error correction modelling techniques. Aziakpono *et al.* (2008) applied a Principal Component Analysis (PCA) as well as an Interest Rate Pass-Through (PT) methodology to investigate banking and monetary market integration in the South African Development Community (SADC) countries.

Amongst the methodologies identified above, one notable method that has gained popularity in investigating the degree of financial integration is the interest rate pass-through PT analysis, based on the work of Cottarelli and Kourelis (1994). PT estimation can reveal how fast and how completely changes in monetary policy rates are passed on to bank lending and deposit rates. Furthermore, PT studies also reveal information about competition in banking markets, and in an international context, PT studies reveal asymmetries across countries under a single monetary policy (Sander and Kleimeier, 2006a: 216). This methodology has been applied extensively to the euro zone and important contributions include studies by Borio and Fritz (1995), Toolsema *et al.* (2002), De Bondt (2005), Sander and Kleimeier (2004, 2006b) and Heinemann and Schuler (2003).

In addition to the euro zone where pass-through analysis has been used extensively, the method has become increasingly popular in measuring the extent of integration amongst African regional blocs. A few notable studies include the work by Aziakpono (2006) that focuses on the PT results as a measure of financial integration by investigating how the central bank and bank interest rates depend on each other across the SACU countries. Aziakpono *et al.* (2008) investigate banking market integration in the member countries of the SADC using a principal component and PT analysis. Sander and Kleimeier (2006a) employ the PT methodology in the CMA countries of the SACU during the period 1991 to 2005. With regard to the East Africa countries, there is to date, no study that has employed this method to gauge the degree of financial integration among the countries. This study aims to fill this gap by employing the interest rate pass-through analysis to establish over time the extent of their financial integration and to determine the feasibility of the five countries forming a monetary union.

1.2 OBJECTIVES OF THE STUDY

The research aims to identify the current level of financial integration amongst the East African countries. This will be achieved by:

- Examining whether the pass-through of monetary policy measures in the 5 countries (Kenya, Uganda, Tanzania, Burundi and Rwanda) has become more similar over time, indicating the level of convergence in monetary transmission. The effectiveness of the transmission of monetary policy is based on two critical elements: the magnitude and the speed with which changes in the official policy rate affect the cost of borrowing, and various other money market rates.
- Measuring the progress over time and the extent to which the convergence criteria have been met. The differences in the interest rate pass-through over time, if any, whether an increase or a decrease, would be an indication of the effectiveness of monetary policy.
- Identifying the feasibility of integration amongst these countries and ultimately the establishment of a single East African central bank.

For the empirical analysis³, the study will make use of monthly data spanning 10 years, for the period 1999 to 2008. The data used consist of the lending, deposit, and discount rates for all East African countries. The discount rates are used as variables representing the central bank rates. In the case of Kenya, owing to limitations of discount rate data, the Treasury-bill rate is used as a proxy of the official policy rate. The interest rate series are obtained from Thompson DataStream and the IMF International Financial Statistics (IFS) except for Kenya's Treasury-bill rate which is obtained from the Central Bank of Kenya.

In investigating the primary goal of the research the interest rate pass-through of monetary policy in each of the five countries, the study will follow the model by Cottarelli and Kourelis (1994) which has been used by numerous authors such as Toolsema *et al.* (2002); De Bondt *et al.*

³ A full discussion of the method is discussed in Chapter 4.

(2002); Sander and Kleimeier, (2004, 2006a) and Aziakpono (2008a) to study convergence amongst countries.

The analysis involves tests for cointegration, and then the model will be estimated using a rolling regression technique in an error correction model (ECM). The point of the rolling regression technique is to measure the progress over time, using rolling windows. These results should provide long run and speed of adjustment parameters, which will indicate whether the monetary policy transmission has been stable over time in each of the countries under consideration. A comparison will then be made between the various parameters across the countries in the sample. This will help to identify whether or not convergence has occurred and whether such convergence has increased over time.

Furthermore, the research will indicate the degree of interest rate stickiness in the countries and the relationship between the interest rate stickiness and the financial system, which will help to identify appropriate policy intervention that could facilitate eventual monetary integration.

The structure of the thesis takes the following form. Chapter 2 reviews the theoretical literature and empirical studies surrounding monetary unions and monetary integration. The theory of interest rate pass-through is also discussed. Chapter 3 is essentially an overview chapter that provides a historical background of the East African Community (EAC). The chapter also discusses the convergence criteria necessary for the East African countries to achieve in order to be eligible to form a monetary union. Finally, an individual country analysis is carried out in order to identify any factors that may impact the pass-through of interest rates in each country. Chapter 4 describes the methodology and empirical framework used to gauge the extent of integration over time in East Africa, while Chapter 5 provides the results of the analysis. The final chapter, Chapter 6, provides a summary of the findings and discusses any implications for policy. Furthermore, possible areas for future work are also discussed.

CHAPTER 2

THEORETICAL ISSUES AND LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews both the theoretical literature and the growing number of empirical studies, with the focus is on monetary unions and monetary integration. The aim of the theoretical review is to discuss the concept of monetary integration and to identify the potential benefits and costs. The theory of interest rate pass-through is also looked at in this chapter. The chapter begins with the theoretical literature, followed by a review of the empirical evidence.

2.2 MONETARY UNIONS: A CONCEPTUAL OVERVIEW

According to Tavlas (1993: 664) there is no generally accepted definition of 'monetary integration' in the literature. Accordingly, Jefferis (2007: 85) notes that monetary integration is a process that involves the progressive harmonisation and linking of monetary and exchange rate policies by a group of countries. Vaubel (1990: 936) notes that this process is said to be complete when the markets with different currencies are not separated by different exchange controls or other discriminatory government interventions. A wide reading of the literature⁴ further highlights that monetary integration can cover different spectrums, which emphasise the different stages and forms of monetary unions. Jefferis (2007: 86) identifies these different spectrums of monetary unions in terms of the stages of monetary integration, and notes that these stages were attributed mainly to the nature of exchange rate policy, which would have implications primarily for monetary policy. The stages can be grouped as follows:

Stage 1: No Monetary Integration

With no monetary integration, there is no attempt to link or co-ordinate the monetary policies of different countries, thus all countries have independent monetary policies. The countries' exchange rates would be market-determined, in other words freely floating exchange rates, and countries would have autonomy with regard to monetary policy. However, if countries have

⁴ See Cobham and Robson (1994), Appleyard and Field (2001), Masson and Pattillo (2005), and Jefferis (2007).

similar economic structures and experience similar external shocks, then the national monetary policies may move in tandem with each other (Jefferis, 2007: 86). For example, external factors such as oil price shocks or, in a more recent case, the global financial crisis, may cause countries' monetary policies to move together, not necessarily due to deliberate co-ordination of their policies.

Stage 2: Weak Monetary Integration

In the second stage, involving weak monetary integration, the exchange rates are in some ways linked, perhaps by a crawling peg arrangement or a managed float that constrains the exchange rates within a predetermined range. Here the linkage of exchange rates may impose restrictions on the independence of national monetary policies but the autonomy of national monetary policy will depend on the extent of capital mobility across the countries. If capital controls are retained, there may still be monetary policy autonomy (Jefferis, 2007: 86).

Stage 3: Strong Monetary Integration

In stage 3, strong monetary integration, the exchange rates of the national currencies are pegged to one another, either with some degree of adjustment permitted, or at the extreme end an irrevocable peg i.e. a fixed peg (Jefferis, 2007: 86). Strong monetary integration can take the form of exchange rate unions, which can be formal or informal. According to Masson and Pattillo (2005: 4) an informal exchange rate union would consist of different currencies whose parities would be fixed but only within certain margins, for example the European Monetary System's (EMS) exchange rate mechanism (after August 1993). A formal exchange rate union may have separate currencies, but the rates can fluctuate within narrow or zero margins, with a strong degree of coordination amongst the central banks⁵. A long standing example would be the CMA, with the currencies of Lesotho, Namibia, and Swaziland being linked one for one with the South African rand (Aziakpono, 2008a: 190; Masson and Pattillo, 2005: 4).

As in the stage two, if there is full capital mobility which would imply no capital controls and well-developed capital markets among the nations, then a single monetary policy will be

⁵ Cobham and Robson (1994: 286) note that a crucial difference between an informal and a formal exchange rate union is that the formal exchange rate union has a central agency coordinating the national central banks. They also note that the difference between the formal exchange rate union and a full monetary union (as seen in stage 4) is that the full monetary union has a single currency and a single central bank.

followed by all countries, for instance by harmonizing movements in interest rates. If monetary policy is not co-ordinated, it would result in unmanageable capital flows that could make the exchange rate impossible to maintain (Jefferis, 2007: 86). Hence, under this form of monetary integration, capital will flow freely among members and interest rates will move in tandem with one another. Furthermore, some central banks will not have much control of their monetary policy.

Stage 4: Full Monetary Union

The final stage, a full monetary union, is the “peak” of the process of monetary integration⁶. A full monetary union would involve all member nations committing themselves to the monetary union and adopting a common currency and a single central bank to manage monetary policy (Jefferis, 2007: 87; Cobham and Robson, 1994: 286; Masson and Pattillo, 2005: 4; and Robson, 1998). Therefore, individual member states would have no autonomous monetary or exchange rate policy⁷. The most notable example of such a union is the EMU, with the euro as the common currency. Thus monetary policy is coordinated from a central point, for example, the executive board of the European Central Bank (ECB) which coordinates the monetary policy for the entire EMU.

The above stages of monetary integration bring to light the different spectrums of monetary unions. At one end, all countries have a freely floating exchange rate and are independent of each other. With further progression of monetary integration, countries move from this floating regime to one that is fixed and finally to a single currency where each country relinquishes its ability to control the exchange rate and monetary policy. Under these situations, the member countries have a common central bank, and thus all money supply decisions will be directed solely by the common central bank, with a governing board with representatives from each country who will decide on monetary policy (Appleyard and Field, 2001).

With regard to the East Africa Community (EAC), the goal is to achieve the final stage of monetary integration – the establishment of a fully fledged monetary union – by the year 2012.

⁶ It is also regarded as the third type of monetary integration arrangement, according to Cobham and Robson (1994: 286) and Masson and Pattillo (2005: 4).

⁷ The loss of monetary policy independence is one of the major costs associated with the formation of monetary unions discussed further in the chapter.

The questions that arise include what the benefits of forming such a union would be and furthermore how well the countries are prepared to join and form a monetary union. In order to answer these questions, the following two sections examine the benefits and costs of forming monetary unions and what criteria should be place for membership.

2.3 THE BENEFITS AND COSTS OF FORMING MONETARY UNIONS

The interest in forming a monetary union and seeking macroeconomic convergence is motivated because of the benefits that it provides to member countries, either individually or collectively. The basic literature on Optimum Currency Areas (OCA)⁸ pioneered by Mundell (1961), addresses the benefits and costs of adopting a common currency (cf. Tavlas, 1993; Tjirongo, 1995; Afxentiou, 2000; Maruping, 2005; Jefferis 2007). These are discussed in the following sections.

2.3.1 *Benefits of Forming a Monetary Union*

A wide reading of the literature⁹ identifies several benefits of forming monetary unions. It is important to note that a benefit in one area may also have an impact on other key areas in the economy via a “ripple effect”, thus the benefits should not necessarily be seen in isolation to one another. The benefits can be categorised under the following headings:

- (i) reduction in transaction costs;
- (ii) elimination of the risk of exchange rate uncertainty among members;
- (iii) reduced costs of financial services arising from the large size of available pools of financial assets: this involves supporting the exploitation of economies of scale in the financial sector;

⁸ An OCA is defined as an optimal geographic domain of a single currency, or of several currencies, whose exchange rates are irrevocably pegged and might be unified (Mongelli, 2002: 7). Mongelli (2002: 7) further notes that optimality is defined in terms of several OCA properties, including the mobility of labour, wage, and price flexibility, diversification in production and fiscal integration, among others.

⁹ Cobham and Robson (1994), Afxentiou (2000), Economic Commission for Africa (2004), Aryeetey (2004) and Buigut (2006). These studies also aid in identifying the costs of monetary unions.

- (iv) increased investments;
- (v) commitment from member countries; and lastly
- (vi) an agency of restraint.

Other benefits according to Maruping (2005: 136) include the attainment of macroeconomic stability, for example through sustainable fiscal deficit, as well as low and stable levels of inflation which are among the key pre-conditions for achieving strong and sustainable economic growth.

i. Reduction in Transaction Costs

A number of authors have considered the elimination of the costs of exchanging one currency for another as the most visible gain of a monetary union (cf. Cobham and Robson, 1994; Maruping, 2005; Tsangarides and Qureshi, 2007; Jefferis, 2007 and Drobyshevskii and Polevoi, 2008). Tjirongo (1995: 13) notes that transaction costs involved in converting one currency into another, and the gathering and processing of information regarding forecasting future exchange rate developments, represent a deadweight loss. Using a common currency as a medium of exchange would significantly reduce such transactions costs. Weimann (2002: 6) and Mongelli (2008: 10) further point out that with the adoption of a single currency, the extent to which money fulfils its basic function grows. A single currency would enhance the function of money as a means of exchange due to reduced transaction costs of conversion, as a store of value due to reduced uncertainty and as a measure of value due to reduced information costs. Furthermore, companies face lower costs as a result of not having to fulfil multi-currency bookkeeping (Weimann, 2002: 6). Alesina and Barro (2000: 5-12) show that reduced transactions costs lead to higher output and consumption gains, thereby improving welfare.

ii. Elimination of the Risk of Exchange Rate Uncertainty among Members

The elimination of the exchange rate risk due to monetary integration can lead to welfare gains from less uncertainty with regard to the future exchange rate which would lead to firms being unsure about their future incomes (Rwakunda, 2004: 33). De Grauwe (1992) argues that in a world populated by risk-averse individuals, the uncertainty would lead to a loss of welfare. Individuals would naturally prefer a future return that is more certain to one that is less so, hence exchange rate unification as a result of monetary integration will reduce this source of

uncertainty and therefore increase welfare. Moreover, once risk-averse individuals are assured about their future revenues, they will be less reluctant to part with their capital in terms of investment, which could have the potential of further stimulating growth and welfare in the economy.

Tjirongo (1995: 15) and Rwakunda (2004: 33) both argue that exchange rate uncertainty also introduces uncertainty about future prices of goods and services. Considering that economic agents make their decisions regarding production, investment, and consumption on the information that the price system provides for them, if such prices become more uncertain the quality of the decisions would decline. Price uncertainty can result in increases in risk which will cause the real interest rate to rise as investors will require a higher risk premium to compensate them for the increased riskiness of the project. These high interest rates lead to increased problems in selecting investment projects in an efficient way, and the problems of moral hazard and adverse selection¹⁰ become significant, which could lead to the selection of more risky projects thereby increasing systemic risk. Thus according to Tjirongo (1995: 16) a monetary union would eliminate this exchange rate uncertainty, allowing the price mechanism to serve as a better guide to making informed economic decisions, and thus reduce the amount of risky projects selected by the market. Hence, the elimination of exchange rate risk would lead to a larger welfare gain especially in small and open economies (Tjirongo, 1995: 16).

With the reduction in exchange rate uncertainty and the assurance provided to risk averse individuals regarding the certainty of their future revenues, accompanied by an efficient price mechanism, economic agents will be able to make better informed decisions as a result of monetary integration. Tavlas (1993: 668) argues that this could further reduce the costs of trade and FDI and, according to Weimann (2002: 7), would result in an improvement in capital allocation and would also increase economic growth. The Economic Commission for Africa (2004:13) adds that this FDI could further promote knowledge spillovers and technology transfers raising productivity in member countries.

¹⁰ See Stiglitz and Weiss (1981) for more elaborate discussion on these concepts.

iii. *Benefits Resulting from Economies of Scale*

Monetary integration reduces distortions and enlarges markets, allowing firms to become more competitive. The increase in competition may encourage firms to eliminate internal inefficiencies and raise productivity¹¹ (Economic Commission for Africa, 2004: 12). Tavlas (1993: 668) points out that there are also further economies of scale to be derived from the move to monetary integration which come about from the enlargement of the foreign exchange market which decreases the volatility of prices and the ability of speculators to influence them, and thus to disrupt the conduct of monetary policy. The elimination of the need for reserves for intra-area transactions and the improved allocational efficiency of the financing process would provide both borrowers and lenders with a broader spectrum of financial instruments enabling them to make more efficient choices in terms of duration and risk (Tavlas, 1993: 669).

iv. *Increased Investment*

The benefit of increased investment can be viewed as a result of the two previous advantages mentioned above. Saville *et al.* (2005: 684) add that the increase in investment and trade flows due to unionisation is a result of reduced exchange rate uncertainty and transaction costs. This idea stems from the fact that reduced transaction costs and the increase in investment by risk-averse economic agents will help facilitate the free movement of capital amongst member states. Additionally, with a well-functioning price mechanism, agents are able to screen out good projects from bad ones, and as a result revenues from investments will increase, making larger investments more attractive, and contributing to economic welfare and growth. Furthermore, monetary integration would encourage foreign investors to invest in one member country with the intention of trading freely with all members, also known as tariff jumping (Economic Commission for Africa, 2004: 12-13).

v. *Commitment Mechanism*

The concept of the commitment mechanism can be understood in light of two aspects described by Aziakpono (2008b: 87), namely macroeconomic discipline and signalling. In the case of macroeconomic discipline, monetary integration forces member countries to follow a strict set of

¹¹ A consequence of this may be a reduction in staffing but the increase in competition will increase worker productivity and thus be an attractive benefit for small and low income countries such as in the case of East Africa (Economic Commission for Africa, 2004: 12).

convergence criteria before they can be admitted to the monetary union (as will be seen further in this chapter). Therefore member countries will be committed to following good macroeconomic policies and, at the same time, can be penalised for bad policies. The commitment to sound policies by members would lead to macroeconomic stability (e.g. a low inflation rate) and capital inflow into the union which would further stimulate growth, for example via investment. With regard to signalling, the policies adopted as a result of monetary integration serve as an indication or signal to investors outside, that the countries are committed to adopting sound macroeconomic policies in the future. Once again, this leads to capital inflows resulting in an increase in the level of domestic investment within the union as well as foreign investment into the union (Aziakpono, 2008b: 87).

vi. *Agency of Restraint*

The formation of a supranational monetary authority or a Common Central Bank (CCB) acting as an agency of restraint would enhance the credibility of monetary policy. Monetary mismanagement in most African countries offers a strong case for the delegation of monetary policy to a suitable supranational monetary authority (Honohan and Lane, 2000; Masson and Pattillo, 2005). When monetary policy is ceded to a CCB, the influence of any single government on the CCB would be less than in the case of national central banks. This could enhance its independence and its ability to resist pressure for monetary financing (Masson and Pattillo, 2005) forcing governments to adhere to more sound fiscal policy as well (Buigut, 2006: 302).

In light of the above, the fact that member countries have 'given their word' to pursue sound macroeconomic policies does not necessarily mean that it will be done. Thus the effectiveness of regional integration arrangements as a 'commitment mechanism' depends on their provisions and how enforceable those provisions are. For example, the costs of breaking the rules of a monetary union, or leaving it, or being expelled from it should be high and would make the agreements more effective. At the same time, strong economic ties among members and the willingness by those members to punish violations of rules also create effective arrangements (Economic Commission of Africa, 2004: 14; Guillaume and Stasavage, 2000: 1393; Alesina *et al.*, 2002: 7). Hence, under these circumstances, members would have no choice but to put in place and actually follow sound policies.

2.3.2 *Costs of Forming a Monetary Union*

Despite the numerous gains just discussed, the literature also highlights possible costs of monetary integration and the formation of monetary unions. A review of the literature¹² suggests that the benefits may outweigh the costs of monetary integration. The most notable cost identified is the loss of monetary policy independence and exchange rate policy among countries. This and other potential costs are examined next.

i. Loss of National Monetary and Exchange Rate Policy Independence

The most crucial drawback associated with forming a monetary union, according to Buigut and Valev (2009: 591), is the loss of independent monetary policy. Countries would have to relinquish their monetary policy autonomy and follow a common monetary policy and exchange rate regime. If exchange rates are permanently fixed and capital is highly mobile, domestic and foreign assets become perfect substitutes. As a result, national interest rates are equalised across members of the union. The consequence of this is that an independent effort by an individual central bank to reduce its domestic interest rates would result in an outflow of funds to more attractive assets in other countries. Thus members of the union cannot conduct a monetary policy independent from the rest of the other union members and vice versa (Glick, 1991: 1).

Mkenda (2001: 4) further notes that a country surrendering the exchange rate as an instrument loses a mechanism for protecting itself from economic shocks. This would not be a problem if the shocks were symmetric (i.e. they affect all countries equally) as a common policy response would be appropriate. However, if the shocks are asymmetric (i.e. they affect the members differently), for example due to different industrial structures, then a common policy may not be appropriate, and thus the inability of a country to use the exchange rate and monetary policy to make the necessary adjustments may result in greater instability in output and employment.

Considering that countries in a monetary union have lost their ability to use monetary and exchange rate policies, one may wonder what tools would be available for these countries to combat negative external shocks. The literature on OCA theory argues that members should have the flexibility to use fiscal policy under such circumstances. However, according to Jefferis

¹² In addition to the studies that helped categorise the benefits, further studies include Glick (1991), Tjirongo (1995), Mkenda (2001), and Buigut and Valev (2009).

(2007: 88), the use of fiscal policy is limited for two main reasons. First, the use of fiscal expansion to compensate for negative shocks can lead to problems of public debt sustainability. Second, budget deficits in one country may have negative externalities for other members of the monetary union, if additional borrowing and recourse to capital markets pushes union wide interest rates upwards. Thus this is a problem with any monetary union with centralised monetary policy decision making and decentralised fiscal policy decision making.

In order to rectify the above problems, limits on budget deficits were adopted under the EMU, which constrained the use of fiscal policy as a stabilisation policy by EMU member states. It is evident that none of the three macroeconomic policies (monetary, exchange rate and fiscal) are available to national governments within a union. Therefore, the loss of monetary policy and the exchange rate as a stabilisation policy can have further negative effects such as adjustment problems, and the difficulty of responding to economic shocks, especially opposing shocks across monetary union members (Jefferis, 2007: 88).

ii. Loss of Seignorage Revenue

The loss of seignorage revenue has more relevance to African countries. In such countries the role of the government as the sole issuer of money is important. Because countries face different allocation costs for taxes, and hence their optimal inflation rates differ, this suggests that any common currency constraint that makes the inflation rates of two countries converge must decrease the revenue of at least one of the countries (Goldberg *et al.*, 1993). Tjirongo (1995: 18) adds that the less developed the tax system, the greater the economic costs in raising revenue by increasing taxes, and the lower the cost of increasing revenues through inflation. This would imply that for a high inflation country converging to a lower rate of the currency union there will be a cost in terms of seignorage revenue¹³. Afxentiou (2000: 250) argues that this loss in

¹³ Honohan and Lane (2000: 12) argue that monetary unions targeting low inflation will generate a limited amount of seignorage, and that Africa relies more on seignorage than Europe. They further add that loss of seignorage is a major fiscal consequence of monetary discipline. Therefore in order to prevent this loss in revenue for African countries, the new arrangements will need to anticipate and make adequate provision for net benefits. For example the Franc and Rand zones both include a seignorage sharing mechanism.

seignorage mainly affects countries with a high rate of inflation, that print money to finance their budget deficits instead of borrowing money in the markets¹⁴.

Despite the costs of the formation of a monetary union, evidence according to Saville *et al.* (2005: 684) suggests that countries that unionise enjoy net economic benefits. The authors further note that considering that unionisation is a multilateral exercise, countries that are considering unionisation must contemplate the feasibility of entry into a monetary union. Furthermore, according to Maruping (2005: 131), integration can be complicated by perceived or real gains or losses among the members that may lead to disputes and a sense of loss of national sovereignty.

Therefore, for integration to be successful, it requires strong commitment in implementing the agreed arrangements, fair mechanisms to solve disputes and equitable distribution of the gains and costs of integration (Maruping, 2005: 131). One way to achieve this commitment is to follow a set of convergence criteria that countries set for themselves in order to form a monetary union. Not only will this allow countries to better contemplate the feasibility of entry into the monetary union, it will also allow them to reap the benefits of joining the monetary union once they have adhered to the convergence criteria. The convergence criteria pertaining to the East African countries will be discussed in the following chapter together with the historical background of the East African Community.

However, at this point the critical question raised is, to what extent have the East African countries achieved their convergence criteria? In looking at convergence, traditionally, studies have tried to examine such a question in different ways. Some studies employ the interest rate pass-through analysis (PT), while others have used the theory of optimum currency areas (OCA) in their analysis (cf. Tjirongo, 1995; Mkenda, 2001 and Tsangarides and Qureshi, 2008). This study, however, draws more on PT analysis, which forms part of the nominal convergence criteria. For this reason the study will first review the theory of pass-through analysis and show how it can be used to gauge the extent of integration amongst countries. Thereafter, the empirical literature will be reviewed.

¹⁴ This however may not be a problem as the convergence criteria require countries to reduce their inflation rates in their efforts to qualify for membership into the monetary union.

2.4 THE THEORY OF INTEREST RATE PASS-THROUGH

The PT process can be regarded as extremely important for the effectiveness of monetary policy. Central banks have a dominant influence on money market conditions and can steer money market rates. Changes in the official central bank rates affect the interbank market rate (first stage of the PT process), which in turn, affects retail bank rates to different degrees (second stage of the PT process, both stages discussed below). Furthermore, bank decisions regarding the yields paid on their assets and liabilities have an impact on expenditure and investment behaviour of deposit holders and borrowers and thus economic growth (De Bondt, 2005 37-38). The process that describes how changes in the official rates affect other retail rates is best explained via the monetary policy transmission mechanism (MPTM).

The MPTM describes a process through which a change in monetary policy is transmitted to achieve the ultimate goal of monetary policy, such as stable and low inflation and economic growth (De Angelis *et al.*, 2005: 5)¹⁵. The literature highlights that the transmission of monetary policy can take place via the different channels and stages. According to Aziakpono *et al.* (2007: 1) the effectiveness of the process would depend on the speed and magnitude of the transmission of official rates to other retail rates.

Aziakpono *et al.* (2007: 2) highlight that the importance of the speed and magnitude of transmission process lies in the fact that if the response of the market rates are not noticed because they are too small, or if the response is delayed or sluggish, then monetary policy may not achieve the desired goal, regardless of the size or magnitude of the change in the official interest rate. In relation to this study, if the East African countries market rates are able to respond quickly to changes in their official rates, it may be an indication that the countries are achieving nominal convergence, a necessary condition for a monetary union. Therefore, the speed and size of the response are not only important for effective monetary policy but may indicate if countries are ready to form a monetary union

Faure (2006) identifies six stages in the transmission process,¹⁶ however, for the purposes of this study it is the transmission of monetary policy via the first two stages that is of relevance. The

¹⁵ The literature on the MPTM has been reviewed extensively by authors such as Mishkin (2005) and Faure (2006).

¹⁶ See Faure (2006) for detailed description of each of the six stages.

first stage has to do with the transmission of the central bank lending rate to the private bank-to-bank interbank market, and the second stage is concerned with the transmission of interbank rates to other market interest rates. A number of studies¹⁷ have focused on the first two stages in order to examine the speed and magnitude of bank interest rates adjustment and the possibility of asymmetric adjustment in these rates.

Of the varying methodologies used to identify the speed and magnitude of changes in interest rates, the PT estimation¹⁸ has been used extensively in the euro area. Sander and Kleimeier (2006a: 216) note that the financial part of the monetary transmission process can be investigated by means of PT estimation which may reveal how fast and how complete changes in monetary policy rates are passed on to retail bank lending and deposit rates. The authors note that PT analysis is important because it can reveal information about competition in banking markets. From an international context, PT analysis can further reveal asymmetries across countries under a single monetary policy. However, the PT of official rates to market rates can be slowed down due to rigidities in market rates, which may impede the effectiveness of monetary policy. Additionally, market rates may respond differently to increases or decreases in the official rate. The literature identifies a number of factors that cause rigidity in interest rate adjustments to changes in official interest rates. These are discussed next.

2.4.1 *Financial Structure*

According to Cottarelli and Kourelis (1994: 590) the concept of financial structure is a broad one and can be attributed to a number of factors such as the degree of competition within the banking system, and between banks and other non-financial institutions. They note that the factors that may affect competition levels may include the regulatory environment, the number and size of intermediaries, ownership structure of the financial intermediaries and the openness of the financial system. The authors note that if the bank loan market is competitive, then their lending

¹⁷ See Hannan and Berger (1991), Neumark and Sharpe (1992) and Scholnick (1996).

¹⁸ Sander and Kleimeier (2006a: 216; 2006b: 406) note that PT studies have been based on the pioneering work by Cottarelli and Kourelis (1994). Other important contributions include Cottarelli *et al.* (1995), de Bondt *et al.* (2002), Toolsema *et al.* (2002), Heinemann and Schuler (2003), and de Bondt (2005).

rates would adjust to changes in the official rates without delay¹⁹, but if there is a lack of competition, for example due to barriers to entry, then this may lead to rigidities in interest rates (Cottarelli and Kourelis, 1994: 592).

Another factor that may reduce competition has to do with the ownership structure of the banks. Aziakpono and Wilson (2008: 8) note that state-dominated banks can sometimes result in some form of monopoly which, as noted above, can result in interest rate rigidities.

Further factors that may impede the PT of interest rates can be explained with the aid of two competing hypothesis developed by authors in their asymmetric price rigidity framework. The first hypothesis, developed by Hannan and Berger (1991), focused on collusion by banks. Essentially, their hypothesis was based on the premise that in a market dominated by a few banks it would be very costly for them to break price agreements due to the extra payments made to depositors if there was an increase in the deposit rate. The second hypothesis was developed by Neumark and Sharp (1992) and centred on the negative reactions of customers, whereby the commercial banks would take into account the views and reactions of their customers before adjusting any of their retail rates. According to Aziakpono and Wilson (2008: 8), the two competing hypotheses would imply certain movements in the interest rates. The collusion hypothesis would imply that the deposit rates would be rigid upwards when the official rates are reduced, whereas the lending rates would be more rigid downwards following a reduction in the official rates. In similar light the adverse customer reaction hypothesis would imply that the deposit rates would be rigid downwards following a reduction in the official rates, while the lending rates would be rigid upwards following an increase in the official rates.

The last factor that falls under the financial structure is the openness of the financial system. Essentially, if the financial system is open, then banks have access to alternative sources of finance. As a result there is no need for banks to rely on the accommodation facilities provided by the central bank. This lack of reliance on the central bank as a source of finance would lead to a slower response of bank interest rate changes following changes in the official rates (Fourie *et al.*, 1999; Aziakpono and Wilson, 2008).

¹⁹ However, Cottarelli and Kourelis (1994: 592) note that this is not always the case, for instance, state-owned banks lending rates can be delayed due to political pressures or just inefficiency.

2.4.2 Asymmetric Information

Asymmetric information problems of adverse selection and moral hazard increase uncertainty/risk in lending transactions. The greater the threat of default²⁰, the greater the perceived need by banks to maintain a large spread between lending and deposit rates. In such a case efforts by the central bank to influence market rates may be fiercely resisted by banks. An expansionary monetary policy, for example, would lower official interest rates but not necessarily translate into lower lending rates by banks (Stiglitz and Weiss, 1981).

2.4.3 The Stage of Financial Development

If a financial system is well developed and carries out its operations efficiently and effectively, then even the services it offers to its customers (the savers and investors) will be of a high standard. The financial system will be able to offer a diverse range of alternative financial instruments and intermediaries. These intermediaries in turn would also offer different investment opportunities, such as bond and equity markets. With a large number of alternative financial instruments and intermediaries, which may even result in competition amongst these intermediaries to offer innovative financial instruments for their customers, then it would not be possible for just one financial intermediary to obtain a monopoly status, therefore interest rates would be more flexible and respond more readily to changes in market conditions (Aziakpono and Wilson, 2008: 9).

The above set out to review some of the factors that may lead to interest rate rigidities. It is important to note that these factors do not affect all countries in a similar way as the financial system in some countries may be more or less developed or the financial environment may differ. However, analysis of the above factors can to some degree aid in identifying the extent of integration amongst a group of countries, and thus a number of empirical studies have set out to examine the relationship between the official and money market interest rates. The next section reviews these studies, beginning with a world wide analysis and narrowing down to the East African case.

²⁰ This threat of default could be associated with an undeveloped financial system and a weak legal environment.

2.5 REVIEW OF EMPIRICAL LITERATURE

To date a number of empirical studies have been carried out to assess the optimality of potential or actual currency areas and whether different countries are suitable to join and form monetary unions (cf. Fielding and Shields, 1999; Phylaktis, 1999; Haug *et al.*, 2000; Mkenda, 2001; Maskay, 2001; De Bondt *et al.*, 2002; De Bondt, 2005; Grandes, 2003; Zhang *et al.*, 2003; Buigut and Valev, 2005a and 2005b; Ahn *et al.*, 2006 Aziakpono, 2006; Egert *et al.*, 2007 Tsangarides and Qureshi, 2008; Aziakpono *et al.*, 2008; Aziakpono, 2008a; Marotta, 2008).

However, with regard to East Africa, Buigut and Valev (2005b: 2120) argue that there is a glaring scarcity of empirical work for the EAC. The few studies on the EAC include those of Buigut and Valev (2005a; 2005b and 2009) and Mkenda (2001). Thus there is a vital need to add to the scant empirical literature relating to monetary integration in East Africa. Therefore, the following section reviews empirical studies that have tried to gauge the extent of integration amongst countries around the world. As has already been noted, this will serve as an indication of whether members are making progress in achieving their convergence criteria and indicate whether they are suitable to join or form a monetary union and reap the benefits of monetary integration.

The studies will be outlined in terms of empirical methodology used and findings will be discussed. The studies differ in terms of their methodologies, variables used and sample periods, which may make comparison somewhat difficult. Thus in order to distinguish between the findings and make comparisons, the empirical review begins by reviewing studies carried out in the rest of the world, such as the euro area, and then narrows down to the African region and more specifically to East Africa.

2.5.1 *The International Case*

Essentially, authors²¹ have used a number of approaches by making use of the nominal convergence criteria of a group of countries. As noted above, one of the most dominant and well-known approaches used is the interest rate pass-through analysis, especially in the euro zone.

²¹ See Mkenda (2001) and Tsangarides and Qureshi (2008).

Studies have also recognised the theory of Optimum Currency Area (OCA) as another dominant method to analyse the extent of integration among countries.

Bergman (1999) examined whether the countries which formed the Scandinavian Currency Union (SCU) – Denmark, Norway and Sweden – constituted an optimum currency area from the period 1873-1921. He investigated the behaviour of six macroeconomic aggregates during the years of the SCU: output growth, money growth, inflation, long term nominal and real interest rates and the discount rate. Furthermore, to investigate whether the single currency area imposed stronger restrictions on macroeconomic behaviour, two additional countries were included – England and Germany – as they were the most important trading partners of the Scandinavian countries during this period (Bergman, 1999: 367). The author further estimated a structural VAR model to examine the symmetry of country-specific structural shocks in each of the three countries. For comparison purposes, a model was estimated for Belgium, which belonged to the gold standard and was a member of the Latin union²².

The empirical results suggested that country-specific structural shocks in the Scandinavian countries were not highly symmetric during the SCU period. Results also showed an absence of clear-cut differences between the pattern of structural shocks in Belgium, and structural shocks in the three Scandinavian countries. Furthermore, it was found that macroeconomic performance in the three countries was not different from the behaviour of England and Germany, which suggested that the gold standard imposed strong restrictions on monetary policy such that the addition of a single currency within the Scandinavian countries only affected macroeconomic performance slightly. Given these findings, Bergman (1999) concluded that the Scandinavian countries did not constitute an optimum currency area.

Toolsema *et al.* (2002) examined how the pass-through of monetary policy measures in six of the largest EMU countries²³ had evolved over time, i.e. whether or not the pass-through had become more similar in these countries indicating whether there was convergence in monetary

²² Bergman (1999: 370) noted that a problem associated with studying the symmetry of country-specific structural shocks is that the shocks in two countries may be correlated due to their economic structures being similar or because both countries depend on economic developments outside the two countries (foreign shocks). To control for this problem, Bergman (1999) included German output in the model such that the author's measure of country specific shocks would be net of foreign influence.

²³The six EMU countries included were Belgium, Germany, Spain, France, Italy and The Netherlands.

transmission. Using monthly data from the period 1980-2000, the authors first estimated the long run relationship between money market and lending rates using the Fully Modified ordinary least squares (FM-OLS) estimator and test for parameter stability. The results of the test indicated that the relationship between the money market and the lending rates was not stable in all countries, meaning that changes did occur over time. The relationship was therefore examined in more detail using rolling regression techniques in an Error Correction Model (ECM)²⁴. The authors found that there were major differences in pass-through in the sample used in terms of initial and long-run responses to policy-induced interest rate changes. However, there was some evidence for convergence of monetary policy transmission.

Sander and Kleimeier (2004) investigated the pass-through process for ten different loan and deposit rates in ten euro-zone countries over the period 1993-2002. In order to carry out the study of the pass-through analysis, the authors employed a unifying approach that utilised VAR and cointegration methodologies allowing for asymmetric and threshold adjustment. The results of the study suggested that the euro-zone pass-through mechanisms have undergone structural changes in the past decade, however these changes do not coincide with the introduction of a single currency. Their findings showed that during the post-break period the pass-through of monetary policy impulses had improved with respect to lending but not to deposit rates. Furthermore, an incomplete long-run pass-through for most retail rates was observed, and interestingly the shorter the maturity the higher the pass-through of the lending rate. The authors noted that while the pass-through has remained heterogeneous across the euro-zone countries, the market for short-term corporate lending had become more homogenous, indicating a more integrated market.

In another study, Sander and Kleimeier (2006b) investigated the interest rate pass-through convergence for eight Central and Eastern European Countries²⁵ (CEECs) that joined the European union, the aggregate euro zone and four countries chosen as representative for the different legal families²⁶. For the CEECs data for a number of retail interest rates were used for

²⁴ The method involves adding one observation at the end of the sample, and dropping one at the beginning.

²⁵ The eight countries were the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia.

²⁶ The four countries were Finland, Germany, Ireland and Spain.

the period 1993-2003, and for the euro zone, due to lack of data, the sample period started from 1996. The authors utilized VAR and cointegration methodologies that allowed for thresholds, asymmetric adjustment and structural changes. In order to account for any structural changes in the CEECs banking markets, they conducted their analysis for 5-year rolling sub-periods from 1993-1997, 1994-1998, and so on until 1999-2003. The authors further investigated convergence towards a structural break-free “post-break” period for the aggregate euro zone and the four representative euro zone countries. This was done in order to investigate convergence towards the euro-zone. The structural breaks were determined using a rolling Chow-test methodology (Sander and Kleimier, 2006b: 407-408).

The results of this study can be explained based on the two stages that were carried out. The first stage looked at the pass-through of interest rates, and the second incorporated financial structure and macro variables into the model to determine whether they affected the pass-through of interest rates. Based on the first stage analysis, the authors found that the pass-through in many of the CEECs had become faster over time and was more complete than in the euro zone. The results from the second stage analysis suggested that convergence across the CEECs could be predicted with market concentration, bank health, foreign bank participation and monetary policy regime as conditioning factors, however there was no evidence for convergence towards the euro zone (Sander and Kleimeier, 2006b: 422).

A final study conducted by De Bondt (2005) examined the interest rate pass-through at the euro area level in order to analyse the impact of the introduction of a common monetary policy in the euro area (De Bondt, 2005: 38). From the period 1996-2001²⁷, three different empirical frameworks were used to identify the robustness of the empirical results. First, a VECM was applied to model both stages of the interest rate pass-through process simultaneously²⁸.

²⁷ De Bondt reviewed nine studies of euro area countries, namely, BIS (1994), Cottarelli and Kourelis (1994), Borio and Fritz (1995), Kleimeier and Sander (2000), Hofmann (2000), Mojon (2000), Donnay and Degryse (2001), and Toolsema *et al.* (2002), and concluded that although all studies showed cross-country differences in interest rate pass-through, the pattern remained unclear.

²⁸ Central banks have a dominant influence on money market conditions and thus steer the short-term money market interest rates, which, in turn, may affect market interest rates with a longer maturity. This is considered as the first stage. Furthermore, this change in market interest rates, in turn, affects retail bank rates to varying degrees, and is considered as the second stage of the interest rate pass-through process (De Bondt, 2005: 43).

Secondly, these two stages of the interest rate pass-through process were separately examined by performing an impulse response analysis based on a VAR model of interest rate pairs in levels. The third empirical framework was an ECM, which examined the immediate or within one-month pass-through, the final pass-through, and the average speed at which the final pass-through is reached.

The empirical results based on the VECM and VAR model suggested that the pass-through of official interest onto market interest rates was complete for money market interest rates up to three months, but not for interest rates with longer maturities. Furthermore, the immediate pass-through of market interest rates to retail bank rates was incomplete and the proportion of the given market interest rate change that was passed through in the short run (i.e. within one month) was around 50 percent. The pass-through was found to be higher in the longer term and notable for bank lending rates close to 100 percent (De Bondt, 2005: 65-66).

In light of the studies examined above, although the methodologies employed differed, one can single out that the dominant method utilised was the interest rate pass-through analysis which examined how fast market rates would respond to changes in the official rates. Based on the studies reviewed above, it can be concluded that although it seems that the pass-through in the euro zone has improved over time with respect to varying retail rates, one cannot safely conclude that there was convincing evidence of complete convergence in the euro zone in both the long and short term. The next sections review the empirical work carried out in Africa so as to identify whether any inferences can be made regarding the extent of integration in African regions.

2.5.2 The Case of Africa

In an attempt to identify and compare macroeconomic shocks to different members of the African CFA Franc Zone and to Kenya, Fielding and Shields (1999) estimated the degree of cross-country correlation between shocks to aggregate output growth and to consumer price inflation. The two CFA monetary unions are the West African Economic and Monetary Union and the region of the Central Bank of Equatorial Africa²⁹. The authors modified the traditional

²⁹ The two recent additions to the CFA, Equatorial Guinea and Guinea-Bissau, were not included in the study due to inadequate data.

Blanchard and Quah (1989) framework and constructed a structural VAR representation of the macro-economy for the 13 countries: the 12 CFA countries for which data was available plus Kenya for the period 1962-1991. Furthermore, the model was estimated by imposing identifying restrictions on a reduced form VAR, the restrictions being imposed on the long run equilibrium model not the short run coefficients. Finally, using the VAR model the authors carried out an impulse response analysis for the impact of each shock on each variable in the 13 countries.

The results of the study show a high degree of correlation between inflation shocks to different CFA members, but not between inflation shocks to the CFA and those of the representative country, Kenya. Furthermore, it was found that the correlation of inflation shocks across the two monetary unions in the CFA was as high as the correlations within them, thus there was no particular advantage to having two currencies rather than just one. The authors note that this conclusion is not necessarily applicable to potential future members of an enlarged monetary union, and more work is required in estimating shocks conditional on monetary policy over the wide variety of policy regimes encountered in Sub-Saharan Africa. According to Fielding and Shields (1999), the conclusions of the study are conditional on the way the monetary authorities in the CFA conduct their policy (Fielding and Shields, 1999: 18).

By making use of a two step VAR model, Buigut and Valev (2005a: 10) examined the possibility of forming monetary unions in 21 Eastern and Southern African countries. The sample period for most of the countries was 1971-2002, and the study aimed at identifying and comparing macroeconomic shocks to aggregate output growth and inflation. In doing so, the authors made use of the VAR identification scheme which was based on the aggregate demand and supply framework (AD-AS). If the correlations are positive, then they were considered symmetric, and if negative they were considered asymmetric. The more symmetric the shocks, the more feasible it becomes for a group of countries to establish a monetary union (Buigut and Valev, 2005a: 12).

The authors found that South Africa showed significant correlations in the supply shocks it faced with those faced by its neighbouring states of Lesotho, Swaziland and Mozambique. Based on the correlations and geographical proximity, the authors suggest a tripolar route to monetary integration. The first is a monetary union to encompass the southern cone, consisting of the existing CMA expanded to include Botswana, Mozambique and Zambia. The second is an East African monetary union with the nucleus as the proposed EAC monetary union. The authors note

the EAC could be expanded gradually to include Rwanda, Burundi, Ethiopia, Sudan and Egypt. Buigut and Valev (2005a: 14) note that though the EAC might not seem to be the natural anchor for the region it might still be the right nucleus since the EAC shows the necessary political will and has taken steps towards a monetary union. Lastly a third monetary union could be based on the Indian Ocean Commission (IOC) for the Island economies³⁰ (Buigut and Valev, 2005a: 14).

In an extension to the above study, Buigut (2006) attempted to find a solution to the overlaps in membership of monetary integration initiatives in Eastern and Southern Africa (ESA) in a study which made use of the VAR and cluster analysis methods³¹. The clusters generated described the country groupings most suitable for a monetary union based on the variables used³². The study considered the region's features by analysing three separate scenarios, namely when there is no anchor currency, when South Africa assumed the role of the anchor economy with other countries pegging to the Rand (as is currently the case in the CMA), and when the euro is assigned the role of the anchor currency (Buigut, 2006: 303).

The overall results indicated that the ESA region had not converged enough for an ESA-wide monetary union. Instead two distinct clusters, one in the Southern cone around South Africa and the other around the EAC, were identified. With regard to the EAC, which comprised the original three members (Kenya, Uganda and Tanzania) plus Rwanda, the author found that this group was a viable entity for a monetary union. The results supported the EAC monetary union initiative and suggested a step-wise approach to monetary union for COMESA with the EAC as the nucleus. This meant that Tanzania would have to abandon SADC membership for COMESA. Another significant finding was that Rwanda was consistently being grouped with the EAC. At the time the study was carried out, Rwanda was pursuing EAC membership, and the result in fact supported its admission into the community (Buigut, 2006: 310).

³⁰ The IOC countries included were Seychelles, Madagascar and Mauritius (Buigut and Valev, 2005a: 20).

³¹ Cluster analysis refers to methods used to organise multivariate data into groups (clusters) based on a set of measurements such that the items in the same group are as similar as possible (Tsangarides and Qureshi, 2008). The algorithms generated from the cluster analysis were used to group Eastern and Southern African countries into monetary clusters using a set of variables motivated by OCA theory and nominal convergence criteria (Buigut, 2006: 302-303)

³² See Buigut (2006: 303) for each of the variables used and how they were derived.

Aziakpono (2006) investigated the degree of financial integration amongst the SACU countries by examining the extent of their interest rate parity. The research tested whether the monetary policy stance in South Africa is passed through to and reflected in the monetary policy of other countries (which the author referred to as the South African Dominance Hypothesis, SADH). Thus the study was concerned with the extent of interest rate pass-through from South Africa to the other members of the union, and whether arbitrage opportunities existed between the countries. The study made use of monthly interest rate series for the period 1990-2004. The methodology employed used cointegration and error correction techniques, as well as impulse response analysis.

The results of the study confirmed the dominant role of South Africa in the Union, and indicated a hierarchy of integration of the financial systems of each member state with that of South Africa, with Namibia being at the top, followed by Swaziland, Lesotho and finally Botswana. The results also suggested that the prevailing integration between the financial systems was mainly due to policy convergence³³ rather than market convergence (Aziakpono, 2006: 11). The study also found that the central banks (excluding Namibia) were more rigid than commercial banks in responding to changes in the official rate in South Africa. The final results of the study suggested greater rigidity in deposit rates than lending rates, since deposit rates had a lower response in the other SACU countries than in South Africa. This suggested the existence of strong market power enjoyed by banks because of limited competition.

In a closely related study, Sander and Kleimeier (2006a) investigated the pass-through in all four CMA countries³⁴ for the period 1991-2005. The study took into account Aziakpono's (2006) SAD hypothesis and investigated both how national bank rates react to national monetary policy rate changes and how they react to South African monetary policy rate changes. In order to do so Sander and Kleimier (2006a) conducted structural break tests due to the changing financial structures over time in order to search for a breakpoint. After identifying break-free (sub-)

³³ The author notes that the policy convergence had to do with the response of interest rates in the other SACU countries to changes in the South African official rate.

³⁴ The CMA countries are South Africa, Lesotho, Namibia and Swaziland. The authors made use of two bank interest rates (prime lending rates and deposit rates) and two proxies of the monetary policy rate (Treasury bill rates and discount rates).

periods, the pass-through was estimated by employing a uniform empirical pass-through model that allowed for thresholds, asymmetric adjustment and structural changes over time (Sander and Kleimier, 2006a).

The findings of the study suggested that the banking markets of the CMA did exhibit some degree of integration. In terms of the lending markets, although the pass-through across all four countries was not perfectly homogenous, they did find a full PT in the long run with fast adjustment over some six months to the major driving interest rates. In terms of deposit markets, the PT was heterogeneous across the countries with South Africa exhibiting a full and fast PT while Namibia exhibited deposit rate stickiness and adjustment asymmetries pointing to some degree of market imperfection.

In an attempt to study the monetary and banking market integration in SADC, Aziakpono *et al.* (2008) investigated the state, development and drivers of banking market integration in the 15 member countries of the SADC. The authors employed interest rate data for the sample period 1990-2005 to investigate the monetary and banking market integration using a principal component analysis (PCA) as well as a pass-through analysis. The method was applied to different time periods, i.e. rolling time windows, in order to document the progress and development of financial integration over time (Aziakpono *et al.*, 2008: 4). The objective of the study was to identify those countries of the SADC that were converging to the CMA countries in order to determine whether an expanded CMA was viable. This would shed light on the prospect for a SADC-wide monetary union (Aziakpono *et al.*, 2008: 19).

The results of the study indicated that the CMA banking markets were most integrated, followed by SACU countries, and that the level of integration increased over time for each region and interest rate. The SADC region was subjected to further analysis focusing on the period 2000-2005 where there was evidence of growing integration, with the aim of sorting the countries into groups that are becoming integrated based on the similarities of their movements. The analysis showed that the CMA countries are highly integrated. From the evidence provided by the study, Aziakpono *et al.* (2008: 29) noted that a selective and cautionary expansion of the CMA would be possible, with Seychelles, Zambia and Botswana being the first potential candidates.

Tsangarides and Qureshi (2008) examined the suitability of countries in the West African region to form the West African Monetary Zone (WAMZ) and the Economic Community of West African States (ECOWAS). This was performed over three overlapping periods: 1990-2004, 1995-2004 and 2000-2004. To assess the possibility of a currency union in West Africa, the economic structures of the countries were examined to identify whether they were similar enough to support a fixed exchange rate agreement. Thus the choice of variables was based on the OCA literature as well as the convergence criteria set for the West African region. In order to do this, the study used a cluster analysis applying crisp (hard) and fuzzy (soft) clustering algorithms to those variables³⁵. The findings of the study revealed dissimilarities in the economic characteristics of member countries, particularly WAMZ countries. Furthermore, when west and central African countries were considered together, there were significant heterogeneities within the CFA franc zone, and some similarities between the central African and WAMZ countries (Tsangarides and Qureshi, 2008).

Judging from the analysis of the studies carried out above, two important observations can be made. First, the theory of OCA aided a number of authors in identifying relevant criteria and variables for their study. And second, of the differing methodologies, the interest rate pass-through analysis came out again as being dominant (as with the international studies) amongst several of the authors identified above. With reference to the studies that incorporated the EAC, the general finding was that the EAC was in fact suitable for a monetary union. The next section pays specific attention to the East African case to determine what studies have been carried out to gauge the extent of integration in East Africa.

2.5.3 *The Case of East Africa*

The earliest study on this region was from Mkenda (2001), who investigated whether the East African Community (EAC), comprising Kenya, Tanzania and Uganda, constituted an optimum currency area. The study was carried out over the period 1981-1998. The paper employed the

³⁵ The clustering method is classified into two groups according to the types of clusters obtained: crisp (or hard) and fuzzy (or soft) clustering techniques. The crisp approach divides the data into clusters so that each object in the data set belongs to only one cluster. However, the fuzzy technique does not force objects to belong to one cluster, rather it allows objects to belong to different clusters to some degree, conveying more information about the data than crisp clustering. (Tsangarides and Qureshi, 2008: 1264-1265). A principal component analysis was used to check the robustness of results for groupings generated from the clustering analysis.

Generalised Purchasing Power Parity (GPPP)³⁶ method and various criteria suggested by the theory of OCA to investigate the optimality of the community as a currency area. The criteria used included the degree of product diversification which was measured by constructing a Herfindahl Index³⁷ for the three countries, degree of openness, which was evaluated using the share of intra-regional trade in each of the countries GDP, and the share of total trade in GDP. Cyclical covariation in economic activity was another criteria used to measure the behaviour of the countries' macroeconomic variables³⁸. The similarity of the industry structure was analysed using the contribution of industries to value added. The last criteria used to assess whether the EAC constituted an optimum currency area was the similarity of inflation across the countries, which would also indicate the manner in which the countries conduct their economic policies (Mkenda, 2001: 32). In terms of the G-PPP method, Mkenda (2001: 33) notes that the method was relevant in a multi-country setting. The author notes that a currency area within such a setting would be one where the factors that drive the real exchange rates would share common trends. In other words, the real exchange rates would be co-integrated and thus the G-PPP was used to establish the extent of cointegration among the countries exchange rates.

According to Mkenda (2001: 41) the results of the various indices that were calculated based on the theory of optimum currency areas gave mixed verdicts and thus were not conclusive. Mkenda (2001) noted that the countries rely heavily on the export of agricultural goods, which constitutes the main source of export earnings, and thus it is likely that the countries tend to experience similar external shocks. This result was confirmed by the G-PPP approach that showed that the

³⁶ The approach can be described in the manner in which it works. Real exchange rates tend to be non-stationary and can be influenced by fundamental variables such as income, terms of trade and so on. These variables themselves have been found to be non-stationary, thus real rates will also be non-stationary. If two countries qualify for creation of a currency union, then they must experience symmetrical shocks to their fundamental variables. These fundamentals in two countries must move together, thus GPPP postulates that the real exchange rates between the two countries comprising the domain of a currency area should be cointegrated according to Mkenda (2001: 33) and Enders and Hurn (1994: 180). Enders and Hurn (1994) applied this theory to the Pacific Rim and India.

³⁷ Essentially the Herfindahl index is a measure for determining market concentration. The values obtained from the index would give an indication of how competitive the market is (Johansson and Svensson, 2006: 19). Mkenda (2001) adapted this model to identify the concentration of the industries in terms of diversification of industries, i.e. how diversified the industrial structure was in terms of production of goods. A high value would indicate a small degree of product diversification. Furthermore, a more diversified industrial structure would allow countries in the currency union to absorb some shocks affecting a particular sector (Mkenda, 2001: 22).

³⁸ The macroeconomic variable included growth of output and money, the nominal and real interest rates.

real exchange rates of the countries were cointegrated for the period 1981-1998 as well as for the period 1990-1998, suggesting that the countries tend to be affected by similar shocks. Mkenda (2001: 42) further notes that the formation of a monetary union relies on political will and cultural ties of the countries concerned and should political stability endure in them, the prospects for more integration are good.

In a similar manner Buigut and Valev (2005b) also assessed the suitability of the East African countries for a regional monetary union. This was the first study to include Burundi and Rwanda as part of the analysis of the EAC. The authors identified and compared macroeconomic shocks to the East African countries and to those of the EMU countries, the United Kingdom and the United States. The authors focused on shocks to aggregate output growth and inflation which were considered the two most important indicators across Africa. Buigut and Valev (2005b: 2120) noted that the limitation of Mkenda's (2001) G-PPP approach was that movements in macroeconomic variables reflected the combined effects of shocks and responses, which meant that Mkenda's (2001) methodology did not distinguish the shocks from the responses. To correct for this, Buigut and Valev (2005b) used a methodology adapted from Bayoumi and Eichengreen (1992) that identified structural shocks using a VAR technique³⁹ in order to identify supply and demand shocks for the East African countries. Impulse response as well as variance decomposition techniques were also carried out in the analysis. The study made use of annual data for the five East African countries, the UK, the US and the EMU countries⁴⁰ covering the period from 1970 to 2001.

The results from the correlation did not show strong support for a currency union but did indicate that more integration may improve the symmetry of shocks. The results from the impulse response functions followed similar patterns, with the exception of Uganda. The adjustment to output and prices to a supply shock occurred within the first three to four years and the long run magnitudes were close. It was noted that while the magnitude of the response was larger in Uganda and the adjustment took a long time, the overall results supported a monetary union

³⁹ A VAR technique is a statistical method that is used to estimate how an unpredictable disturbance affects other variables in the economy (Buigut and Valev, 2005b: 2120). The method employed was similar to their 2005a study.

⁴⁰ The EMU countries included were Germany, France and Italy, and in addition the GDP-weighted aggregate of all EMU countries was used.

among the East African countries. Furthermore, the evidence of linking an East African currency to an external anchor was found to be weak, however, evidence from the lagged supply shock correlations was in favour of the euro as an anchor currency over the US\$ and pound sterling.

The most recent study done on East Africa was carried out by Buigut and Valev (2009). The methodology employed was a theoretical model developed by the authors to show that a multilateral monetary union can enhance monetary stability for its member states even if none of them has a history of independent and prudent monetary policy as in the case of the five-member EAC. The authors focused on credibility effects of monetary integration in addition to estimating the welfare loss from losing independent monetary policy in the EAC (Buigut and Valev, 2009: 586). In order to study the welfare effects of an East African monetary union the authors adopted the approach used by Swank (1997)⁴¹ in their welfare framework using data on real and nominal GDP covering the period from 1990 to 2004⁴². In carrying out their regressions, a rolling regression method was used, and then the same data series was used to identify the output shocks faced by the EAC countries by regressing the growth of real output on its two lags to identify the variance and covariance of the shocks for each country.

The results of the model suggested that a monetary union may dampen the negative effects of policy shocks under the condition that the shocks are not highly correlated across member countries. Furthermore, the welfare effect of a monetary union differed across all five countries. Uganda and Tanzania did benefit from a union whereas Kenya, Burundi, and Rwanda did not. By decomposing the net welfare into three effects – those of loss from output shocks asymmetry due to lack of monetary policy independence, imported monetary policy credibility, and mutual restraint on monetary policy interference – the authors noted that the most important factor determining net welfare were the strong preferences for output stimulation. They found that Uganda would benefit from a monetary union with countries that display stronger aversion to high inflation. Kenya, Rwanda and Burundi, however, would lose from a monetary union with the two countries (Uganda and Tanzania). According to Buigut and Valev (2009: 590), the

⁴¹ In Swank's model, the policy maker chooses nominal output to balance the objectives of low inflation and high output subject to a constraint based on the short run Phillips curve (Buigut and Valev, 2009: 588).

⁴² The data set was deliberately kept short so as to capture relatively more recent developments in the five countries (Buigut and Valev, 2009: 588).

results indicate that none of the EAC countries would be able to fill the role of being the anchor, but the welfare of the countries would improve when the EAC currency is linked to the euro as anchor, causing the net welfare for Kenya, Rwanda, Uganda and Tanzania to increase, but not for Burundi.

From the review of the studies above, with only three studies assessing the possibility of a monetary union, it is evident that the empirical work on East Africa is severely limited. Furthermore, the results as to whether the East African countries should form a monetary union remain to an extent inconclusive. For example, Mkenda (2001) argued for the possibility of monetary integration after finding that the exchange rates for the countries were cointegrated. However, Buigut and Valev (2005b; 2009) remained sceptical stating that Kenya, Rwanda and Burundi would lose out if they formed a monetary union with Uganda and Tanzania.

2.6 SUMMARY AND CONCLUSION

The chapter reviewed the issues surrounding the aspect of monetary unions and monetary integration. The different spectrums of monetary unions were reviewed in the forms of monetary integration. The focus of the study remained in the final stage, being a full monetary union where countries adopt a common currency and a single central bank to manage monetary policy.

The review of empirical literature reveals that a large amount of research has been done in the Euro area and in Africa. In both cases, the PT estimation was seen as popular amongst several of the studies reviewed, however, this was not the case in East Africa. The only three studies focusing specifically on the East African case apply the G-PPP, VAR and a theoretical model by Mkenda (2001), Buigut and Valev (2005b) and Buigut and Valev (2009) respectively. Thus with regard to East Africa, as noted above, there has been no study that employed the interest rate pass-through method to gauge the degree of financial integration among the countries. Furthermore, no study has assessed the extent of integration over time amongst all five East African countries. The importance of this lies in the fact that there is a need to identify how far the countries have come in terms of their convergence process if they are to form a monetary union by 2012. Thus this study will fill the gaps by employing the interest rate pass-through methodology to identify the extent of integration and determine the possibility of all five EA countries forming a monetary union.

CHAPTER 3

THE EAST AFRICAN COMMUNITY

3.1 INTRODUCTION

The chapter provides an overview of the East African Community (EAC) and draws on any implications that may have an effect on the pass-through analysis. Essentially, the community collapsed in 1977, and after its revival, the Republics of Burundi and Rwanda were accepted to it, boosting its membership to five countries. The critical objective of the new EAC is to form a monetary union by 2012. In order to do so, it has set aside convergence criteria for member countries to comply with as they progress towards a monetary union. This chapter reviews the convergence criteria, and highlights the objectives and achievements to date of the new EAC. The final section provides an individual country analysis that aids in identifying the factors that may have an impact on the interest rate pass-through analysis in each country. The chapter begins with a historical background of the EAC.

3.2 THE EAC: A HISTORICAL BACKGROUND

Integration arrangements amongst the East African countries began as early as the colonial times where the economies were integrated in both monetary and customs union. The EAC community treaty was signed in June 1967 by the heads of state of the then three partner countries, Kenya, Tanzania and Uganda. Even though the EAC was formalised in 1967, the conditions for the establishment of the EAC was developed during the colonial era, where in 1917 a customs union was established between Kenya and Uganda with Tanganyika (now Tanzania) joining ten years later in 1927. According to Mkenda (2001: 12) within the customs union the three member states jointly administered a number of services, such as customs tax, excise and income tax, medical and industrial research, education, transport and communication and agriculture. Additionally, the factors of production such as labour were mobile across the member states and a monetary union existed amongst the three countries with a high degree of fiscal integration (Mkenda, 2001: 13; Bigsten and Mkenda, 2002: 39).

Bigsten and Mkenda (2002: 39) note that before the community was formalised certain significant developments occurred. The first was the establishment of the East African High Commission (EAHC) in 1948. This commission was made up of governors of the three countries and acted as a legislative and administrative organ for East Africa, with policy decisions effected through its secretariat in Nairobi. The second development was the establishment of the Central Legislative Assembly (CLA) which considered and enacted laws relating to aspects of the common services (Mkenda, 2001: 13; Bigsten and Mkenda, 2002: 39).

However, after all three countries gained independence⁴³, certain changes occurred that affected how the co-operation was run. Masson and Pattillo (2005: 130) note that after independence the member countries, which shared a common currency under Britain's colonial rule, issued separate currencies. In 1961, the high commission was transformed into the East African Common Services (EACSO), which consisted of the chief executives of the three governments. Some changes were also effected in the way the CLA was to operate services (Mkenda, 2001: 13; Bigsten and Mkenda, 2002: 39). Mkenda (2002: 13) notes that the CLA was enlarged, and the authority operated through various committees which comprised the three ministers from each country. In 1967, the treaty that officially established the EAC was signed with the main aim of forming a common market. The treaty specified free exchange of currencies at par, and the link to the sterling was broken following the 1967 sterling devaluation (Masson and Pattillo, 2005: 130). The treaty also established the East African Council consisting of three presidents and five councils assigned to various areas such as common market, communications, economics and planning, amongst others (Mkenda, 2002: 14). The aim of the community was stated as follows:

it shall be the aim of the Community to strengthen and regulate the industrial, commercial and other relations of the partner states to the end that there shall be accelerated, harmonious and balanced development and sustained expansion of economic activities the benefits whereof shall be equitably shared (Hazelwood, 1979: 53).

⁴³ In 1961 Tanzania, which was also known as Tanganyika, attained independence, and Kenya and Uganda gained their independence in 1963 and 1962 respectively.

After the treaty was signed in 1967, problems started to emerge in the monetary union. According to Mkenda (2001: 15) the first problem that occurred in 1967 had to do with the nationalisation of banks in Tanzania and the ensuing exchange controls that were imposed against Kenya and Uganda to restrict capital flight. These exchange controls caused a temporary break in the union. In 1970, the announcement of a nationalisation policy in Uganda caused a heavy outflow of capital from all three countries. Exchange controls against Kenya and Uganda were imposed, and the export and import of the Ugandan currency was banned. As a result, in retaliation to the exchange controls member countries started to pursue their own policies with regard to the pegging of their currencies, and all currencies were then pegged to the dollar. This continued until the EAC collapsed in 1977, and was officially dissolved in 1983 (Mkenda, 2001: 15). The next section identifies what caused this collapse of the EAC.

3.2.1 *The Collapse of the EAC*

Hazelwood (1979: 43) argues that the failure of the treaty could not be attributed to a single cause. The author notes that in reality, there were a number of interacting influences and issues, some of which may have derived from the Treaty and some not, which may have resulted in the collapse, and thus no simple lesson can easily be drawn from the EAC experience.

A review of the literature⁴⁴ highlights two major factors that contributed to the collapse of the EAC: differences relating to the distribution of benefits, and ideological clashes. With regard to the distribution of benefits, there was a feeling that the benefits of a common market were accruing more to Kenya than to Tanzania and Uganda. Furthermore, the fact that Kenya's industrial sector was more developed than that of the other member states meant that the relatively less developed countries were buying more goods from Kenya than Kenya was buying from them, which resulted in a trade imbalance in favour of Kenya, with Tanzania and Uganda being in persistent deficit to Kenya (Musonda *et al.*, 1997; Rothchild, 1974; Bigsten and Mkenda, 2002: 40). Furthermore, the latter two countries were disappointed that compensating mechanisms such as subsidies, concessions from Kenya, or redistribution through the East African Development Bank did not work (Goldstein and Ndung'u, 2001: 11).

⁴⁴ See Mkenda (2001), Bigsten and Mkenda (2002), Masson and Pattillo (2005), and Kamala (2006).

The other factor that contributed to the collapse of the EAC, which according to Mkenda (2001: 16) may have been the most important one, was the ideological differences between the three countries. Mugomba (1978: 262) argued that the tensions that were already in existence in the EAC were worsened by the ideological distance between the partner states. Politically, Tanzania (under President Julius Nyerere) and Uganda (under President Milton Obote) pursued socialist-oriented strategies of development, while Kenya was more capitalistic, and thus was becoming isolated in a region that was predominantly socialist. Furthermore, Tanzania did not recognise the Idi Amin government that took power in a 1971 coup in Uganda, partly because of the brutal nature of Idi Amin's dictatorship. This prevented summit meetings of the three leaders of East Africa and contributed to the eventual collapse of the community in 1977 (Mugomba, 1978: 262; Mkenda, 2001: 17; Bigsten and Mkenda, 2002: 40).

3.2.2 The revival of the EAC

The current EAC is regarded by many as a revival of the old EAC. Considering that it was mainly ideological factors and lack of compensatory mechanisms for addressing the inequalities in the sharing of the costs and benefits of the integration that led to its collapse in 1977, this section begins by reviewing how the community was revived and identifying what made it different from the old one. Furthermore, the objectives and achievements to date will be highlighted.

Following the dissolution of the community, according to Bigsten and Mkenda (2002: 40) a mediation agreement was signed by the heads of the state of the partner countries to divide the assets and liabilities and to identify the possibility of the member countries co-operating in the future. The result of this was the establishment of the Permanent Tripartite Commission for East African Co-operation in November 1993, and in 1996 the EAC secretariat was established (Bigsten and Mkenda, 2002: 40). In the meantime, the agreement that revived the EAC came under debate by the heads of state in April 1997 regarding whether the Agreement could be revived and signed as a treaty. It was finally upgraded to a treaty, and signed in November 1999 (Institute for Security Studies, 2006: 1-2).

In addition to the decision to re-establish the EAC by the end of 1999, one of the vital issues raised was the admittance of Rwanda and Burundi to the EAC. The question of whether Rwanda should be admitted to the community raised a heated debate during a meeting attended by three

of the foreign ministers in January 1999. The Ugandan delegation wanted Rwanda to be admitted, however, Tanzania disagreed, arguing that it was not possible to admit new members at that stage, as the procedure for doing so was still being debated. The proposal by Uganda was defeated when the Tanzanian and Kenyan delegates voted against it (Institute for Security Studies, 2006: 1-2). However, according to Ncube (2009: 1) the Republic of Rwanda and the Republic of Burundi joined the EAC in June 2007 and became full members of the community from July 2007.

After the revival of the EAC, several institutions were set up to ensure that the objectives set out by member countries were achieved. These institutions included the summit, the council, the Co-ordination Committee, the Sectoral Committees, the EAC Court, the EAC Assembly, and the Secretariat,⁴⁵ as stated in Article 9 in chapter 3 of the EAC Treaty (East African Community, 1999: 20). In terms of the objectives, this was stated in Article 5 of the Treaty. Essentially, it sought to develop policies and programmes aimed at widening and deepening co-operation among the partner states so as to promote the development of the partner states economically, politically, socially and culturally on the basis of balance, equity and mutual benefit of the three partner states (EAC 1999: 15). In order to achieve these objectives⁴⁶, the partner states undertook to establish a customs union by 2005 (which has already been achieved as discussed below), a common market by 2010, a monetary union by 2012, and ultimately a political federation of the East African states (Sarotto, 2008: 2). Mkenda (2001: 19) further notes that the EAC sought co-operation in various other areas, such as fiscal and monetary policies, transport and communication, immigration, security, energy, promotion of investment in the region, political, health, labour, education and training amongst others.

⁴⁵ See Mkenda (2001: 18) and the Institute for Security Studies (2006: 5-6) for more detail on what each of these organs of the EAC consisted of.

⁴⁶ When the EAC was revived, it launched its first Development Strategy (1997-2000) as a vehicle for achieving its objectives. However, constraints and limitations in implementation such as unrealistic time frames, lack of public education and campaigns, wrong sequencing of activities, and lack of donor funding for programmes as well as reliance on donor funding are among the factors that led to the second Development Strategy, which covered the period 2001 to 2005. This Strategy took into account the aims of the treaty and accordingly set up actions consistent with those aims (Bigsten and Mkenda, 2002: 39-44). The third Development Strategy⁴⁶ (2006-2010) was launched in November 2006 and set out an ambitious programme and target for the realisation of a vastly transformed and fast modernising East African region (Sarotto, 2008: 2).

Because this study is particularly concerned with the establishment of a monetary union in East Africa, emphasis is placed on the objective of forming a monetary union with the goal of introducing a single currency by 2012. For monetary union to be realised, the members of the EAC have pledged to meet a series of economic convergence criteria. Maruping (2005: 131) notes that for this to be successful, it requires strong commitment in implementing the agreed arrangements, fair mechanisms to solve disputes and equitable distribution of the gains and costs of integration. Furthermore, not only will this allow countries to better contemplate the feasibility of entry into the monetary union, it will also allow them to reap the benefits of joining the monetary union once they have adhered to the convergence criteria. The following sections identify and examine these convergence criteria.

3.3 MACROECONOMIC CONVERGENCE AND THE CRITERIA FOR FORMING A MONETARY UNION

Typically, countries forming a monetary union set criteria which members must meet before being able to join the monetary union. The most notable and widely cited criteria that has set the precedent for others being established in different parts of the world are the Maastricht criteria.

The Maastricht treaty represented the first step toward the creation of the Economic and Monetary Union (EMU) in Europe (Soukiazis and Castro, 2005: 386). According to Bayoumi and Mauro (1999: 9), the Maastricht treaty provided a detailed timetable and set of preconditions for the final stages of the process of monetary integration and convergence. These criteria were established so as to achieve nominal convergence, which would result in a reduction in the economic disparities that existed between the European Union (EU) countries before the creation of the EMU in 1999 (Soukiazis and Castro, 2005: 386).

Afxentiou (2000: 249), Haug *et al.* (2000: 420), and Soukiazis and Castro (2003: 6) identify these criteria as⁴⁷:

⁴⁷ See Polasek and Amplatz (2003) for further discussion on the criteria.

1. An inflation rate of no more than 1.5 percentage points above the average of the three countries with the lowest inflation rates;
2. Nominal long-term interest rates not exceeding by more than 2 percentage points, those for the three countries with the lowest inflation rates;
3. No exchange rate realignment for at least two years; and
4. A government budget deficit and debts not exceeding 3 percent and 60 percent of GDP, respectively.

According to Afxentiou (2000: 249), the first three convergence criteria were designed to ensure monetary stability by supporting a fixed exchange rate regime among member countries. The last two criteria were set out to reinforce the stability of the euro. This was aimed at protecting the European Union from threats of inflation which could have arisen from budget deficits.

Following the pattern of the euro, African countries have begun to set criteria for themselves with slight variations due to the different economic environments, structural characteristics and macroeconomic conditions faced by these African economies. As a result, the majority of sub-Saharan African countries are members of one or more regional or sub-regional arrangements. For example,⁴⁸ regional arrangements in Southern Africa include the Southern African Development Community (SADC), and the South African Customs Union (SACU) which also has a Common Monetary Area (CMA), in central Africa, the Central African Economic and Monetary Community (CEMAC) and in West Africa the Economic Community of West African States⁴⁹ (ECOWAS) and its monetary union (UEMOA).

The EAC has also set convergence criteria of its own. According to the Central Bank of Kenya's annual report (2008: 58), the Governors of the EAC partner states adopted a new set of convergence criteria in May 2007 which were classified into primary and secondary criteria. The primary criteria were the primary preconditions for convergence, which needed to be met, while the secondary criteria reinforced the primary criteria.

⁴⁸ See Maruping (2005: 133) for more examples of the different unions in Central Africa, East Africa, Southern Africa, North Africa and West Africa as well as other groupings.

⁴⁹ See for example Rossouw (2006: 384) for convergence criteria for SADC, Rogers (2004: 32) and Harvey et al. (2001) for convergence criteria for CEMAC, and Bawumia (2002: 2) for convergence criteria for ECOWAS.

The primary criteria are:

1. Overall budget deficit/GDP ratio (excluding grants), of not more than 3 percent;
2. Annual average inflation rate not exceeding 5 percent;
3. Minimization of central bank financing to 0 percent target; and
4. Foreign exchange reserves equivalent to six months of imports of goods and non-factor services.

The secondary criteria are:

1. Achievement and maintenance of stable real exchange rates;
2. Achievement and maintenance of market based interest rates;
3. Achievement of sustainable real GDP growth rate of not less than 7.0 percent;
4. Sustained pursuit of debt reduction initiative on domestic and foreign debt i.e. reduction of total debt as a ratio of GDP to sustainable level;
5. National savings to GDP ratio of not less than 20 percent;
6. Reduction of current account deficit (excluding grants) as a percentage of GDP to sustainable level consistent with debt sustainability;
7. Implementation of the 25 core principles of bank supervision and regulation based on agreed action plan for harmonisation of bank supervision; and
8. Adherence to the core principles for payment systems by modernising payment and settlement systems.

The macroeconomic criteria provided above⁵⁰ highlight that the success of any monetary integration process will largely depend on the extent to which member countries are able to meet their convergence criteria. It can be observed that the East African criteria bear some resemblance to those of the Maastricht Treaty but are more elaborate and detailed. Naturally one would expect the criteria to be more elaborate considering that the East African countries are developing, thus greater attention would be required in such countries to prepare them for monetary integration. The critical question raised at this point is, to what extent have the East African countries managed to achieve these criteria?

⁵⁰ The criteria presented above may lead one to question the possibility of them being attained, especially in less developed countries such as the EAC. Thus the relevance of this study is vital to determine the extent to which these member countries have met the convergence criteria.

Since its inception, the new EAC has achieved a number of its objectives. The most significant accomplishment, according to the Economist Intelligence Unit (2007: 50), has been the creation of the EAC customs union, which came into force on 1st January 2005. The customs unions provided for free trade between the member states, with the proviso that Uganda and Tanzania could still impose tariffs on selected Kenyan manufacturers for an interim five-year period. It also set a common external tariff (CET) for trade with the outside world of 25 percent for final goods, 10 percent for intermediate goods and 0 percent for raw materials.

Following the implementation of the customs union, Kenya, Uganda and Tanzania have tried to harmonise their fiscal and monetary policies. For example, there is full convertibility of the three currencies in each of the countries, and an agreement has been reached to liberalise capital accounts (Mkenda, 2001: 19). According to the Economist Intelligence Unit (2007: 50) a Monetary Affairs Committee has also been established. Other notable achievements include holding of pre-budget and post-budget consultations by finance ministers, synchronisation of the budget day, and development of a macroeconomic framework for the region in order to guide the three states towards economic convergence, establishment of the East African passport and reductions in border delays, harmonisation of customs documentation, and execution of a tripartite agreement on avoidance of double taxation. These are all aimed at achieving a single market (Mkenda, 2001: 19; Bigsten and Mkenda, 2002)⁵¹.

The following section provides a historical context of each of the five EAC member countries, by looking at their financial developments and monetary policy frameworks with a view to identifying any factors that could affect the pass-through of interest rates in the countries.

⁵¹ See the East African Community Portal (2009) which highlights a number of achievements to date ranging from policy matters to aspects such as gender issues.

3.4 OVERVIEW OF EAST AFRICAN FINANCIAL SYSTEMS

3.4.1. Kenya's Financial System

According to Ngugi and Kabubo (1998: 6) at independence, Kenya inherited a financial system which comprised the Currency Board of East Africa, a commercial bank sector dominated by foreign banks, and a small number of specialised financial institutions. This inherited financial system expanded and increased in terms of diversity in the 1970s and 1980s due to an increase in local participation in the financial system made possible by government policies. Furthermore, specialised institutions were set up to collect savings and finance investment through the issuing of new bank and Non-Bank Financial Institution (NBFI) licences. During the 1980s the growth of locally owned Financial Institutions (FIs) increased and began to include commercial banks (Brownbridge and Harvey, 1998: 93). Ngugi and Kabubo (1998: 6) note that the number of commercial banks increased from 9 to 15 in 1980, and by 1985 there were a total of 23 commercial banks.

However, in the mid-1980s the financial system suffered its first major episode of financial fragility when several locally owned FIs were closed down after encountering severe liquidity problems due to mismanagement and fraud. The first cycle of bank failures occurred during 1984-6 and in 1989-90 several small NBFIs and building societies collapsed and were taken over by the Central Bank of Kenya (CBK) (Brownbridge and Harvey, 1998: 93). Ngugi (2001: 7) notes that the reason for the collapse may be attributed to low entry capital requirements and inadequate supervision and the fact that most NBFIs were undercapitalised and poorly managed. Furthermore the NBFIs mismatched asset and liability maturities invested in riskier assets and offered higher rates than commercial banks, thus squeezing their margins and ultimately facing problems of illiquidity and insolvency. The problems did not stop there, Brownbridge and Harvey (1998: 93) add that during the 1990s the scale of bank failures escalated when six banks and 11 NBFIs were put into liquidation or placed under statutory management of the CBK for serious breach of banking regulations during 1993-4⁵².

⁵² Brownbridge and Harvey (1998: 93) note that the major causes of bank failures in Kenya have been the accumulation of bad debts because of fraudulent or imprudent lending, including lending to companies connected to politicians. Adverse selection problems in terms of lending to prospective borrowers, the poor quality of management and inadequate capitalization all contributed to the financial fragility affecting locally owned FIs.

According to Ngugi (2001: 7), in response to the financial crisis the Banking Act was reviewed and approved in 1989 with the objective of enhancing the regulatory and supervisory functions of the central bank. Brownbridge and Harvey (1998: 95-97) note that the bank failures in the 1980s and 1990s served as an indication of the deficiencies that existed in the system of prudential supervision and regulation of the commercial banks and NBFIs. As a result the government introduced a number of reforms in the 1980s and early 1990s which were aimed at strengthening the institutional structure and regulatory framework of the financial system, such as revision of banking laws and improvements in supervision.

With the introduction of the policy reforms since the early 1980s there was an increase in controlled interest rates from 1982 which ensured that pre-tax interest rates were positive in real terms. Furthermore, the gap between the Treasury bill and lending rates was narrowed. The interest rate differentials between commercial banks and NBFIs were reduced in the mid-1980s and the spreads between the deposit and lending rates were widened in the second half of the decade. In 1990 the controls over the lending-related fees and charges were removed and in 1991, the interest rates were deregulated (Brownbridge and Harvey, 1998: 97).

Despite the trend in liberalization, Kenya failed to meet the basic prerequisites for successful financial reforms because of increasing inflationary pressures and deteriorating economic conditions, thus Kenya was thus not able to reap the fruits of its liberalization process (Ngugi, 2001). For example the fiscal deficit in 1992 led to a large borrowing equivalent to 8 percent of GDP, further leading to an increase in money supply and inflation rates of 30 percent in 1992 and 46 percent in 1993. At the time the TB rates were raised to absorb liquidity through open market operations (Ngugi, 2001; Brownbridge and Harvey, 1998: 97). According to Brownbridge and Harvey (1998: 97) the system still remained largely oligopolistic, with large banks operating an informal cartel in setting interest rates and charges. Even though interest rates had been deregulated, commercial banks were reluctant to raise their lending rates to match those of the high TB rates or the rise in inflation as it would have threatened the solvency of some of the banks' borrowers.

According to the Central Bank of Kenya (2008a: 32), as of June 2007 and June 2008 the number of financial institutions remained at 45. The Banking Supervision report (Central Bank of Kenya ,2008b: 1) notes that 43 of these financial institutions were commercial banks, and the other two

were mortgage finance companies. The banking sector experienced rapid expansion with branch networks increasing by 44.6 percent from 534 branches in June 2007 to 772 branches in June 2008. Currently the banking sector is dominated by 6 large banks which account for approximately 58 percent of the market share. This serves as an indication of opportunities in the economy to expand banking services to parts of the population that do not hold bank accounts, for example in the rural areas. This would provide a larger pool of saving to fund productive investments.

In light of the above, the possible factors that could affect the pass-through stem from oligopolistic behaviour and bank size. Since 1992 the banking sector has been dominated by large players, which indicates that these banks are able to liaise with one another and set rates according to what suits them best. Although Table 3.1 in Section 3.5.6 below indicates that the level of banking concentration has been low since 1995, the fact that it is dominated by 6 large banks controlling half (almost 60 percent) of the market share indicates that there is a possibility that these banks may be able to dictate their own rates and thus oligopolistic practices amongst the banks in Kenya may affect the pass-through of interest rates

3.4.2. Tanzania's Financial System

According to Mwega (2003) the financial system was entirely owned and controlled by the government between the periods 1967 until 1991. The system was considered narrow since it was made up of the central bank, three commercial banks, five Designated Financial Institutions (DFIs), two insurance companies, two contractual savings institutions and one hire purchase company, and these institutions were not subject to any form of competition or banking regulation. The state owned most of these institutions, including all commercial banks and insurance companies. In addition the only social security institution and three of the five DFIs were owned by the state. The only commercial bank of any significance was the National Bank of Commerce (NBC) which was a monopoly, and dominated the financial system, accounting for 85 percent of bank deposits. According to Brownbridge and Harvey (1998: 189-197) until the 1990s, no new entry by the private sector into the financial markets was allowed, however this changed with the Banking Act in 1991 that made provision for the entry of the private sector for the first time since the 1960s.

From the 1990s Tanzania began to implement financial sector reforms. Major components of the reforms were programmes aimed at restructuring the financially distressed public sector banks, encouraging private banking, the deregulation of the capital market, and strengthening of prudential regulation and supervision (Mwega, 2003). Furthermore, according to Brownbridge and Harvey (1998: 193) the reforms entailed interest rate liberalisation and the introduction of indirect instruments of monetary control, as well as policy measures to encourage new entrants from the private sector and to remove any obstacles to new entry. The authors further note that the impact of liberalization on competition was limited. Four new private sector banks, all with foreign participation, had been set up by 1996, however, their operations were confined to urban areas and lending was mainly focused on corporate customers.

A recent article by Tirabassi (2009: 1) noted that the banking market is characterised by a few big players and several small banks. There were a total of 27 banks and a few NBFIs. Furthermore, 90 percent of deposits were in the hands of eight banking institutions⁵³, three of which were local banks and five foreign banks. According to Machira (2008: 1) these eight banks dominate the industry and represent about 70 percent of total banking sector assets.

Until 1991 when the private sector banks started to emerge, the banking sector was characterised by the monopoly behaviour of the NBC. Thus with the lack of competition, the NBC was able to influence rates in any manner it wanted, regardless of changes in the official rates. Since the reforms of the 1990s there has been a considerable amount of foreign participation, but competition still remained weak. Currently, oligopolistic and collusive behaviour by the eight dominant banks is possible and may impact on the pass-through of interest rates.

3.4.3. *Uganda's Financial System*

The Ugandan banking system until the 1980s was considered to be highly oligopolistic and inefficient in terms of performing many basic banking functions, the largest bank and the several smaller ones being insolvent. The problems of the banking system were attributed to the financial policies pursued by the governments between the mid- 1960s and the later 1980s, combined with the severe economic crises, civil conflicts and acute political instability which

⁵³ The eight banks were National Microfinance Bank (NMB), National Bank of Commerce (NBC), Cooperative and Rural Development Bank (CRDB), Standard Chartered Bank (SCB), Citibank, Stanbic, Barclays, and Exim Bank (Machira, 2008: 1).

affected Uganda during this period (Brownbridge and Harvey, 1998: 127). Cihak and Podpiera (2005: 6) note that the government began to implement financial sector reforms in the early 1990s, the first being in 1992, with the objective of enhancing the efficiency of the financial sector and promote growth, thus redressing the crises. The reforms included liberalization of interest rates, restructuring distressed banks and strengthening prudential regulation (Brownbridge and Harvey, 1998: 127). Table 3.1 indicates that during the early 1990s the level of competition within the banking sector remained poor, confirming the possibility of oligopolistic behaviour on the part of the banks.

According to Cihak and Podpiera (2005: 7) the reforms did improve the performance and depth of the financial system in Uganda, however it is still regarded as small even by regional standards. Factors such as the weak infrastructure and a problematic legal and institutional environment continue to deter the financial sector development. Judging from Table 3.1, from 1996 onwards the concentration levels seemed to be decreasing to more steady levels, which may indicate that the reforms may have caused an increase in the level of competition in the banking sector, forcing institutions to provide better financial services for their clients.

A recent article by Oketch (2009: 1) noted that the Uganda's financial sector has been progressively growing in size and coverage, as well as in terms of expansion and product development. This is as a result of the lifting of a moratorium on licensing of more banks in 2005, which has led to an increase in the number of commercial banks from 14 to 21⁵⁴ with one yet to begin operations. This makes the current number of banks in Uganda 22, with four credit institutions and three microfinance deposit-taking institutions.

3.4.4. Burundi's Financial System

Since independence in 1962, before the adoption of financial reforms, Burundi's financial system was considered shallow. The sector was dominated by two commercial banks, a savings bank, a development bank and three NBFIs. The state was a major shareholder of these institutions. According to Nkurunziza (2009: 6) it was this strong state intervention as well as other rigidities

⁵⁴ See also the Bank of Uganda Annual Supervision Report (2008: 2) confirming the number of commercial banks in Uganda at 21.

that explained why Burundi's financial system was inefficient, far from dynamic and uncompetitive⁵⁵.

With financial liberalization taking place in the 1980s and 1990s, the country's financial sector has been described as being more diversified⁵⁶ (Nkurunziza and Ngaruko, 2002: 34; Nkurunziza, 2009: 6). Moreover, the reforms set in place in the 1980s with the objective of liberalizing the financial sector⁵⁷ was in fact the second phase of an already ongoing structural adjustment programme since 1986 with the focus on liberalising the real sector of the economy in the first place (Nkurunziza, 2009: 6). Table B1 in Appendix B indicates that from the 1990s the financial sector began to steady contribute towards growth in the economy.

In terms of the effects of the financial liberalisation process, the financial sector has been considered to be more competitive than it was before the reforms 20 years ago. According to Nkurunziza (2009: 8), currently Burundi has eight commercial banks, one development bank, one housing bank, three insurance companies and several microfinance institutions. It is important to note that Burundi has no stock market, therefore financial intermediation is performed by the banks. However, the author notes that despite liberalisation efforts, the availability of banking has been limited to a small group of people, indicating that the effects of liberalisation have not gone far enough.

Despite the fact that the financial sector had become more competitive than in the 1980s, Nkurunziza (2009: 12) highlights that the financial sector remains oligopolistic in nature, with three banks accounting for 60 per cent of the credit allocated and 78 per cent of the total deposits. In combination, the three banks share approximately 84 per cent of the total net profits

⁵⁵ See Nkurunzazi (2009: 6-7) for ways in which the state intervention caused inefficiencies in Burundi's financial system.

⁵⁶ According to Nkurunziza and Ngaruko (2002: 35), as at 2002 the financial system comprised eight commercial banks, one development bank, two leasing companies, two investment banks, one mortgage bank, a rural development fund and a rural credit and savings cooperative. Additionally two specialised funds were established to assist investors to raise the necessary guarantees to access lending. The post office network also provided some financial services. Lastly, the country had five insurance companies of which four were privately owned.

⁵⁷ Nkurunziza (2009: 7) notes that the objective of the financial liberalisation focused on allowing market fundamentals to determine lending and deposit interest rates, creating a bond market that would be accessible by financial operators and commercial banks, prudential regulation for risk management by ensuring that banks comply with reserve ratios and finally encouraging competition in the financial sector.

in the credit market. The concentration figures provided confirm that throughout the period from 1996 to 2005 competition amongst the banks remained poor, confirming the oligopolistic nature of the banks in Burundi. Furthermore, the constant presence of the state in the financial sector makes it prone to political influences.

Considering that Burundi has been characterised by ethnic based civil war, it is understandable that its financial system is still at an early stage of development and the regulatory and supervisory structures are still at their infant stages. The cyclical nature of the civil wars and political risk has increased the level of uncertainty over the future, and thus financial institutions may become cautious, causing interest rate rigidities. For example banks may keep lending rates at high levels to prevent lending to those with risky projects, causing rigidities in lending rates downwards. Furthermore, the levels of concentration remained significantly high, especially in 2004 and 2005 where 1 was the highest concentration figure. This could seriously impede the pass-through of interest rates.

3.4.5. Rwanda's Financial System

Rwanda's financial sector faces a poor environment with economic activity concentrated in a few sectors as well as a weak credit culture, accounting and auditing systems and poor institutional, legal, and judicial frameworks. The programme of recapitalization and privatization started after 1994 and has strengthened the short-term resilience of banks, however structural weaknesses remain (IMF Country Report, 2005: 1).

According to the IMF Country Report (IMF, 2005: 8) Rwanda's financial system is considered to be "shallow" and dominated by a small number of banks. Table 3.1 shows the significantly high concentration figures from 1996 to 2007. At the time the report was prepared, there were six commercial banks. Of the six, the three largest banks controlled about two-thirds of total system assets.

However, Rwanda's financial sector has been growing at unprecedented levels. According to Rwanda's finance minister, Mr James Musoni, the country's financial sector has been growing at 20 per cent annually for the last five years. This increase in growth was attributed to the Financial Sector Development Program. In the first 12 months of implementation of the program, between April 2007 and March 2008, there was an increase in the minimum capital

requirements for banks from \$2 million to \$8 million, the objective of which was to increase the robustness and resilience of banks in Rwanda (Kezio-Musoke, 2008: 1). Table B1 in Appendix B indicates the slow pace of growth in the contribution of the financial sector to the economy from 1999 onwards.

Judging from the ethnic based civil wars in both Burundi and Rwanda, including the Rwandan genocide, one can conjecture that during these periods there would naturally be no banking developments. In both countries the stages of financial development, oligopolistic behaviour and weak regulatory and supervision frameworks may affect the pass-through of interest rates.

3.5 OVERVIEW OF THE EAST AFRICAN MONETARY POLICY FRAMEWORKS

3.5.1. Kenya's Monetary Policy Framework

According to Kinyua (2001: 9) the effectiveness of monetary policy from the 1970s to the 1980s was constrained by the fixed exchange rate policy Kenya pursued at that time. The central banks were not able to carry out independent monetary policy as the expansionary fiscal policy that it accommodated was in conflict with the fixed exchange rate regime of the 1970s and 1980s. As a result credit targets were rarely met. Furthermore credit guidelines used as a way of containing monetary policy expansion suffered a number of drawbacks⁵⁸. Therefore monetary policy could not be considered to have been effective in the 1970s and 1980s.

Ngugi and Kabubo (1998: 9) note that the period before liberalisation was also characterised by a weak monetary policy. In the early 1990s, emphasis was placed on direct monetary controls such as credit controls by the government. For example, credit ceilings were put in place to limit private sector lending by the commercial banks. With the ceilings in place, the authors note that the central banks tried to offset the effect of large fiscal deficits on monetary expansion. The ceilings however did not apply to NBFIs (which may be a possible explanation for their failures in the early 1990s), varied across commercial banks and had minimal compliance from state-owned banks. Furthermore, the ceilings were based on weak and selective enforcement which lead to the segmentation of the financial market. As a result the government was not able to

⁵⁸ See Kinyua (2001: 9) for these drawbacks.

control inflationary pressures due to expansionary fiscal policy, lending by NBFIs and state-owned banks. Furthermore, those banks with tight ceilings sent their riskier clients to other banks and NBFIs (Ngugi and Kabubo, 1998: 9).

After the period of liberalisation in the early 1990s, there was a shift away from direct to indirect instruments of monetary control and in 1996 a new framework for conducting monetary policy was set in place with the primary objective of achieving and maintaining price stability. For most of the 1990s, the conduct of monetary policy focused on the behaviour of the broad money aggregate M2 which comprises currency in circulation and term and non-term domestic currency deposits with banks and NBFIs. With an increase in the openness of the economy, the stability of the relation between M2 and nominal GDP thus came into question. Thus by 1998, the central bank shifted its focus to a much broader monetary aggregate, M3, which comprises M2 plus foreign currency deposits held by residents (Rotich *et al.*, 2007: 4-5).

In order to ensure the realisation of its objectives, the primary one being price stability, the central bank makes use of three major instruments to implement its monetary policy. According to the Central Bank of Kenya (2008c) these include: Open Market Operations (OMO), Reserve Requirements and Discount Window Operations. Cheng (2006: 5) highlights that OMOs are regarded as the main active monetary instruments most frequently used by the central bank to manage liquidity. Through OMOs the central bank buys and sells securities in order to achieve a certain level of reserves. Alternatively the central bank injects money into the economy by buying securities in exchange for money stock (Central Bank of Kenya, 2008c).

The second instrument of monetary policy is the reserve requirement. Under this instrument the bank is required to retain a certain proportion of commercial bank deposits to be held as reserves at the central bank (Central Bank of Kenya, 2008c). As at December 2008 the reserve ratio currently stood at 5 percent (Central Bank of Kenya, 2009: 17). Table B1 in Appendix B shows that the ratio of reserves to total assets in Kenya was relatively high from 1990 to 2007, indicating that the banks were somewhat over liquid. This suggests that the effectiveness of monetary policy in draining liquidity out of the banking system may have been weak, potentially affecting the pass-through of interest rates.

Finally, according to Cheng (2006: 5) rediscount facilities and lender of last resort facility are also used as instruments of monetary policy. However, the author notes that these instruments have not been recently used as key tools for implementing monetary policy in Kenya.

3.5.2. Tanzania's Monetary Policy Framework

In 1995 a new Bank of Tanzania Bill was enacted by parliament. Under this act, there was a shift away from the multiple policy objectives of the former Bank of Tanzania (BoT) act, to a single policy objective of price stability. Moreover, the implementation of monetary policy shifted from one that focused on the use of direct instruments to one that used indirect instruments to influence the money supply (Masawe, 2001: 6). Thus from the period 1995 to date, the BoT has implemented monetary policy via a combination of indirect instruments in order to keep liquidity in the financial sector within desired levels⁵⁹. The instruments include OMOs, foreign exchange market operations, reserve requirements, discount rate, moral suasion and gentlemen's agreements. The main instrument for monetary policy in Tanzania is OMOs, and Masawe (2001: 6) notes that two approaches are used with regard to OMOs, namely the active and passive approaches. The active approach aims at attaining a certain level of base money, and at the same time allowing the price of reserves which are the interest rates to fluctuate. In contrast to this, the passive approach aims at a particular price of reserves while allowing the amount of reserves to fluctuate.

Foreign exchange market operations is another instrument of monetary policy whereby the central bank engages in buying and selling foreign exchange to commercial banks. However, since the shilling is determined by market forces of demand and supply, the central bank only intervenes to smooth out any fluctuations and build external reserves without affecting the primary objective of price stability (Masawe 2001: 6).

⁵⁹ Masawe (2001: 6) highlights that the implementation of monetary policy in Tanzania involves setting three levels of targets followed by the choice of instruments. The first target, known as the operating target, can be easily controlled by the central bank, and is measurable and predictable. The choice of target depends on factors such as the level of sophistication of the markets or the type of system being used by the central bank, for example money-based versus exchange rate-based stabilisation. The author notes that the Bank of Tanzania uses reserve (base) money as the operating variable/target. The second target is a quantifiable target known as the intermediate target. This target is influenced by the operating target and linked to the ultimate target (being the third target level). In Tanzania the money supply (M2) is the intermediate target since it is a money-based stabilisation system.

Reserve requirements are also used to affect the proportion of assets that the banks are required to hold. According to the Central Bank of Tanzania (2009b: 4) the bank increased the reserve requirements on central government deposit held by the banks from 10 percent to 20 percent effective from January 2009. However according to Masawe (2001: 6) the BoT does not use this instrument frequently as it is considered to be more direct than indirect. Table B1 in Appendix B shows that from 1993 onwards the ratio of reserves to total assets has been increasing, suggesting that the banks still remain highly liquid. This may also be explained by the fact that the central bank does not pay much attention to this form of monetary policy instrument.

The discount rate used by the central banks serves two functions. Firstly, the central bank buys Treasury Bills and other securities from those banks that are in need of liquidity before the securities mature. Secondly, via the discount window the central bank provides loans to those banks that are in need as well as to the government (Central Bank of Tanzania, 2009a: 1). Masawe (2001: 7) notes that considering that the OMO is the main instrument for monetary policy, the discount rate is highly restrictive in order to discourage borrowers from resorting to this form of monetary policy instrument. The reason for doing so, according to the Central Bank of Tanzania (2009a: 1), is that borrowing from the central bank injects liquidity into the system which may ultimately result in inflationary pressures.

Additional instruments used by the central bank include moral suasion and gentlemen's agreements. Moral suasion is a situation where the bank tries to influence the behaviour of certain market players. This instrument is used in conjunction with other policy instruments. Gentlemen's agreements are essentially voluntary agreements between the central bank and commercial banks with the aim of improving monetary conditions in the economy. Gentlemen's agreements were used in Tanzania between the central bank and the largest commercial bank with the aim of lowering the spread on interest rates (Masawe, 2001: 7).

3.5.3 Uganda's Monetary Policy Framework

During the period 1971-72 to 1992-93, the effectiveness of monetary policy was weak and subordinate to fiscal considerations. Monetary policy was exercised via direct means such as interest rate controls and credit controls, and ultimately monetary policy was considered dormant. Between 1972 and 1992, the reserve requirement remained at 10 percent even when liquidity conditions called for a change. Laws on limits were hardly enforced and a number of

commercial banks had open access to credit from the Bank of Uganda (BoU). Moreover, interest rates remained unchanged for long periods of time despite developments in inflation, and when rates were changed, the magnitude of the change was not sufficient to offset the inflation. This resulted in negative real interest rates for most of the period and led to excessive demand for bank credit which slowed down the mobilisation of financial resources. Thus in the 1980s monetary policy remained practically inactive. However in 1993, indirect monetary policy instruments were introduced as part of the financial sector reforms⁶⁰. Furthermore the reserve money programme was introduced in 1993 as the monetary policy-operating framework after the BoU was given the power to operate monetary policy (Musinguzi and Katarikawe, 2001: 7).

Since the initiation of the reforms Uganda has succeeded in stabilising inflation to single digit levels from its high levels in the 1980s and early 1990s due to prudent macroeconomic management, and since 2002 the BoU has targeted reserve money with the aim of achieving inflation rates below 5 percent (Saxegaard, 2006: 19). Moreover, Ingves (2004: 74) and Saxegaard (2006: 19) note that after the reform period the BoU shifted to a combination of rule-based monetary policy instruments and money market operations to conduct monetary policy. According to Saxegaard (2006: 19) the rule-based instruments include reserve requirements and standing facilities. The reserve requirements were introduced in 1977 at 10 percent of total deposits and by 2006 they were set at 9.5 percent for deposits of all maturities and are also applied to foreign currency and local currency deposits. Table B1 in Appendix B indicates that the ratio of reserves to total assets remained relatively high from the period 1990 to 2007, providing an indication that the banks remain highly liquid. Therefore the effectiveness of this monetary policy instrument in draining liquidity out of the banking system may have been weak, ultimately affecting the pass-through of interest rates.

The standing facilities take two forms. The first is the rediscount window which exists for treasury bills with a remaining maturity of 91 days or less. The rediscount rate is considered to be the policy rate set by the BoU to signal its monetary policy stance, and is based on the moving average on the 91 day Treasury bill plus a policy margin. The second facility is known as the

⁶⁰ The introduction of the indirect monetary policy instruments was part of a broader set of reforms which also included macroeconomic stability and liberalisation of the whole economy (Musinguzi and Katarikawe, 2001: 7).

automatic borrowing window, where the banks are allowed at their own discretion to borrow up to 5 percent of required reserves for a period of 5 days. The interest rate is equal to the rediscount rate plus a 1 percent margin (Ingves, 2004: 74; Saxegaard, 2006: 19).

The BoU makes extensive use of OMOs to manage the amount of liquidity in the economy. According to Saxegaard (2006: 19) about one-third of the BoU's money market operations are carried out by issuing government securities in the primary market and the use of repurchase agreements. The remaining two-thirds of the money market operations are effected through the sale and purchase of foreign currency from the private sector.

3.5.4. Burundi's Monetary Policy Framework

From 1988 to the present the Bank of Burundi (BoB) undertook a significant reform of its monetary and credit policies. The components of the reform focused on discarding the system of prior agreements, creating a market for Treasury certificates, adopting a single rate of refinancing after the removal of historical rates, the introduction of the system of reserve requirements and refinancing ceilings (Central Bank of Burundi, 2009).

Currently the BoB conducts its monetary policy using instruments that affect certain monetary aggregates. After having exercised monetary policy via direct control over money creation by the management of credit and regulation of interest rates, the bank has now introduced indirect instruments based on market mechanisms in the allocation of credit by financial institutions.

The instruments of monetary policy include refinancing policies, a minimum reserve system and a market for Treasury bonds (Central Bank of Burundi, 2009). The refinancing policy is considered the main mechanism used for the conduct of monetary policy, and is concerned with volume refinancing. Under volume refinancing with the liberalisation of the distribution of private sector credit, banks and financial institutions are allowed to classify themselves as eligible for refinancing loans. The minimum reserve system as an instrument of monetary policy was established in 1991 and requires the financial institutions to keep a portion of their cash or deposits with the central bank. According to the Central Bank of Burundi (2008: 4) during 2008 the bank continued to use the ratio of reserves requirements as an instrument for regulating liquidity and maintained the rate in Burundi Francs at 3 percent. Judging from Table B1 in Appendix B, the reserve ratio began to increase from 2004 to 11 percent in 2006, indicating that

during these periods the effectiveness of the reserve ratio as a tool of monetary policy may have been weakening. The final tool of monetary policy is the market for Treasury bonds. Essentially, the impact of this market on monetary policy and credit lies in that the market, amongst other things, aimed to emphasize the value of money via the market mechanism of demand and supply. The resultant market prices would serve as a benchmark for setting other interest rates, in particular the rate of refinancing (Central Bank of Burundi, 2009).

3.6.5 Rwanda's Monetary Policy Framework

Following the pattern of the East African countries Rwanda also shifted from a direct to an indirect monetary policy in November 1990. This was as a result of the structural adjustment policy imposed by the IMF and the World Bank. The direct control of money supply and prices was abandoned to allow market forces to determine prices. However, the efforts of the reform process in order to reduce the government's participation in the economy were halted due to the war that escalated into genocide in April 1994. In 1995 the reform process began again and monetary policy came to rely more on indirect instruments and in 1998 the central bank was advised by the IMF and World Bank to consider inflation targeting as its main objective (Sayinzoga and Simson, 2006: 67-68).

In order to regulate the liquidity in the economy the central bank implements monetary policy using three instruments, namely OMOs, the discount rate and the reserve requirement. It is important to note that during the last decade, the central bank made use of weekly auctions for absorbing or injecting liquidity. However, from 2008 onwards, the central bank replaced the weekly auction and overnight deposit facility by repo operations. The central bank also makes use of foreign exchange sales as a supplementary monetary policy instrument, mainly to smooth out any unexpected liquidity fluctuations in the market (National Bank of Rwanda, 2008: 1). With regard to the reserve requirements, in February 2009 the national bank of Rwanda reduced the reserve ratio from 8 to 5 percent in an attempt to address short-term liquidity. Table B1 in Appendix B highlights that the Rwandan banking sector remained highly liquid from 1991 to 2005, which suggests that once again the effectiveness of reserve requirement as a tool of monetary policy remained weak in controlling the liquidity in the banking system.

Based on the above overviews of the monetary policy frameworks, it can be concluded that after liberalisation periods in each of the countries, the focus of central banks in East Africa was

geared towards achieving price stability as their primary objective of monetary policy. In order to do this, the central banks shifted away from direct to more indirect instruments of monetary policy. The use of reserve requirements was common to all countries in the efforts of central banks to regulate the levels of liquidity in the banking sector. However, making any inferences with regard to the effectiveness of monetary policy was somewhat difficult, because despite the central banks efforts to manage liquidity in the banking system, Table B1 suggests that for countries such as Kenya, Tanzania, Uganda and Rwanda, the ratio of reserves to total assets is still high indicating a somewhat weak monetary policy. The consequence of this is that the commercial banks would not rely on the central banks for accommodation facilities due to their large reserves and thus any changes in the official rates would not have the desired impact on bank retail rates, ultimately causing rigidities in the pass-through of interest rates.

After looking at the East Africa financial systems and monetary policy frameworks, the following section gives an overall summary of the banking concentration in the countries. Additionally the asset and liability ratios of the commercial banks are examined to identify any other factors that could possibly affect the pass-through of interest rates.

3.5.6 Overview of Banking Concentration and Deposit Money Bank Asset and Liabilities in East Africa

Table 3.1 below reports the banking market concentration for the five EAC countries. This provides some indications of the level of competition in the banking sector as this can have an impact on the pass-through of interest rates.

YEAR	KEN	TZ	UG	BUR	RW
1992	0.87	*	1.00	*	*
1993	0.75	*	0.89	*	*
1994	0.66	*	0.81	*	*
1995	0.58	*	0.69	*	*
1996	0.53	*	0.47	1.00	1.00
1997	0.51	*	0.49	0.90	1.00
1998	0.56	*	0.61	0.88	0.93
1999	0.57	*	0.67	0.93	1.00
2000	0.60	*	0.65	0.92	0.94
2001	0.61	*	0.61	0.89	0.94
2002	0.59	*	0.69	0.86	0.91
2003	0.58	*	0.68	0.93	0.76
2004	0.54	0.64	0.67	1.00	0.72
2005	0.50	0.59	0.62	1.00	0.63
2006	0.49	0.50	0.65	*	0.71
2007	0.79	0.49	0.63	*	0.87

Note: * represents years where no data was available

Source: Dataset, Beck *et al.* (2009).

The bank concentration provided in Table 3.1 is calculated as the ratio of the assets of the three largest banks to the total of the banking sector assets. As can be seen, the concentration index varies between 0 and 1. A value close to 1 indicates the country has a high bank concentration, thus competition within the banking sector is low. In the same way, a low concentration index (closer to 0) indicates a less concentrated banking sector, thus a higher degree of competition exists in the banking sector. From Table 3.1 it can be seen that the level of banking concentration is generally low, especially from 1995 onwards for Kenya, Tanzania and Uganda. However Burundi maintained relatively high concentration ratios from 1996 to 2007, whereas Rwanda was less concentrated from 2003 to 2006. Overall, banking concentration was highest in Burundi and Rwanda, averaging to 0.93 and 0.87 respectively in the periods where data was available. Banking concentration ratios in Kenya, Tanzania and Uganda averaged 0.61, 0.55 and 0.68 respectively, suggesting that banking concentration would not be a major factor affecting the pass-through of interest rates in these countries.

Table B1 in Appendix B reports the assets and liabilities for the commercial banks, providing additional information on the performance of the banking system. Overall, the table shows that the banks in all five countries have continuously depended on demand deposits and time, savings and foreign currency deposits. As can be seen from Table B1 the ratio of these two liabilities to total liabilities has remained significantly higher than any other ratio in each of the countries

over the entire period. Additionally, Burundi also relied on foreign liabilities more for the period 2000 to 2006, ranging between 11.1 percent in 2000 and 23.7 percent in 2004. This could be an indication that Burundi relies less on borrowing from its central bank as a source of finance and more on funds from outside the country. This may affect how the bank interest rates respond to changes in the official rate and possibly result in a slowdown of the pass-through of interest rates, rendering the transmission of monetary policy ineffective. However, with regard to the other four countries – Kenya, Tanzania, Uganda and Rwanda – funding from foreign sources has remained relatively low. Other sources of funds to the banks include credit from other financial institutions, liabilities to non-bank financial institutions and government deposits.

Looking at the assets of the commercial banks, overall it is evident from Table B1 in Appendix B that claims on the private sector and government for all five countries throughout the period significantly dominate the assets of the banks. Furthermore, for Kenya, Tanzania, Uganda and Rwanda, the ratio of reserves to total assets is quite high. In Kenya this ranged from 6.40 in 2003 to 17.66 in 1994, in Tanzania from 3.84 in 1990 to 13.01 in 2000, in Uganda from 7.49 in 2003 to 17.56 in 1991, and in Rwanda from 3.78 in 1990 to 21.06 in 1994. The ratios suggest that the liquidity in the financial systems was increasing over time. Burundi was the only exception however: from 2004 onwards the reserve ratio started to pick up slightly, from 7.03 percent in 2004 to 11 percent in 2006. Other uses of funds include claims on non-financial public enterprises, claims on Non-Bank Financial Institutions (NBFIs) and claims on local government. Additionally, the credit to the private sector was calculated as a share of GDP in each of the countries. This ratio was used to identify the extent to which the commercial banks finance the domestic economy. Overall, Table B1 in Appendix B highlights that for all countries except Kenya the ratio remained significantly low. In Kenya the ratio grew over time to 25.62 percent in 2000, however despite the growth the contribution of the banks to financing the domestic economy remained low. It can be deduced from this that the banks do not finance the domestic economy and thus the economy does not rely on the banking sector for credit. This also suggests a low level of financial intermediation on the part of the banking sector.

The high reserve ratios identified above indicate that in the event that the banks ever needed to source funds, they would first resort to running down on their own reserves before seeking other sources of finance. Considering that the banks now use their own reserves as a source of finance,

they may not rely on the accommodation facilities provided by the central bank, thus changes in the official rate may not have the desired impact on the bank interest rates thus affecting the pass-through process.

It was also identified that the banking sector lends a large amount to the government. This could be due to a number of reasons which may ultimately affect the pass-through process. Firstly, political influences may force the banks to lend to the government, or government has a large influence on the banking sector for example in terms of ownership⁶¹. In such cases naturally the banks would be forced to lend to the state without necessarily increasing their lending rates regardless of what happens to changes in the official rates. Another reason that may explain the large lending to the government is simply that the private sector may be underdeveloped and as a result the risk of lending to the private sector may be too high⁶². The government may pose less of a risk in terms of default on their loans than lending to the private sector. The overall result would be that there would be no need for the banks to adjust their interest rates following changes in the official rates, causing rigidities and ultimately affecting the pass-through process.

3.6 SUMMARY AND CONCLUSION

This chapter provided a historical overview of the EAC and to identify how the new EAC differed from the old after its collapse in 1977. Some of the vital developments in the new EAC included the introduction of the EAC treaty in 1999 which identified the objectives of the community. One of the objectives of the EAC is the formation of a monetary union and introduction of a single currency by 2012. A development was the long awaited acceptance of Burundi and Rwanda into the community in 2007.

All five countries now form part of the EAC and have pledged to meet a convergence criteria to be eligible to form a monetary union. This convergence criteria were reviewed and it is noticed that they bear some resemblance to the Maastricht criteria. This is not surprising, because the

⁶¹ Recall that in section 2.4.1 of Chapter 2 it was highlighted that state-dominated banks can lead to monopolies which can result in interest rate rigidities.

⁶² In such cases information asymmetries and the resultant moral hazard play a role in lending less to an undeveloped private sector.

Maastricht criteria set the precedent for other countries when setting their own. To date the most notable development has been the introduction of the customs union which was introduced in 2005.

As noted in the previous chapter, the study seeks to use the interest rate pass-through analysis to identify the extent of integration amongst these five EAC member countries. However, considering that there are a number of factors that may impact the pass-through of interest rates, an overview of the financial systems and monetary policy frameworks of each of the countries was carried out. The analysis of the financial systems indicated that bank concentration was more prevalent in Burundi and Rwanda than in the other countries. With regards to monetary policy, it may be that monetary policy may have not been as effective in draining liquidity out of the banking system in Kenya, Tanzania, Uganda and Rwanda, because the ratio of reserves to total assets in these countries remained high suggesting that the banks were highly liquid. This results in a lack of reliance on accommodation facilities provided by the central bank and ultimately hinders the pass-through of interest rates. The large lending to the government in all countries suggests either that there were political influences in the banking system, or that the private sector was undeveloped. Lastly, the lack of contribution to the economy by the banks in all countries suggests that the financial system is inefficient in carrying out its role of financial intermediation.

CHAPTER 4

METHODOLOGY AND EMPIRICAL FRAMEWORK

4.1 INTRODUCTION

The purpose of this study is to examine whether or not the pass-through from central bank to commercial bank retail rates has become more similar over time in the five countries that make up the EAC, i.e. whether there is convergence in monetary transmission. To do so the study examines this relationship using a rolling window analysis in an Error Correction Model (ECM). Focus is placed on the speed and magnitude of these changes and the possibility of asymmetry in the pass-through of interest rates.

4.2 DATA AND METHODOLOGY

4.2.1. Data Definitions and Sources

The study uses monthly data from 1999-2008 for all the series as described below. The choice of the period was based on the availability of data that was comparable across all five countries. Two sets of empirical analysis were carried out. Firstly the analysis was carried out for the entire sample period. The second set of analysis made use of a rolling sample period of 5 years (60 observations) with the first period being 1999-2003. Subsequently the next windows are 2000-2004, 2001-2005 and so on until the final rolling window period of 2004-2008. The rolling windows help capture the dynamic development of the interest rate pass-through over time. The end of period discount rate for Tanzania, Rwanda and Burundi, and bank rate to commercial banks for Uganda, are used as variables representing central bank rates (CBRs). Note that in the case of Kenya, there was no sufficient data available for the discount rate, thus the Treasury bill rate has been used as a proxy and is also represented as a CBR. The lending rate and deposit rates for the five countries are used as variables representing the commercial banks' retail rates (RRs). Except for Kenya's Treasury-bill rate, which was obtained from the Central Bank of Kenya, all other interest rate series were obtained from Thompson DataStream and the IMF International Financial Statistics (IFS). The next section begins with the estimation techniques.

4.3 ESTIMATION TECHNIQUES

4.3.1 *Tests for Cointegration*

Cointegration analysis was proposed by Engle and Granger (1987). Brooks (2002: 388) notes that a set of variables can be classified as being cointegrated if a linear combination of them is stationary. For example, if two or more variables that have stochastic trends are found to be cointegrated, it would mean that although they may not be individually stationary, one or more linear combinations of them would be. Hence, cointegrated variables can be thought of as having a long-run equilibrium relationship between them, and non-cointegrated variables would suggest the non-existence of a long-run association (Brooks, 2002: 388). The cointegration analysis therefore seeks to identify whether such a relationship exists, and if so, the number and structure of cointegrating vectors.

Generally, a study of this nature employing time series data begins with determining the order of integration of the relevant time series i.e. to test whether the series is stationary or non-stationary. According to Brooks (2002: 367) a stationary series can be described as one with “constant mean, constant variance and constant autocovariances for each given lag”. The objective of such stationarity/unit root tests is to determine whether the interest rate series are integrated of order one, $I(1)$ so that a combination of these series will produce residuals that are integrated of order zero, $I(0)$. This would indicate the presence of a cointegrating relationship between the interest rates. In order to investigate the stationarity/unit roots of the time series, several methods have been developed, for instance visual plots of data, the autocorrelation function, unit root tests and those that directly test for stationarity, amongst others. In this study, we employ the conventional Augmented Dickey Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test to examine the stationary properties of the series⁶³. The ADF tests the null hypothesis that the series is non-stationary (has a unit root) against the alternative of stationarity (no unit root). However, the KPSS tests the null hypothesis of stationarity, thus reversing the null and alternatives of the unit root tests (Brooks, 2002: 382).

⁶³ The KPSS test is used in addition to the ADF test because the ADF tests have been criticized for their poor size and power properties. This means that they have the tendency to “over-reject the null-hypothesis of nonstationarity when it is true and under-reject it when it is false” (Aziakpono, 2008: 198). See Brooks (2002: 377-386) for a full discussion on the ADF and KPSS tests, and Harris (1995: 39) for a discussion of the problems relating to ADF unit root tests.

If the interest rate series are found to be stationary at level, then the relationship between the central bank rates (CBRs) and the commercial bank retail rates (RRs) will be estimated using Ordinary Least Squares (OLS). However, if the unit root test reveals that the series are not stationary at level, but stationary at first difference, then cointegration tests discussed below will be carried out to determine whether or not the CBRs and RRs of the respective country are cointegrated. If the non-stationary series of the CBRs and the RRs are found not to be cointegrated, then their relationship will be estimated with first difference series to avoid the problem of spurious regression. But if the rates are found to be cointegrated, then the ECM will be estimated to determine the extent of the pass-through as well as how long it will take for the RRs to adjust to changes in the CBRs (Aziakpono and Wilson, 2008: 26). Furthermore, for the cointegrated series, the study employs an asymmetric error correction model used by Scholnick (1996). Essentially, the model allows one to determine whether the adjustment in interest rates is faster back down to equilibrium if the residuals were above their mean, or whether the adjustment is faster back up to equilibrium if the residuals were below their mean. The asymmetric error correction model is discussed below under the empirical PT analysis in Section 4.3.2 of this chapter.

After establishing the order of integration of the series, cointegration techniques can then be used to reveal useful long run relationships amongst the variables. In this study a number of different tests for cointegration will be carried out. Firstly, the study makes use of four types of tests to provide robust evidence on the nature of cointegration among the interest rates. These are: (1) the Johansen maximum likelihood approach, (2) the cointegrating regression Durbin-Watson (CRDW) test, (3) the Engle-Granger (EG) approach, and (4) the error-correction based test⁶⁴.

According to Kremers *et al.* (1992: 1) the ECM statistic can also be viewed as a cointegration test and is considered more powerful than cointegration tests based upon the Dickey-Fuller (DF) statistic that is applied to the residuals of a static cointegrating regression⁶⁵. Based on this, cointegration is considered to exist if the coefficient of the ECT_{t-1} is significant at the 5 percent

⁶⁴ See Seddighi *et al.* (2000: 281), Brooks (2002: 387), Aziakpono and Wilson (2008: 27) and Gujarati and Porter (2009: 763) for further discussion of these tests.

⁶⁵ According to Kremers *et al.* (1992: 1) the possible reason for this is that the error correction based test uses available information more efficiently than the DF test.

level even if other tests indicate that cointegration does not exist. This decision is based purely on the premise that the error correction based test is considered to be more powerful than the Dickey-Fuller test (Kremers *et al.*, 1992: 1-3). The method will test whether the coefficient of the $ECT_{t-1} = 0$, i.e. RR_t and CBR_t are not cointegrated (Kremers *et al.*, 1992: 3). If the null hypothesis is rejected, then it will be concluded that there is cointegration between the interest rates. If cointegration has been established, the study employs an error correction model to examine the relationship further.

4.3.2 Empirical Pass-Through Analysis

According to Sander and Kleimeier (2006a: 216) a widely used methodology in order to investigate the effectiveness of the monetary transmission process is the interest rate pass-through (PT) estimation due to its ability to reveal how fast and how completely changes in monetary policy rates are passed on to bank lending and deposit rates.

The study follows the pioneering work by Cottarelli and Kourelis (1994) which influenced a number of authors to use the PT approach in their studies (cf. De Bondt *et al.*, 2002; Toolsema *et al.*, 2002; Sander and Kleimeier, 2004, 2006a, 2006b; Aziakpono, 2008 and Aziakpono *et al.*, 2008). The PT is modelled based on cointegration methodologies:

$$RR_t = \beta_0 + \sum_{i=1}^{k^*} \beta_{RR,i} RR_{t-i} + \beta_1 CBR_t + \sum_{i=1}^{n^*} \beta_{CBR,i} CBR_{t-i} + \varepsilon_t \quad (1)$$

where CBR_t is the central bank rate and RR_t represents the commercial banks' retail rate which can be a lending rate (LR) or a deposit rate (DR)⁶⁶. The lag length is indicated by k^* and n^* respectively. Note that the above equation (1) represents a PT model in level terms and is used for a set of interest rates that are stationary i.e. exhibit an $I(0)$ property.

From equation (1) above the responsiveness of RRs to the CBRs can be measured with reference to two sets of multipliers, namely the impact multiplier and the long-term multiplier. The impact multiplier β_1 measures the immediate adjustment within the current month. Hence, a value of $\beta_1 < 1$ would indicate a sluggish adjustment, known as interest rate stickiness (Sander and Kleimeier, 2004: 465).

⁶⁶ The variables RR and CBR have been adapted from the study by Aziakpono *et al.* (2008).

However, when turning to the long-run case, obtaining estimates for the long-run pass-through depends entirely on whether cointegration is present amongst the interest rates in question. If the cointegration tests reveal a stable long-run relationship between the interest rates, then the long-run parameters can be obtained via ordinary OLS estimation. This long-run relationship can be represented as:

$$RR_t = \theta_0 + \theta_1 CBR_t + u_t \quad (2)$$

where θ_0 and θ_1 represent the long-run intercept and slope coefficients respectively.

As already been noted, Equation (1) above, is used for a set of interest rates that are stationary, however, if the interest rate time series used in this study exhibit an I(1) property, i.e. they are non-stationary and thus do not have a constant mean or variance, then the PT model as in equation (1) is estimated using first differences:

$$\Delta RR_t = \beta_0 + \sum_{i=1}^{k^*} \beta_{RR,i} \Delta RR_{t-i} + \beta_1 \Delta CBR_t + \sum_{i=1}^{n^*} \beta_{CBR,i} \Delta CBR_{t-i} + \varepsilon_t \quad (3)$$

where Δ represents the first difference of the respective interest rate, and ε_t is the white noise error term. According to Sander and Kleimier (2004, 2006a) equation (3) specification avoids the problems associated with spurious regression, however, it would lead to a loss of information about long-run relationships. This loss of information can be recovered if the central bank and commercial bank retail rates are found to be cointegrated. If the cointegration tests reveal that the CBRs and RRs are cointegrated, then their relationship will be estimated further using a rolling regression technique in an error correction framework⁶⁷.

However, if the tests reveal no clear signs of cointegration, in order to obtain the long-run parameters we follow the method employed by Kwapil and Scharler (2009). To do this we use the first difference of the series in the model and calculate the long-run pass-through as:

⁶⁷ The idea behind the rolling regression approach is to take a fixed number of observations and to redo the regressions, every time adding one observation at the end of the sample, while dropping one at the beginning. The results should provide an indication of whether monetary policy transmission has been stable over time in the country under consideration (Toolsema *et al.*, 2002: 9).

$$\theta = (\sum_{i=0}^n \beta_1) / (1 - \sum_{j=1}^m \beta_{RR,j}) \quad (4)$$

where n and m indicate the number of lags chosen, β_1 is the coefficient of the central bank rate and $\beta_{RR,i}$ represents the coefficient of the retail rates which could either be a deposit or a lending rate. If $\theta=1$, one can speak of a full PT in the long run. As noted in Chapter 2, interest rate rigidities which lead to an incomplete PT can be caused by a number of factors such as financial structure, information asymmetries, credit demand functions that are not fully elastic, imperfect competition and other market imperfections. Such factors would result in $\theta < 1$ (Sander and Kleimeier, 2004: 465). However, if $\theta > 1$, this may indicate times when banks were not rationing credit supply but increasing lending rates to compensate for higher risks stemming from credit risk factors due to information asymmetries between banks and their borrowers (Sander and Kleimeier, 2004: 465).

When the series are cointegrated, Aziakpono *et al.* (2008: 14) note that a proper PT measurement should be based on an error correction model (ECM). This is shown below:

$$\Delta RR_t = \beta_0 + \sum_{i=1}^{k^*} \beta_{RR,i} \Delta RR_{t-i} + \beta_1 \Delta CBR_t + \sum_{i=1}^{n^*} \beta_{CBR,i} \Delta CBR_{t-i} + \beta_{ECT} ECT_{t-1} + \varepsilon_t \quad (5)$$

where Δ represents the first difference of the respective interest rate, and ε_t is the white noise error term. Of special interest is β_{ECT} , the coefficient of the error correction term, which measures the degree of adjustment to equilibrium. This coefficient is expected to be negative and a larger value would indicate a faster adjustment to the long run equilibrium. According to Aziakpono and Wilson (2008: 29) a coefficient of the ECT_{t-1} that is statistically significant suggests that market forces are in operation to restore long-run equilibrium following a short-run disturbance. β_1 is the short-run PT and $\beta_{RR,i}$ is the coefficient of the lagged dependent variable. It is important to note that the error correction terms in equation (5) above can only be obtained if a stable cointegrating relationship is found between the interest rates in question. The logical reasoning behind this is the fact that there would be no adjustment back to long-run equilibrium (represented by the error correction term) following any disturbances in the short run if no long-run relationship between the interest rates was present in the first place.

From equation (5) above a symmetric mean adjustment lag can be calculated to determine the speed of adjustment back to equilibrium. A high mean lag would indicate that it takes longer for the interest rates to respond to changes in the official rates and vice versa for a low mean lag (Scholnick, 1996). Following Scholnick (1996) the study computes the symmetric mean adjustment lag as:

$$ML = (1 - \beta_1) / \beta_{ECT} \quad (6)$$

A major drawback to using such a specification to calculate the mean lag is that it assumes that the adjustments are the same whether the retail rates are above or below equilibrium (Scholnick, 1996: 489). As a result the adjustment is said to be symmetric and not asymmetric (when the adjustment is different). Therefore, in order to examine the asymmetric adjustment, the author proposes a procedure by dividing the series of residuals which can be denoted by ECT^+ and ECT^- (error correction terms when the residuals are below and above equilibrium respectively) from the cointegrating regressions as follows:

$$\begin{aligned} ECT^+ &= ECT & \text{if} & \quad ECT > \mu \\ ECT^+ &= 0 & \text{if} & \quad ECT < \mu \end{aligned} \quad (7)$$

and

$$\begin{aligned} ECT^- &= ECT & \text{if} & \quad ECT < \mu \\ ECT^- &= 0 & \text{if} & \quad ECT > \mu \end{aligned} \quad (8)$$

where μ is the mean of the ECT. Once introduced into the model, the asymmetric short-run equation takes the following form:

$$\Delta RR_t = \delta_0 + \delta_1 \Delta RR_t + \beta_1 \Delta CBR_t + \phi_1 ECT^+_{t-1} + \phi_2 ECT^-_{t-1} + \omega_t \quad (9)$$

where ϕ_1 and ϕ_2 are the coefficients of the asymmetric error correction term, and from this the asymmetric mean lags for when the interest rates are above or below equilibrium can be calculated as follows:

$$ML^+ = (1 - \beta_1) / \phi_1 \quad (10)$$

and

$$ML^- = (1 - \beta_1) / \phi_2 \quad (11)$$

Equation (10) represents a situation in which the residuals are greater than the mean and thus represents the adjustment back down to equilibrium, while equation (11) is when the residuals are below the mean, thus representing adjustment upward to equilibrium. The importance of

asymmetric mean adjustment allows one to identify whether the speed of adjustment is faster upwards or downwards, which may provide some indication of the direction of the rigidities in the interest rates being analysed. Once equation (9) above has been estimated, the study applies the Wald test to determine whether asymmetry is present. The Wald test tests whether $\phi_1 = \phi_2$ in equation (9). If the test confirms that the parameters are in fact equal, it means no asymmetry is present in the adjustment.

Once the estimations have been carried out, the short-run and long-run PT parameters will be graphically plotted in order to examine whether or not the PT from policy-induced changes in the CBR to the RRs has become more similar over time, i.e. whether there is convergence in monetary transmission. The symmetric and asymmetric mean lags will also be plotted to analyse the direction of adjustment back to equilibrium. If it is evident that convergence has occurred judging from the graphical analysis, then the formation of a monetary union becomes more feasible.

4.4 CONCLUSION

The chapter provides the empirical framework that is used in this study. After determining the order of integration, the study makes use of four cointegration tests to test for the existence of any long-run relationships amongst the relevant interest rates. The analysis makes use of an interest rate PT estimation using rolling windows in a symmetric and asymmetric error correction framework to identify whether the PT of monetary policy measures has become similar over time in each of the five countries, and finally the study uses the Wald test to confirm the presence of asymmetry. Having set out the analytical framework, next the study applies them to the five East African countries with a view to achieving the objectives set out in Chapter 1.

CHAPTER 5 EMPIRICAL RESULTS

5.1 INTRODUCTION

This chapter presents the results of the interest rate pass-through analysis as described in Chapter 4. The results of the stationarity tests are presented in Section 5.2 while Section 5.3 presents the findings from the cointegration analysis. Section 5.4 gives a graphical analysis and provides a discussion of the findings of the pass-through model for the EAC. Section 5.5 concludes the chapter. A summary of the interest rate pass-through analysis is provided in Appendix I.

5.2 UNIT ROOT TESTS

The empirical analysis commenced with testing for unit root using the ADF and KPSS tests. The detailed results for the unit root tests are provided in Appendix C and D respectively. The tests were conducted for both the CBRs and RRs for each of the rolling windows. With regard to the ADF test, in majority of the cases, the results for the series in levels suggested that the null hypothesis (H_0) of unit root (and thus non-stationarity) could not be rejected, implying that the series were non-stationary at levels. These results were confirmed by the KPSS test, where the null of stationarity was rejected in levels, however at first difference, the null of stationarity could not be rejected⁶⁸. For example, Table C1 in Appendix C shows that the null hypothesis for the ADF test for the Treasury bill rate for Kenya in all 6 rolling window periods could not be rejected in levels implying a non-stationary series. However, at first difference the null of non-stationarity was rejected, implying that the series was stationary at first difference. These results were confirmed by the KPSS tests shown in Table D1 in Appendix D where in all 6 rolling window periods, the null hypothesis of stationarity could not be rejected at first difference, implying that the Treasury bill rates for Kenya were stationary at first difference. Overall, based on both tests, the results suggested that the interest rates were I(1) series.

⁶⁸ As noted in Section 4.3.1 the ADF tests the null hypothesis that the series is non-stationary (has a unit root) against the alternative of stationarity (no unit root). However, the KPSS tests the null hypothesis of stationarity, thus reversing the null and alternatives of the unit root tests (Brooks, 2002: 382).

5.3 COINTEGRATION ANALYSIS

As noted in the previous chapters, the study made use of four different methods to determine whether cointegration was present amongst the pairs of interest rates. Since the findings from the unit root tests suggested that the interest rates (CBRs and RRs) were stationary at first difference, i.e. integrated of order $I(1)$, cointegration tests were then used to determine if there was a stable long-run relationship between the pairs of interest rates over the various rolling windows. The tests used were the Johansen maximum likelihood method, the Engle-Granger method, the CRDW test and finally the error correction-based test. The results of these tests are reported in Appendix E. The analysis of the results showed some degree of discrepancy in terms of whether to accept or reject the null of cointegration from the different tests carried out. Thus the error correction-based test was used to determine whether or not cointegration was present. The results showed that cointegration was strongest between the official rate and deposit and lending rate in Uganda. Cointegration was also strong between the official rate and the Burundi and Rwanda lending rate. The weakest evidence of cointegration came from the Tanzanian lending rate where the null of no cointegration could not be rejected in six out of the seven rolling windows, similarly with the Burundi and Rwanda deposit rates where in four out of the seven rolling windows there was no cointegration. Once cointegration and thus the existence of a long-run relationship has been established between the CBR and RRs, an error correction model can be used to establish the short-run dynamics of the interest rate pass-through. It is important to note that in cases where no cointegration was present, it was not possible to estimate an error correction model. The following sections present the results from the interest rate pass-through analysis.

5.4 RESULTS FROM THE INTEREST RATE PASS-THROUGH ANALYSIS

The regressions carried out in the study were estimated for a sample period of 10 years, based on the availability of data, from January 1999 to December 2008. Within this time frame, rolling sample periods of five years (60 observations) were estimated in order to capture the dynamic development of the pass-through over time, and thus to identify the extent of nominal convergence in the East African Community over time. The summary of the long- and short-run regression analysis are provided in Appendices F and G respectively. As noted earlier, the overall result indicates that the series are $I(1)$. Figures 5.1 to 5.6 below represent the results from

the regressions carried out under the various rolling windows for the short-run pass-through, the long-run pass-through and the mean adjustment lag (ML) for both the deposit and lending rates for the EAC.

5.4.1. Short-Run Pass-Through Analysis

As noted in the previous chapter, the responsiveness of the RRs to changes in the CBRs could be measured over two time horizons, namely the short term and the long term. The short-run pass-through or impact multiplier measures the immediate adjustment of the RRs to changes in the CBRs. Figures 5.1 and 5.2 below show the short-run pass-through in the deposit and lending rates respectively.

Figure 5.1: Short-Run Pass-Through: Deposit Rate.

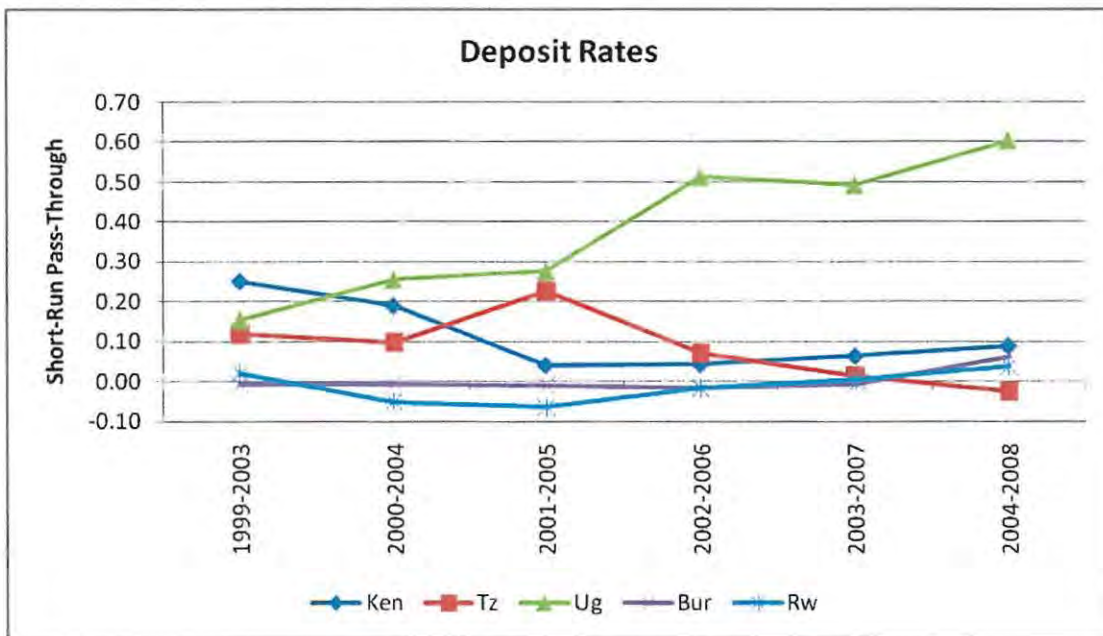


Figure 5.2: Short-Run Pass-Through: Lending Rate

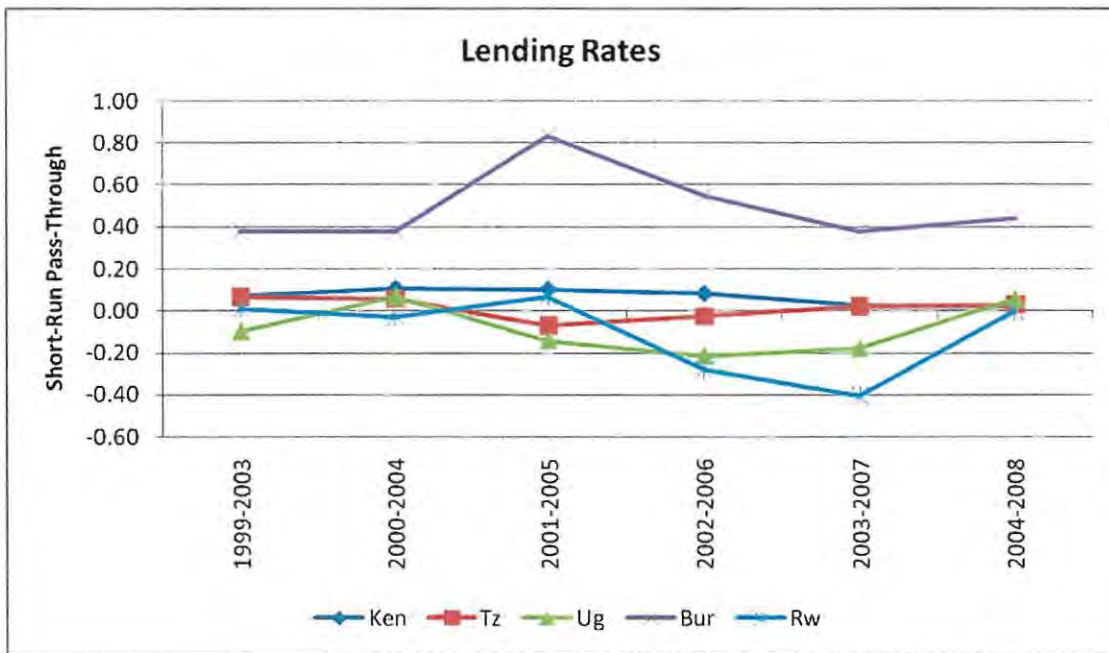


Figure 5.1 above shows that there are some discrepancies in the pass-through in the earlier time periods from 1999-2003 to 2001-2005 for Kenya, Tanzania and Uganda. However, for the period 2004 and 2005, the pass-through for Kenya and Tanzania respectively fell to levels similar to those of Burundi and Rwanda. In terms of convergence, evidence from Figure 5.1 suggests that, with the exception of Uganda, the countries began to converge from the period 2002-2006 rolling window.

As can be seen from the figures above, the short-run pass-through remained extremely low, being less than 10 percent from the 2002-2006 rolling window onwards. Despite the convergence amongst some of the countries, there are still serious rigidities in the deposit market over time. With regard to the entire estimation period 1999-2008, the results show that the pass-through in Tanzania, Burundi and Rwanda is similar. Kenya and Uganda appear to be converging, with Kenya having a higher pass-through than Uganda. Once again the magnitude of the pass-through in both cases remained extremely low, with the first group being less than 10 percent and the second being approximately 23 percent.

With regard to the short-run pass-through in the lending rates, Figure 5.2 clearly indicates that, with the exception of Burundi, the pass-through of Kenya, Tanzania and Uganda remained consistently similar to one another from 1999-2003 to 2004-2008 rolling windows. Rwanda follows the same trend although with lower short-run pass-through from 2001-2005 rolling window onwards and then begins to rise to levels again similar to the three countries in 2004-2008. With regard to the lending rates in the East African countries, Figure 5.2 shows that Kenya, Tanzania, Uganda and Rwanda were converging from 1999-2003 to 2001-2005 rolling window. The same countries began to converge again in the rolling windows 2003-2007 to 2004-2008. As with the deposit rates highlighted above, the magnitude of the short-run pass-through of the lending rates remained excessively low, hovering around 10 percent, thus implying serious rigidities in the lending rates. The results from the entire period 1999-2008 indicated that all five countries had a low similar short-run pass-through.

As mentioned in the previous chapter, if the value of the short-run pass-through is less than 1, it is an indication of a sluggish adjustment in the short-run, hence the interest rates are sticky. From Figures 5.1 and 5.2 it is evident that interest rate adjustment in all five countries remains sluggish. Figure 5.1 indicates that the interest rate adjustment was highest in Uganda from 2000-2004 rolling window onwards rising to a level of approximately 60 percent in 2004-2008 rolling window. With regard to the lending rates, Figure 5.2 shows that Burundi was the only country with a relatively quick interest rate adjustment, the highest being at 80 percent in 2001-2005 rolling window, however the magnitude began to decrease from this period onwards to a low of 38 percent in the 2003-2007 rolling window.

5.4.2. Long-Run Pass-Through Analysis

Having looked at the short run pass-through analysis, Figures 5.3 and 5.4 below show the pass-through of interest rates in the long run, and whether the countries are converging towards one another.

Figure 5.3: Long-Run Pass-Through: Deposit Rate

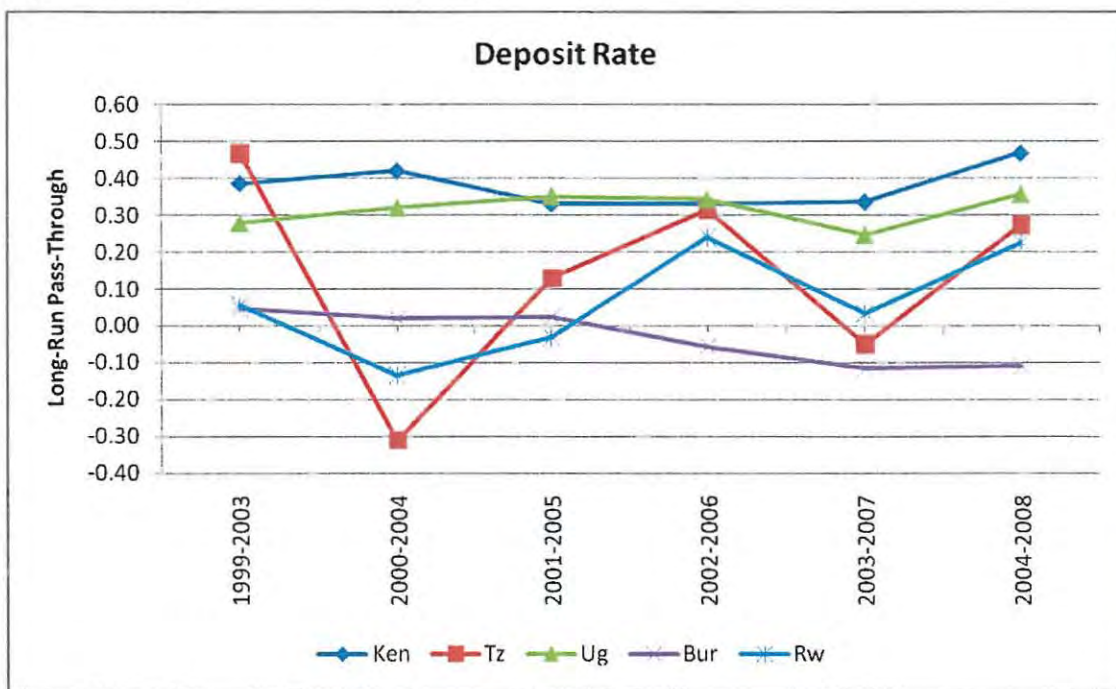


Figure 5.4: Long-Run Pass-Through: Lending Rate

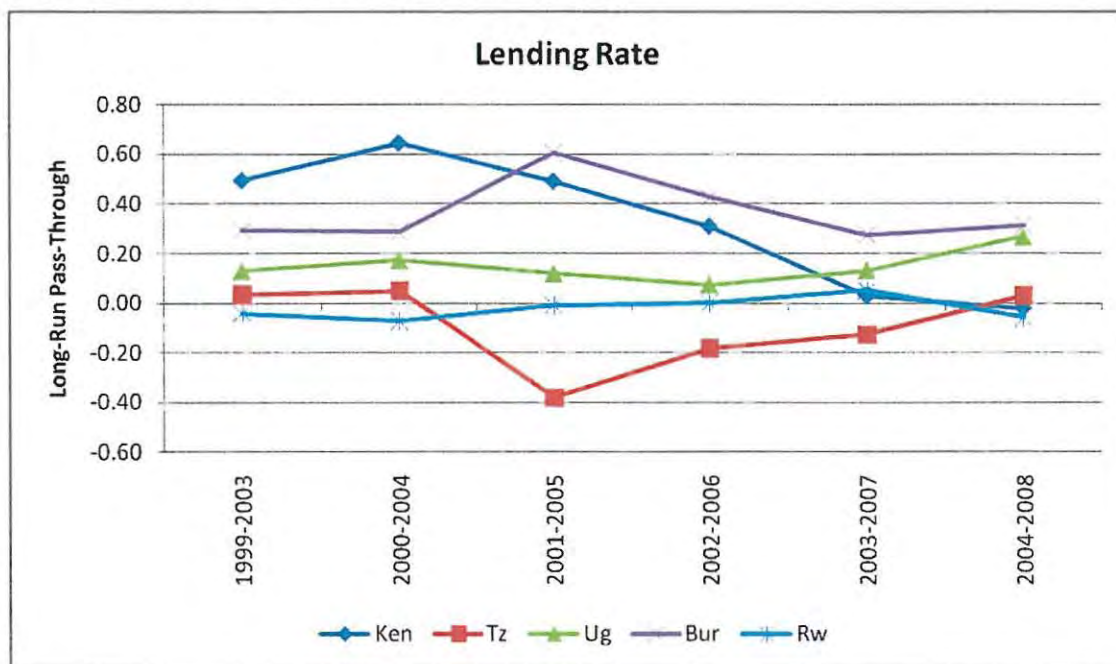


Figure 5.3 above shows that there is no evidence of a strong pass-through in the long-run for all five countries for most of the estimation period. Generally, for all countries there are great disparities across interest rates over time. For countries such as Tanzania and Rwanda, there is a considerable level of fluctuation in the long-run pass-through parameters over the entire period. While the pass-through between these two countries tends to fluctuate in similar directions, the pass-through for Tanzania rises to levels greater than Rwanda and falls to levels below Rwanda. The pass-through in Burundi, however, seems to be fairly consistent over time, yet significantly different from and lower than all the other countries. After the 2001-2005 rolling window onwards, the pass-through in Burundi remains the lowest of the other countries. With regard to Kenya and Uganda, there is some evidence of consistent long-run pass-through over the entire period, especially from 2001-2005 and 2002-2006 rolling periods, when the rates are almost equal. Despite the discrepancies in the pass-through for all countries, Figure 5.3 provides some indication of convergence for all countries in rolling window 2003-2007, and with the exception of Burundi some convergence in 2004-2008. Even though the countries may not necessarily be converging towards one another, the direction of the pass-through in these countries is similar. For example in rolling window 2003-2007 all countries are converging in the direction of a slower pass-through, whereas in rolling window 2004-2008, the countries are converging towards a slightly higher pass-through. However, the magnitude differed for all countries in these two rolling windows. For example in the 2003-2007 rolling window Kenya had the fastest pass-through of 34 percent, while Tanzania had the lowest of negative 5 percent. Similarly, in 2004-2008 Rwanda had the lowest pass-through of 23 percent while Kenya had the highest of 47 percent. Overall, the magnitude of the pass-through remained low, highlighting the existence of rigidities in the pass-through of deposit rates in the long-run. With regard to the entire estimation period, 1999-2008, no evidence of convergence was found.

Turning to the lending rates, Figure 5.4 indicates some level of consistency in the pass-through over time. Over the period 1999-2003 to 2004-2008, the pass-through in Uganda and Rwanda remained consistent over time. From rolling window 2002-2006 onwards, the pass-through in Kenya, Tanzania and Burundi begin to move towards the levels of Uganda and Rwanda, and as a result some evidence of convergence was identified in the 2002-2006 rolling window. The countries continued to converge until 2004-2008. It should be noted that from 2002-2006 onwards, the countries were converging towards a slower pass-through. In 2004-2008 the pass-

through in Burundi was the highest at 31 percent while Rwanda had the lowest pass-through of negative 6 percent. The results from the entire estimation period 1999-2008 showed some slight convergence between Tanzania, Uganda and Rwanda. Based on the findings, it can be concluded that from 2002-2006 onwards, there is slight evidence of convergence in the long-run pass-through parameters in all five countries. However, the slow rate of pass-through implies the existence of rigidities in the lending rates.

In order to supplement the discussion of the long-run pass through analysis, the coefficient of variation was calculated to provide further insight about the dispersion in the deposit and lending rates. Figure 5.5 and 5.6 below provide a graphical plot of the variability of the interest rates over time in the EAC.

Figure 5.5: Coefficient of Variation of Long-Run Multipliers: Deposit Rates

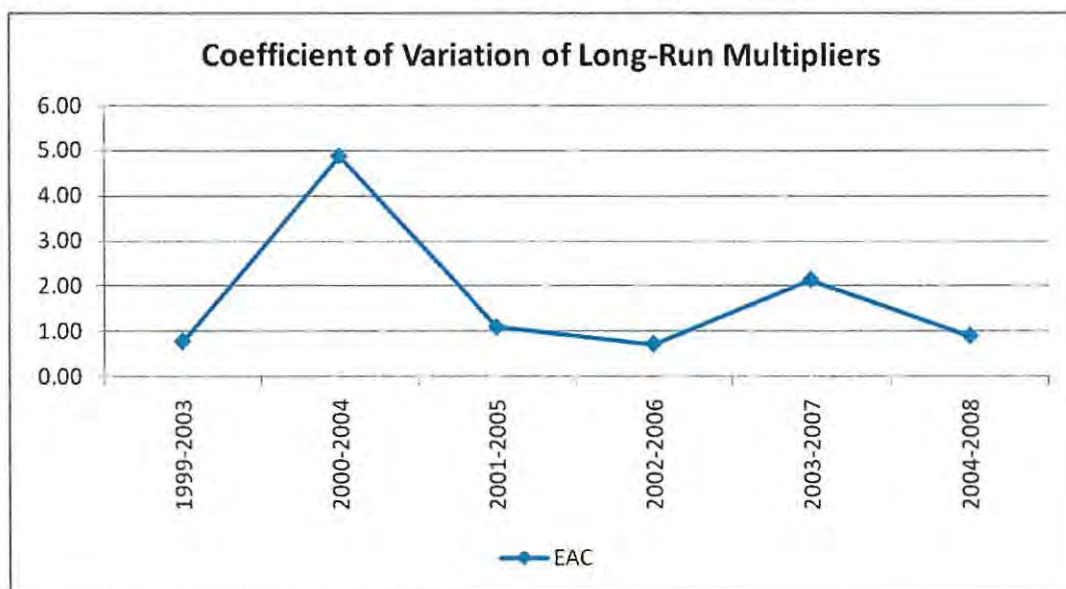
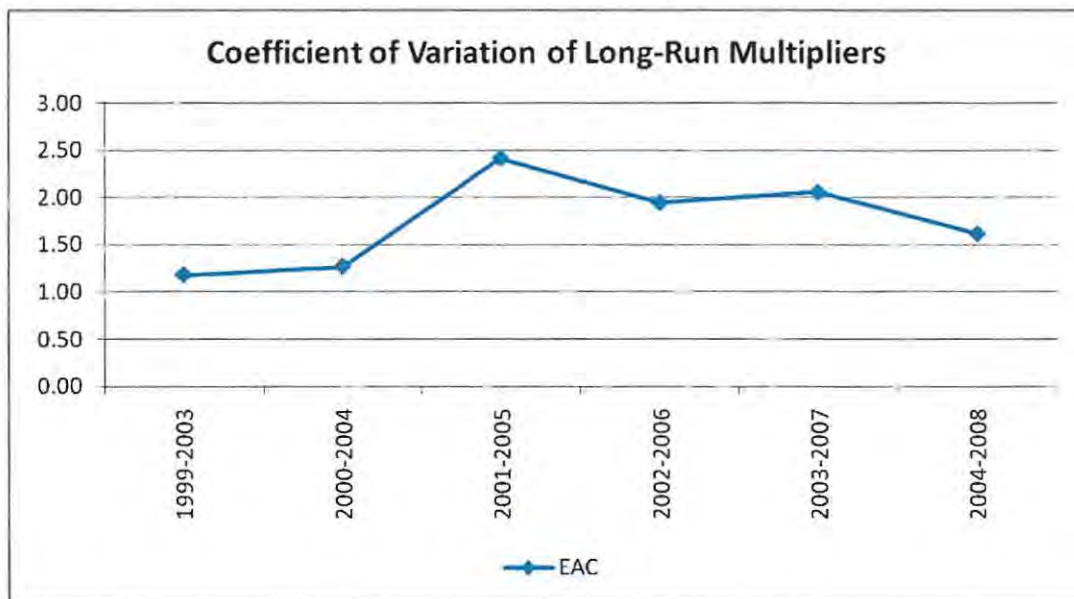


Figure 5.6: Coefficient of Variation of Long-Run Multipliers: Lending Rates



The coefficient of variation is calculated by dividing the standard deviation of all the countries' interest rates by their mean. Figure 5.5 above shows that there was great dispersion in the deposit rate in the 2000-2004 rolling window as well as in the lending rate in the 2001-2005 rolling window indicated in Figure 5.6. Despite the decrease in the dispersion in both the deposit and lending rates, as noted from the long-run results the speed and magnitude of the pass-through remained significantly low. Possible reasons for the low speed and magnitude and their implications on the pass-through are discussed further down in this chapter.

From the discussion of the results above, with regard to the deposit rates, the pass-through in the short-run indicated some slight evidence of convergence amongst Kenya, Tanzania, Burundi and Rwanda over time, however in the long run there was still evidence of somewhat heterogenous pass-through for the countries under analysis. With regard to the lending rates, there was some slight evidence of convergence in the short-run amongst all the countries except Burundi. However, in the long run, the rates remained heterogenous and after the 2001-2005 rolling window, the rates for all the countries seemed to be converging at a slow rate but still varying over time.

Moreover, the estimation results show that there was no situation where there was a complete pass-through of interest rates i.e. the pass-through parameters in the deposit and lending rates in

the long run remained significantly below 1. It is important to mention that in the event that the coefficient of the long-run pass-through was equal to 1, this would imply a full or perfect pass-through of changes in the central bank rates to the retail rates. The results of the long run pass-through indicate no evidence of a movement towards a full and complete one-for-one pass-through for either deposit rates or lending rates.

The reason for the incomplete pass-through in some cases are country-specific. Section 3.5 of Chapter 3 looked at the possible factors that could affect the pass-through of interest rates and thus provide an explanation for the decreasing pass-through. Banking concentration was seen as one of the major causes of interest rate rigidities and thus the slow-down of the pass-through. The East African countries financial systems are dominated by a few commercial banks, and thus they may have the ability to set their own interest rates despite changes in the official rates. As a result this could lead to rigidities in the lending and deposit rates in both the long and short term. Banking concentration was particularly relevant in the cases of Burundi and Rwanda. Table 3.1 in Section 3.5 of Chapter 3 highlights that the level of banking concentration in these two countries remained significantly high, averaging 0.93 and 0.87 respectively based on the concentration index provided in the table for periods where data was available. Another possible factor identified was the effectiveness of monetary policy in these countries. The ratio of reserves to total assets provided in Table B1 in Appendix B was relatively high for Kenya, Tanzania, Uganda and Rwanda, suggesting that the banks were very liquid. This could be an indication that the countries rely on reserve requirement rather than the discount rate as a tool of monetary policy. The high liquidity would mean that the countries would first run down their own reserves before resorting to the central bank as a source of finance, resulting in banks not changing their retail rates in response to changes in official rates.

Moreover, the large credit provided by the banks to the government was common to all countries. This suggests that either the banks were subjected to large political influences which may have forced them to lend to government organisations, or that the private sectors are undeveloped, and so lending to the state poses less of a risk in terms of defaulting on their loans than lending to the private sector. Lastly, the poor contribution of the banking sector to financing the domestic economy in East Africa suggests that the financial system was generally inefficient as well as inefficient in carrying out its role of intermediation. These factors may significantly

contribute to the rigidities in the lending and deposit rates identified from the estimation results which was slowing down the pass-through.

5.4.3. Symmetric Mean Adjustment in the ECM Model

Figure 5.7: Mean Adjustment Lag (ML): Deposit Rate

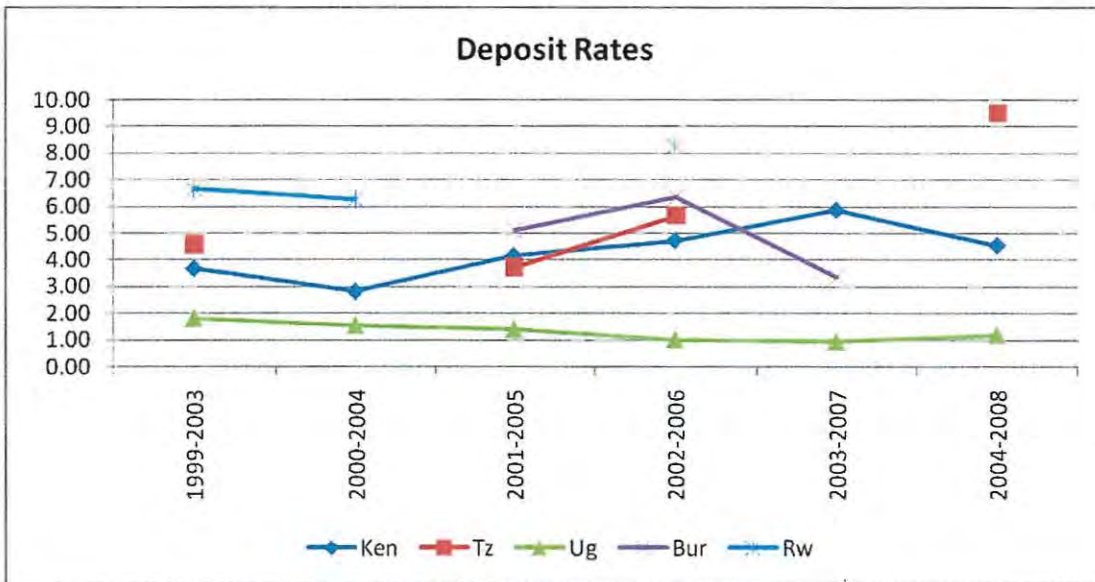
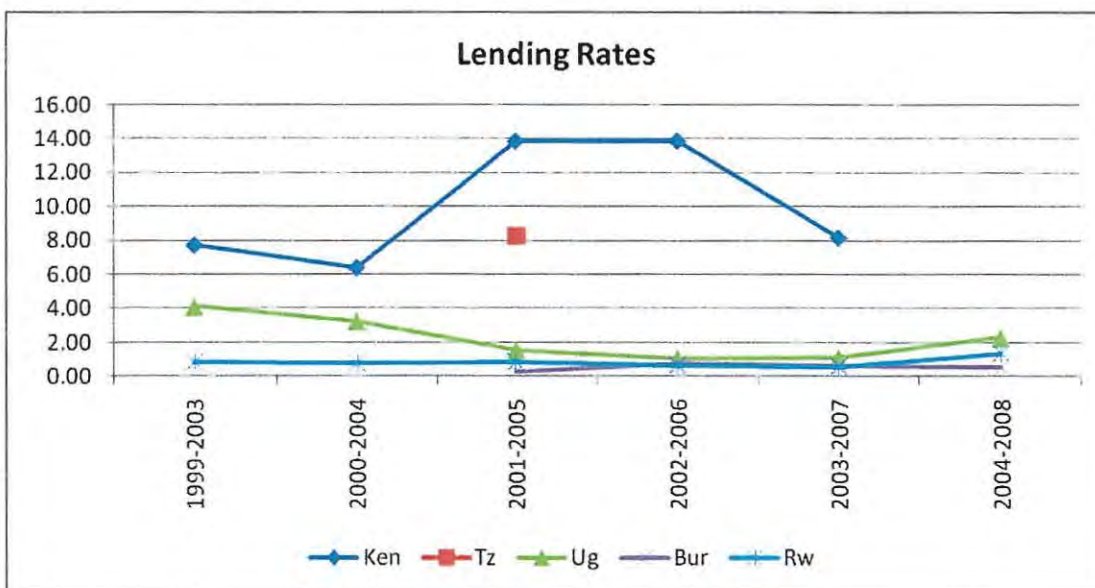


Figure 5.8: Mean Adjustment Lag (ML): Lending Rates



The mean adjustment lag essentially indicates how long it would take for the long run-interest pass-through to be fully realised. Naturally the longer it takes for the full adjustment to be realised, the slower the process and vice versa. Figure 5.7 above illustrates the speed of the transmission process in the deposit rates given by the ML following changes in the official rates. It is important to recall that the calculation of the ML as described in Chapter 3 can only be done when a cointegrating relationship between the interest rates under consideration is found. In the event that there is no cointegrating relationship, an error correction model (ECM) cannot be estimated and thus no MLs can be calculated. This explains the reasons for the possible breaks in the line graphs in the above figures such as for Tanzania, Burundi, and Rwanda in Figure 5.7 and Kenya Tanzania and Burundi in Figure 5.8.

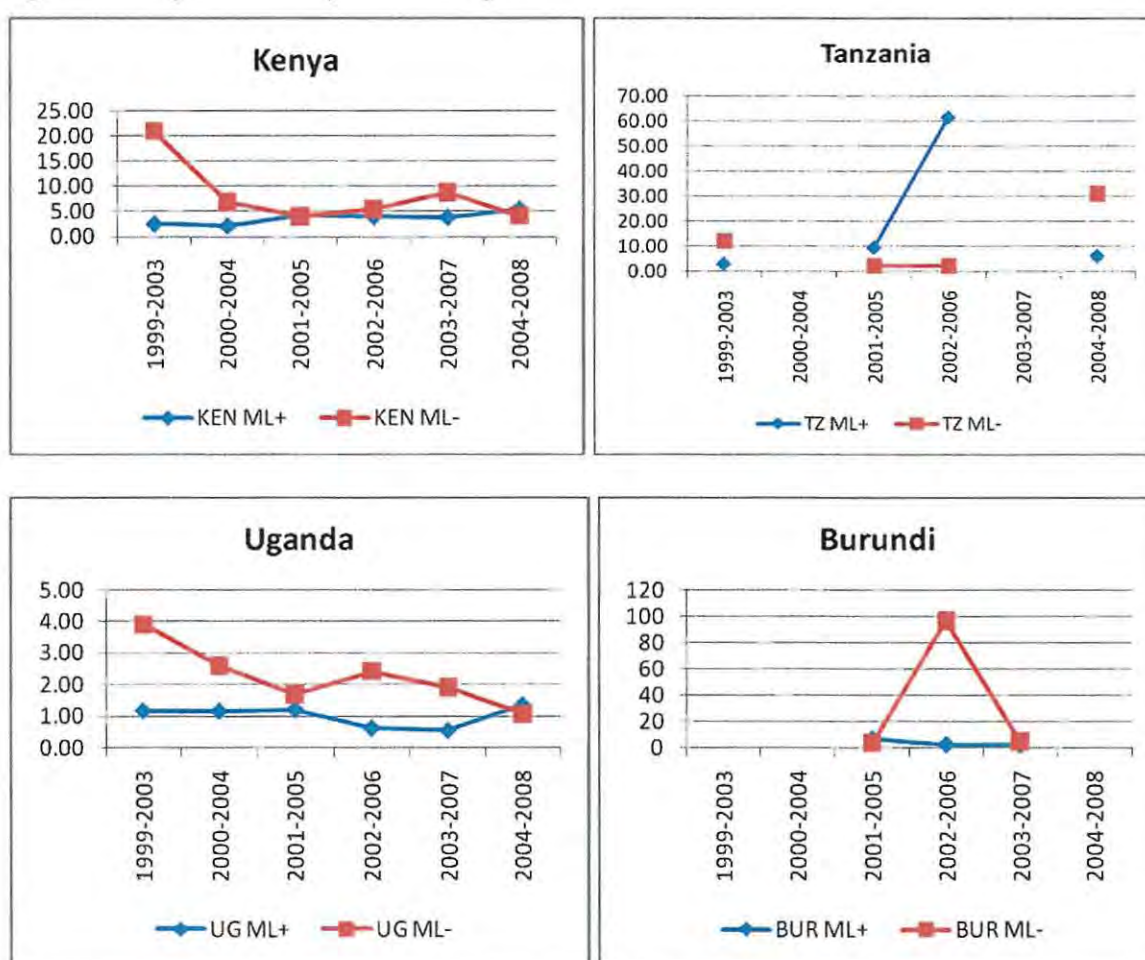
From Figure 5.7, it is apparent that the only country that seems to have a low and stable ML is Uganda, thus the speed of the transmission process is fastest in Uganda throughout the estimation period. However, the speed of adjustment in Kenya began to slow down after 2000-2004 until the 2003-2007 rolling window. With regard to the three remaining countries, no concrete inferences can be drawn because a stable long-run relationship between the CBRs and the DRs was not found, thus the significant number of gaps in the lines. Hence, overall Uganda recorded the fastest speed of adjustment in the long run, with the transmission process being completed in just over a month of a change in the CBR. With regard to the entire estimation period 1999-2008, for the countries where cointegration was present, Uganda reported the fastest speed of adjustment with the transmission being completed in about two months, followed by Kenya and Tanzania with the transmission being completed in about 4 and 7 months respectively.

With regard to the lending rates, Figure 5.8 indicates that there tends to be a relatively low and stable ML from the 2001-2005 rolling window onwards for Uganda, Rwanda and Burundi. Thus these three countries reported the fastest speed of adjustment with the transmission process being completed in about two months. However, the speed of adjustment in Kenya remained relatively inconsistent from the 2003-2007 rolling window. After the 2003-2007 rolling window there was no evidence of cointegration amongst the rates under question. The oddest case comes from Tanzania, with no cointegration identified in 6 out of the 7 rolling windows and thus no strong inferences can be made about how the lending rates in Tanzania respond to changes in the

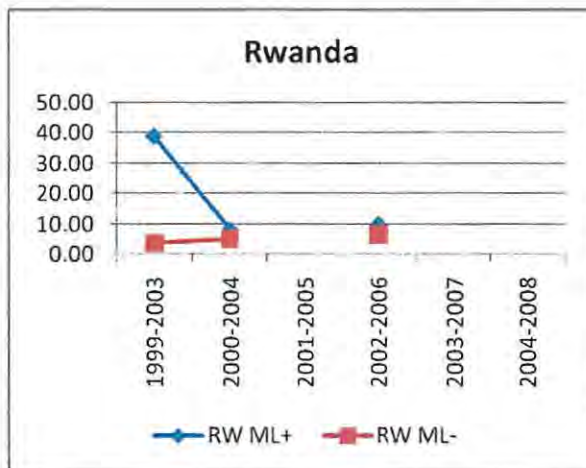
official CBRs. However, in the instance where cointegration was found, i.e. in rolling window 2001-2005, the transmission process was completed in just about 8 months indicating a slow adjustment process. The results from the entire estimation period indicate that the adjustment process was fastest in Rwanda with the transmission process being completed in a month, whereas Kenya reported the slowest adjustment, with the process taking approximately 15 months to complete⁶⁹.

5.4.4. Asymmetric Mean Adjustment in the ECM model

Figure 5.9: Asymmetric Adjustment: Deposit Rates

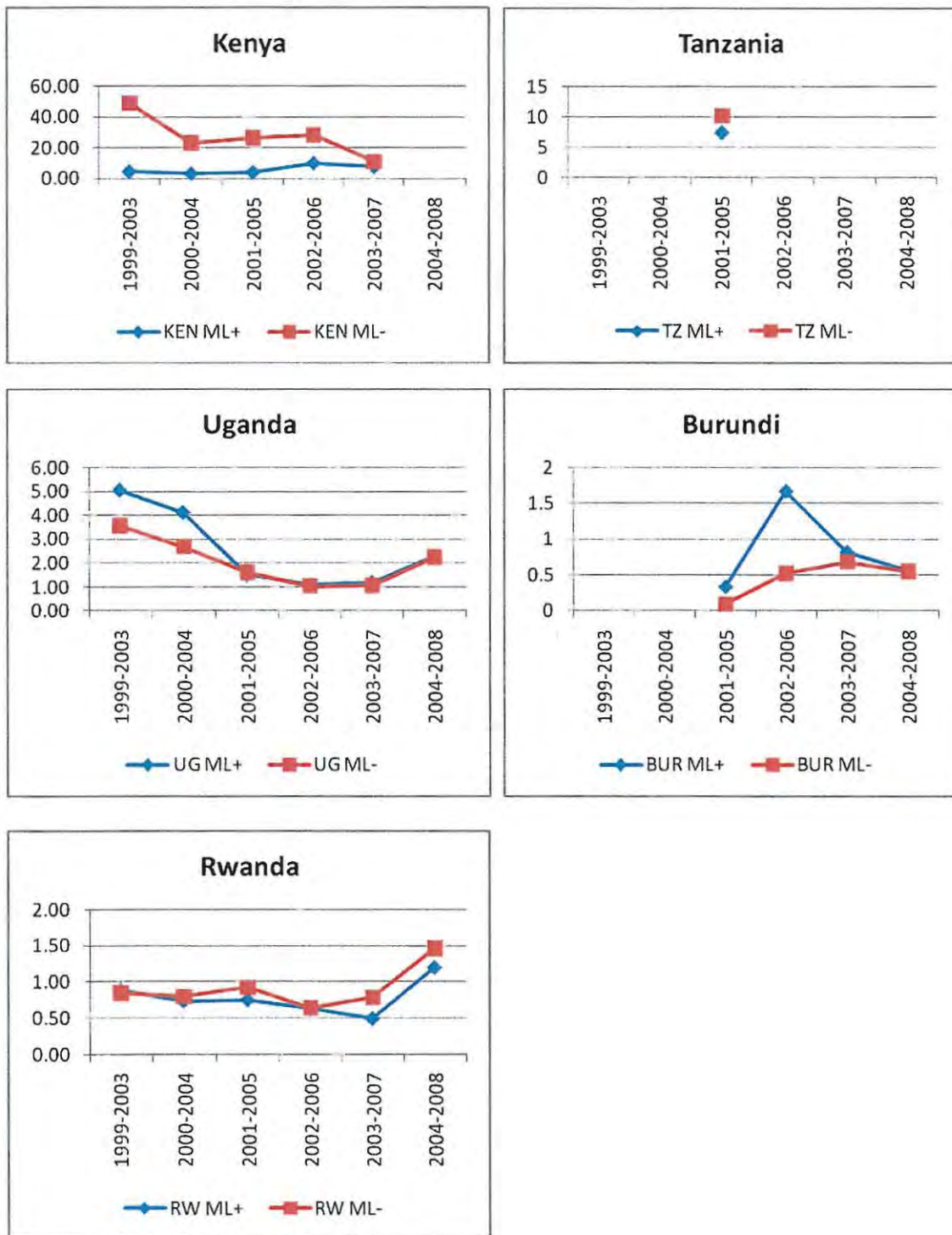


⁶⁹ The possible reasons for the slow speed of adjustment in the transmission process was country specific. These factors as well as the implications for policy are discussed in more detail in Section 6.1.1 in Chapter 6.



The Wald test was used to establish whether or not there was asymmetry in the adjustment of commercial bank rates. As mentioned in Chapter 4, the Wald test involves testing whether the coefficients of the positive and negative residuals in the asymmetric error correction model are equal. The Wald test was not significant, suggesting that there was no statistically significant asymmetry of deposit rate in Kenya. However, Figure 5.9 shows that the adjustment was faster downwards than upwards. The results are similar in the case of Uganda, where the adjustment was faster downwards than upwards, but out of the 7 rolling windows the Wald test was only significant in the 2003-2007 rolling window. With regard to Tanzania, Burundi and Rwanda, the Wald test was not significant in any of the rolling windows except for Tanzania in the 2002-2006 rolling window, indicating the absence of asymmetry in adjustment. Overall, despite the lack of significant asymmetry, there seems to be greater rigidity in deposit rate upwards than downwards in response to changes in the official rates. This may be an indication of collusion amongst banks in the deposit market. This is consistent with the framework proposed by Hannan and Berger (1991) discussed in Section 2.4.1 of Chapter 2. As noted in the chapter the authors showed that in a market characterized by a few banks, breaking price agreements set amongst them would be costly if there was an increase in the deposit rate, and as a result banks would be reluctant to increase their deposit rates causing rigidities in the deposit rate increases.

Figure 5.10: Asymmetric Adjustment: Lending Rate



With regard to the lending rate, Figure 5.10 above indicates that in Kenya and Rwanda, there are some indications of asymmetric response to changes in the official rate. In both countries the adjustment was faster when there was an increase than a decrease. For Kenya this result was more pronounced, confirmed by the Wald test which was significant in 2 out of the 6 rolling windows for a faster adjustment where there was an increase in the official rate. This behaviour in interest rates suggests the presence of collusion amongst the banks in the lending market and supports the collusion framework (see Scholnick, 1996) as discussed in Section 2.4.1 in Chapter 2. However, with regard to Rwanda, the Wald test was not significant, suggesting no significant asymmetry in any of the rolling windows. With regard to Burundi the Wald test showed no significant presence of asymmetry, however Figure 5.10 indicates that from the 2001-2005 rolling window onwards it took longer for the lending rate to increase than to decrease, suggesting a faster adjustment downwards. This result leans more towards the customer reaction hypothesis proposed by Neumark and Sharpe (1992) as discussed in Section 2.4.1 in Chapter 2.

With regard to Uganda, the evidence from Figure 5.10 shows that from the 2001-2005 rolling window onwards there was no presence of asymmetry. This is because from this period onwards the positive and negative residuals from the asymmetric error correction model are equal. This was confirmed by the Wald test which remained insignificant for all the rolling windows including the entire estimation period 1999-2008. Finally, no concrete inferences can be made about the asymmetric adjustment for Tanzania because in 6 out of the 7 rolling windows, there was no cointegration present between the lending rates and the CBRs. Where cointegration was present in 2001-2005 rolling windows, even though the Wald test was not significant, Figure 5.8 indicates some evidence of asymmetry showing that the lending rates take a longer time to decrease than increase. This suggests that the adjustment was faster upwards than downwards.

5.5 CONCLUSION

The results of the short- and long-run pass-through show that the countries that showed some evidence of convergence differed over time horizons in both their deposit and lending rates. The results however indicated the presence of convergence amongst the countries. In the short-run deposit rates, all countries except Uganda converged, whereas in the lending rates the only exception was Burundi. Thus the countries that were consistent in converging in both rates were Kenya, Tanzania and Rwanda, especially from the 2003-2007 rolling window onwards. The

results from the long-run pass-through suggest that in some cases all five countries seemed to follow some pattern of convergence. In the deposit rates, this was identified in the 2003-2007 rolling window and in the lending rates all countries converged in the 2002-2006 rolling window. From this one may conclude that in the 2003-2007 rolling window, for both interest rates all five countries followed a similar pattern of convergence. For example, in the deposit rate the countries converged towards a slower pass-through, whereas in the lending rate, the magnitude of the pass-through differed for all countries except for Uganda and Rwanda where the pass-through remained consistent for both countries.

Despite the level of convergence identified among the countries, the results clearly suggest that the deposit and lending rates remained largely sticky. In the short run the magnitude of the pass-through in both the deposit and lending rates hovered around 10 percent. In the long run, the magnitude of the pass-through varied amongst the countries in the deposit rates where the countries were converging towards a lower pass-through in the 2003-2007 rolling window and then towards a higher pass-through in the 2004-2008 rolling window with the exception of Burundi. In the 2003-2007 rolling window the average of the magnitude of the pass-through of all countries was 9 percent, and in the 2004-2008 rolling window the magnitude of the pass-through averaged 33 percent for the four converging countries. With regard to the lending rates, where the countries were seen to be converging, the magnitude of the pass-through was less than 30 percent in 2003-2007 rolling window.

Regarding the speed of adjustment (i.e. ML) the general finding is that the speed of adjustment remained low for most countries. The evidence suggests that the highest speed of adjustment occurred for the lending rates, followed by the deposit rates. With regard to the direction of the speed of adjustment i.e. the asymmetric adjustment, the results varied amongst the countries. For example in Kenya and Uganda the result suggests that commercial banks are becoming more rigid in adjusting their deposit rate upwards. With regard to the lending rates, the findings suggest that in Kenya, Tanzania and Rwanda the adjustment was faster upwards, indicating greater rigidities in lending rate decreases than increases. However, the opposite was found in Burundi, where the results show that the adjustment was faster downwards, suggesting greater rigidities in lending rate increases than decreases.

CHAPTER 6

CONCLUSION

6.1 SUMMARY OF FINDINGS

At the heart of this study was to identify whether the pass-through of monetary policy had become similar over time, giving an indication of the extent to which the East African countries had met their nominal convergence criteria and thus the possibility of forming an East African monetary union and ultimately the establishment of a single East African central bank. The analysis made use of cointegration and asymmetric error correction models to examine how RRs responded to changes in the CBRs. The study further explored whether there was asymmetry in the responses. The study used three monthly interest rate series, the central bank rate (in the case of Kenya the Treasury-Bill rate was used as a proxy), commercial bank lending rate and deposit rate. To identify the extent of integration over time, the analysis was carried out for the period 1999 to 2008, as this was the period for which the data was available for all five countries. To capture the dynamic development of the pass-through over time, the study uses rolling windows. A summary of the results from the estimation follows.

From the empirical results provided in Chapter 5, it was most evident that the magnitude of the pass-through in the short and long run for both interest rates remained very low. In the short run the magnitude for both rates hovered around 10 percent. In the case of the long-run pass-through to deposit rates, where convergence was identified in the 2003-2007 and 2004-2008 rolling windows, the magnitude of the pass-through averaged 9 and 33 percent respectively. The magnitude of the pass-through in the lending rates also remained low, hovering around 30 percent in rolling window 2003-2007 where convergence was identified. The low magnitude of the pass-through further indicates that there were significant rigidities in the interest rates over the long and short term. With regard to which countries were seen to be converging, the results show that in the deposit rates all five countries were converging in the 2003-2007 rolling window. Additionally, in the 2004-2008 rolling window, with the exception of Burundi, some convergence was also identified between the other four countries. In the lending rates, the results suggested a greater level of consistency in the pass-through when compared to the deposit rates. The results show that in rolling window 2003-2007 there was some evidence of convergence amongst all the countries. Furthermore, compared to the deposit rates, where convergence for all

countries was identified, the magnitude of the pass-through remained slightly higher in the lending rates. This finding was similar to that of De Bondt (2005) discussed in Section 2.5.1 of Chapter 2 which showed that the pass-through for lending rates was higher than for deposit rates in the long term. A general observation about the lending rates is that, despite the low speed and magnitude of the pass-through and with the exception of one or two countries, the pass-through in the lending rates seemed to have improved over time. This result was similar to the findings of the study carried out by Sander and Kleimeier (2004) discussed in Section 2.5.1 of Chapter 2: they noted that the pass-through of monetary policy had improved with respect to the lending but not the deposit rate. However, as noted above, despite convergence identified in the above rolling windows, the magnitude and speed of adjustment of the pass-through remained low.

The results of the asymmetric adjustment suggest that there seemed to be greater rigidities in deposit rate increases than decreases in response to changes in the official rates. This result was similar to the findings of Scholnick (1996) where the author found that the adjustment in deposit rates in Malaysia and Singapore was faster downwards than upward. This result suggested that the banks in the East African countries were colluding and thus supported the collusion hypothesis proposed by Hannan and Berger (1991). From the banking concentration ratios provided in Chapter 3 and the overview of the financial systems in East Africa, it was concluded that the financial sectors specifically in Burundi and Rwanda were dominated by a few commercial banks. Thus it is possible that the results suggested that collusion amongst the banks was a possible factor that caused rigidities in the interest rates in these two countries. With regards to the lending rates, the results were more country specific. As noted in Chapter 5 the results suggested a tendency towards greater rigidity in lending rate decreases than increases in response to changes in the official rates in Kenya, Tanzania and Uganda. This may suggest the possibility of collusion amongst the banks in these countries. However, the results in Burundi showed greater rigidities in lending rate increases than decreases leaning more towards the customer reaction hypothesis proposed by Neumark and Sharpe (1992).

Chapter 3 highlighted additional factors that may impede the pass-through of interest rates. From the asset and liability ratios calculated, two more factors could have contributed to the low level of pass-through of interest rates. Judging from the ratio of reserves to total assets it could be that the banks in East Africa were somewhat liquid. As a result there may be no need for the

commercial banks to rely on the accommodation facilities provided by the central banks. In times of need, the banks would run down on their own reserves before resorting to the central banks as a source of finance. Furthermore, the increasing ratio of credit to the government may suggest a strong influence of the government over the banks or an underdevelopment of the private sector. Lastly, the weak contribution of the banking sector in financing the domestic economy shows inefficiency on the part of the banks in the financial intermediation process.

Previous studies carried out in East Africa with the exception of Buigut and Valev (2009) generally supported the monetary union initiative amongst the countries that were included as part of the EAC in their studies⁷⁰. However, the results of this study do not indicate any evidence of strong convergence amongst all five countries over time, although there were periods where some countries were seen to be converging in certain rolling windows. The results suggest that the pass-through in lending rates had become more similar over time. Judging from the results of this study one may conclude that the extent of monetary policy transmission has been weak over time considering the slow speed, magnitude and large rigidities in the interest rates. In order to prepare the countries for a monetary integration initiative, certain policy actions may be needed. This is discussed next.

6.1.1 Policy Implications

From the analysis of the results, it was identified that the speed and magnitude of the pass-through to deposit and lending rates remained low in all countries. Furthermore, there were significant rigidities in the interest rates over time. This finding could be the result of several factors identified in this study that affected the countries either individually or collectively. These and their implications for policy are discussed next.

In Kenya, Tanzania and Uganda it was identified that the weak contribution of the financial sector to the domestic economies, the high liquidity nature of the banks and the large lending provided to the government were the three major factors that may be responsible for the low

⁷⁰ As discussed in Section 2.5 of Chapter 2 the only three known studies carried in East Africa were those of Mkenda (2001), Buigut and Valev (2005b) and Buigut and Valev (2009). Additionally, Buigut and Valev (2005a) and Buigut (2006) incorporated the EAC in their studies. The results from Mkenda (2001) support a monetary union between Kenya, Tanzania and Uganda. Buigut and Valev (2005a; 2005b) support the formation of a monetary union including all five countries. Buigut (2006) shared similar results, supporting the EAC monetary union initiative. Buigut and Valev (2009) suggest that not all countries would benefit in a monetary union.

pass-through of interest rates. The first factor implies that the banking system in each country was generally inefficient in performing its role of intermediation. In this regard policy concerns should be geared towards financial reforms that may improve the manner in which the banks perform their role of intermediation. The second factor identified relates to the excess reserves and thus the high liquidity nature of the banks. This may be an indication of an ineffective monetary policy. As noted under the overview of policy frameworks in Section 3.6 of Chapter 3, the main instrument of monetary policy in these countries is OMOs. This suggests that monetary policy does not rely much on the discount rate, in fact the discount rate in some of these countries is highly restrictive so as to prevent banks from borrowing from the central bank. As a result the banks are not indebted to the central banks and thus there would be no response of bank interest rates to changes in the official rate and ultimately no transmission of monetary policy. Therefore making the discount rate the primary tool of monetary policy would greatly improve the transmission of monetary policy, because banks would adjust their retail rates in response to changes in the official rates.

Finally the large lending to the government raises two important points regarding the possible cause of the low pass-through. The first point is that the banks in these countries may have been subjected to a high degree of political influences or government intervention. In such a case policy reforms should be concerned with freeing the financial system of government control. Secondly, the large credit provided to the government may have also been due to the fact that the private sector may be undeveloped and so lending to the private sector was risky. In such a case institutional factors, such as a strong regulatory and supervision framework, may play a major role in overcoming the challenges of an undeveloped private sector. According to Ndung'u and Ngugi (2000: 17) a strong regulatory framework would improve lending practices, especially when information asymmetries exist. Adequate supervision would lead to credit being provided to trustworthy parties and thus reduce incidents of default. Furthermore, the authors note that a proper legal and regulatory framework would put in place necessary rules of law and improve the intermediation process, which, as was noted above, is needed for all five countries.

The factors that affected the pass-through in Burundi and Rwanda were the poor contribution of the financial sector to the domestic economy and the lack of competition in the banking sector due to high concentration and oligopolistic behaviour by the commercial banks. Thus in addition

to the financial reforms as explained above to improve the financial intermediation process, policy should also focus on liberalising the banking system, thereby introducing more competition. Moreover, by allowing the entry of foreign financial institutions this would further reduce the level of banking concentration in Burundi. It is important to note that Rwanda was also characterised by excess liquidity which may imply that monetary policy may have also been ineffective. In such a case policy may be concerned with using the discount rate as the primary tool to manage liquidity in the economy or the possible revision of the reserve ratio so as to maintain certain amount of liquidity in the banking system.

6.3 AREAS FOR FURTHER RESEARCH

As noted earlier, this study did not directly model the factors that may have affected the pass-through of interest rates over time. Future studies may explore the effect of variables such as bank concentration, ownership of banks, the development and openness of the financial system amongst others to determine the extent to which each have an effect on the pass-through of interest rates and thus the effectiveness of monetary policy.

Of the several factors identified in this study that may have affected the pass-through of interest rates, it was identified that the large credit provided to the government was common to most countries. This suggests that the government may have a large influence in the banking system or that the private sector in the countries remain underdeveloped, suggesting that lending to the private sector may be too risky. Thus, a possible area for future studies may be to explore these factors further so as to determine the extent to which they affect the pass-through of interest rates.

REFERENCES

- AFXENTIOU, P., 2000. Convergence, the Maastricht Criteria, and Their Benefits. *The Brown Journal of World Affairs*. 7, 1: 224:254.
- AHN, C., KIM, H. and CHANG, D., 2006. Is East Asia Fit For an Optimum Currency Area? An Assessment of the Economic Feasibility of a Higher Degree of Monetary Cooperation in East Asia. *The Developing Economies*. 44, (3): 288-305.
- ALESINA, A. and BARRO, R., 2000. Currency Unions. *NBER Working Paper 7927*. National Bureau of Economic Research.
- ALESINA, A, BARRO, R and TENREYRO, S., 2002. *Optimal Currency Areas*. [Online]. Available: <http://faculty.haas.berkeley.edu/arose/ABTFinalNBER.pdf> [Accessed 5th September 2008].
- APPLEYARD, D. and FIELD, A., 2001. *International Economics* (4e). New York: McGraw-Hill.
- ARGUELLO, R., 2000. Economic Integration. *An Overview of Basic Economic Theory and other Related Issues*. [Online]. Available: <http://www.urosario.edu.co/economia/documentos/pdf/bi03.pdf> [Accessed 10th March 2009].
- ARYEETAY, E., 2004. *An Analysis of the Experiences of Financial and Monetary Cooperation in Africa*. [Online]. Available: <http://www.un.org/esa/ffd/regionalcommissions/seminar2004/0704-RAF-Aryeetey-paper.pdf> [Accessed 10th March 2009].
- AZIAKPONO, M., 2006. Financial Integration amongst the SACU Countries: Evidence from Interest Rate Pass-Through Analysis. *J.Stud.Econ.Econometrics*. 30, (2): 1-23.
- AZIAKPONO, M., 2008a. Financial and Monetary Autonomy and Interdependence between South Africa and the Other SACU Countries. *South African Journal of Economics*. 76, (2): 189-211.
- AZIAKPONO, M., 2008b. *The Depth of Financial Integration and Its Effects on Financial Development and Economic Performance of the SACU Countries*. Unpublished PhD Thesis. Department of Economics, University of the Free State.
- AZIAKPONO, M., KLEIMEIER, S. and SANDER, H., 2008. Banking Market Integration in the SADC Countries: Evidence from Interest Rate Analysis. *Maastricht Research School of Economics of Technology and Organizations*. Research Memorandum No. RM/07/047.
- AZIAKPONO, M. and WILSON, M., 2008. Interest Rate Pass-Through and Monetary Policy Regimes in South Africa. Paper for presentation at the Bi-Annual *African Economic Research Consortium (AERC) Workshop*, 28th November – 4th December 2008, Nairobi, Kenya.

- AZIAKPONO, M., WILSON, M.K. and MANUEL, J., 2007. Adjustment of Commercial Bank's Interest Rates and the Effectiveness of Monetary Policy in South Africa. *The African Journal*. 9, (1): 1-20.
- BECK, T., DEMIRGUC-KUNT, A. and LEVINE, R., 2009. *Financial Structure Dataset*. [Online]. Available: <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:20696167~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html> [Accessed 10th October 2009].
- BAWUMIA, M., 2002. *The Feasibility of Monetary Union in the West Africa: A CGE Evaluation*. [Online]. Available: <http://unpan1.un.org/intradoc/groups/public/documents/IDEP/UNPAN006589.pdf> [Accessed 10th December 2009].
- BANK OF UGANDA, 2008. *Annual Supervision Report*. [Online]. Available: http://www.bou.or.ug/bouwebsite/export/sites/default/bou/bou-downloads/annual_supervision/BSAnnualReports_2008.pdf [Accessed 10th December 2009].
- BANK OF INTERNATIONAL SETTLEMENTS (BIS), 1994. *National Differences in Interest Rate Transmission*, March, Basle.
- BAYOUMI, T. and EICHENGREEN, B., 1992. Shocking Aspects of European Monetary Unification. *NBER Working Paper Series 3949*. Cambridge, Massachusetts.
- BAYOUMI, T. and EICHENGREEN, B., 1998. Exchange Rate Volatility and Intervention: Implications of the Theory of Optimum Currency Areas. *Journal of International Economics*. 45: 191-209.
- BAYOUMI, T. and MAURO, P., 1999. The Suitability of ASEAN for a Regional Currency Arrangement. *Working Paper 99/162*. International Monetary Fund.
- BERGMAN, M., 1999. Do Monetary Unions Make Economic Sense? Evidence from the Scandinavian Currency Union, 1873-1913. *Scandinavian Journal of Economics*. 101, (3): 363-377.
- BERSTEIN, S. and FUENTES, R., 2005. Concentration and Price Rigidity: Evidence for the Deposit Market in Chile. *Working Paper No. 311*. Central Bank of Chile.
- BIGSTEN, A. and MKENDA, K., 2002. Kenya and the East African Community. *Country Economic Report for SIDA 2002: 1*. Goteborg University.
- BORIO, C. and FRITZ, W., 1995. The Response of Short-Term Bank Lending Rates to Policy Rates: A Cross-Country Perspective. *Bank for International Settlements*. Working Paper No: 27.
- BROOKS, C., 2002. *Introductory Econometrics for Finance* (6e). Cambridge: Cambridge University Press.

- BROWNBIDGE, M. and HARVEY, C., 1998. *Banking in Africa* (5e). Oxford, England: James Currey.
- BLANCHARD, O. and QUAH, D., 1989. Dynamic Effects of Aggregate Demand and Supply Disturbances. *American Economic Review*. 79: 655-673.
- BUIGUT, S., 2006. Monetary Integration Initiatives in Eastern and Southern Africa (ESA): Sorting the Overlapping Membership. *International Finance* 9, (3): 295-315.
- BUIGUT, S. and VALEV, N., 2005a. Eastern and Southern Africa Monetary Integration: A Structural Vector Autoregression Analysis. *Working Paper 05-04*. Georgia State University.
- BUIGUT, S. and VALEV, N., 2005b. Is the Proposed East African Monetary Union an Optimal Currency Area? A Structural Vector Autoregression Analysis. *World Development*. 33, (112): 2119-2133.
- BUIGUT, S. and VALEV, N., 2009. Benefits from Mutual Restraint in a Multilateral Monetary Union. *World Development*. 37, (3): 585-594.
- CENTRAL BANK OF BURUNDI, 2009. *Monetary Policy*. [Online]. Available: http://www.brb-bi.net/pol_mon.htm [Accessed 10th December 2009].
- CENTRAL BANK OF BURUNDI, 2008. *Annual Report*. [Online]. Available: <http://translate.google.co.za/translate?hl=en&sl=fr&u=http://www.brb-bi.net/&ei=w0E7S8PaPIO14Qadx72qCA&sa=X&oi=translate&ct=result&resnum=2&ved=0CBQQ7gEwAQ&prev=/search%3Fq%3DBanque%2Bde%2Bla%2BR%25C3%25A9publique%2Bdu%2BBurundi%26hl%3Den%26client%3Dfirefox-a%26rls%3Dorg.mozilla:en-GB:official%26hs%3DKTI> [Accessed 10th December 2009].
- CENTRAL BANK OF KENYA, 2008a. *Annual Report*. [Online]. Available: http://www.centralbank.go.ke/downloads/publications/annual/annual_2007-8.pdf [Accessed 20th May 2009].
- CENTRAL BANK OF KENYA, 2008b. *Banking Supervision Report*. [Online]. Available: <http://www.centralbank.go.ke/downloads/bsd/annualreports/bsd2008R.pdf> [Accessed 20th September 2009].
- CENTRAL BANK OF KENYA, 2008c. *Monetary Policy*. [Online]. Available: <http://www.centralbank.go.ke/monetary/default.aspx> [Accessed 9th December 2009].
- CENTRAL BANK OF KENYA, 2009. *Annual Report*. [Online]. Available: http://www.centralbank.go.ke/downloads/publications/annualreports/cbk/RevisedAnnual_2009.pdf [Accessed 10th December 2009].
- CENTRAL BANK OF TANZANIA, 2009a. *Monetary Policy Statement*. [Online]. Available: http://www.bot-tz.org/Publications/MonetaryPolicyStatements/2009_Jun_MPS.pdf [Accessed 25th December 2009].

- CENTRAL BANK OF TANZANIA, 2009b. *Quarterly Economic Bulletin*. [Online]. Available: http://www.bot-tz.org/publications/QuarterlyEconomicBulletins/QEB_Mar_2009.pdf [Accessed 25th December 2009].
- CHENG, K., 2006. A VAR Analysis of Kenya's Monetary Policy Transmission Mechanism: How Does the Central Banks Repo Rate Affect the Economy? *IMF Working Paper/06/300*.
- CIHAK, M. and PODPIERA, R., 2005. Bank Behavior in Developing Countries: Evidence from East Africa. *IMF Working Paper WP/05/129*.
- COBHAM, D. and ROBSON, P., 1994. Monetary Integration in Africa: A Deliberately European Perspective. *World Development*. 33, (3): 285-299.
- COTTARELLI, C., FERRI, G. and GENERALE, A., 1995. Bank Lending Rates and Financial Structure in Italy: A case study. *IMF Staff Papers*, September, No. 38, pp. 670-700.
- COTTARELLI, C. and KOURELIS, A. 1994, Financial Structure, Bank Lending Rates and the Transmission of Monetary Policy, *IMF Staff Papers*, December, No. 41, pp 587-623.
- DE ANGELIS, C., AZIAKPONO, M. and FAURE, P., 2005. The Transmission of Monetary Policy under the Repo System in South Africa: An Empirical Analysis. *South African Journal of Economics*. 63, (4): 657-673.
- DE BONDT, G., 2005. Interest Rate Pass-Through: Empirical Results for the Euro Area. *German Economic Review*. 6, (1): 37-78.
- DE BONDT, G., MOJON, B. and VALLA, N., 2002. *Interest Rate Setting by Universal Banks and the Monetary Policy Transmission Mechanism in the Euro Area*. [Online]. Available: <http://www.cepr.org.uk/meets/wken/5/583/papers/valla%20paper.pdf> [Accessed 5th March 2009].
- DE GRAUWE, P., 1992. *The Economics of Monetary Integration*. Oxford, New York: Oxford University Press.
- DE GRAUWE, P., 2003. *Economics of Monetary Union (5e)*. United States: Oxford University Press New York.
- DEROSA, D., 1998. *Regional Integration Arrangements: Static Economic Theory, Quantitative Findings, and Policy Guidelines*. [Online]. Available: <http://www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2007/wps2007.pdf> [Accessed 6th April 2009].
- DONNAY, M. And DEGRYSE H., 2001. Bank Lending Rate Pass-Through and Differences in the Transmission of a Single EMU Monetary Policy. *Discussion Paper 17*. Centre for Economic Studies, K. U. Leuven.
- DROBYSHEVSKII, S.M. and POLEVOI, D.I., 2008. Financial Aspects of Monetary Integration in the CIS (Part 1). *Problems of Economic Transition*. 50, (11): 6-86.

- EAST AFRICAN COMMUNITY, 1999. *EAC – Treaty*. [Online]. Available: www.eac.int/about-eac/quick-links/unido-norad-programme/doc_download/1-treaty-establishing-the-east-african-community.html [Accessed 3rd March 2009].
- EAST AFRICAN COMMUNITY PORTAL, 2009. *EAC Achievements*. [Online]. Available: <http://www.eac.int/about-eac/achievements.html> [Accessed 20th October 2009].
- ECONOMIC COMMISSION FOR AFRICA, 2004. *Assessing Regional Integration in Africa. ECA Policy Research Report*. Addis Ababa, Ethiopia.
- ECONOMIST INTELLIGENCE UNIT, 2007. *Regional Overview: Membership of Organisations*. [Online]. Available: <http://web.ebscohost.com/ehost/pdf?vid=5&hid=5&sid=58af4c98-ba61-4b33-9325-fd9e4439f566%40sessionmgr102> [Accessed 20th May 2009].
- EDMUND, K., 2008. *Consultations on Regional Monetary Union to Begin*. [Online]. Available: <http://allafrica.com/stories/printable/200807090650.html> [Accessed 5th September 2009].
- EGERT, B., CRESPO-CUARESEMA, J. and REINIGER, T., 2007. Interest Rate Pass-Through in Central and Eastern Europe: Reborn from Ashes Merely to Pass Away. *Journal of Policy Modelling*, 29: 209-225.
- ENDERS, W. and HURN, S., 1994. Theory and Tests of Generalized Purchasing Power Parity: Common Trends and Real Exchange Rates in the Pacific Rim. *Review of International Economics*, 2, (2): 179-190.
- ENGLE, R.F. and GRANGER, C.W.J., 1987. Cointegration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, 55, (2): 251-276.
- FAURE, A.P., 2006. *Monetary Policy: Money: Functions, History, Creation, Definition*. Cape Town: Quoin Institute (Pty) Limited.
- FIELDING, D. and SHIELDS, K., 1999. Is The Franc Zone an Optimal Currency Area? *Working Paper Series No: 2000-3*. University of Leicester.
- FOURIE, L.J., FALKENA, H.B. and KOK, W.J., 1999. *Student Guide to the South African Financial System (2e)*. Cape Town: Oxford University Press.
- GLICK, R., 1991. *European Monetary Union: Costs and Benefits*. [Online]. Available: <http://www.frbsf.org/publications/economics/letter/1991/el91-16.pdf> [Accessed 5th March 2009].
- GOLDBERG, L.S., ICKES, B.W. and RYTERMAN, R., 1993. Departures from the Ruble Zone: The Implications of Adopting Independent Currencies. *World Economy*, 17, (3): 293-322.
- GOLDSTEIN, A. and NDUNG'U, N.S., 2001. Regional Integration Experience in the East African Region. *Working Paper No. 171*. OECD Development Centre.

- GRANDES, M., 2003. *Southern Africa's Monetary Area: An Optimal Currency Area? Which Costs? Which Benefits?* [Online]. Available: http://www.soc.uoc.gr/ss6/students_papers/grandes.pdf [Accessed 5th September 2008].
- GUILLAUME, D. and STASAVAGE, D., 2000. Improving Policy Credibility: Is There a Case for African Monetary Unions? *World Development*. 28, (8): 1391-1407.
- GUJARATI, D.N. and PORTER, D.C., 2009. *Basic Econometrics* (5e). New York: McGraw-Hill/Irwin.
- HANNAN, H. and BERGER, N., 1991. The Rigidity of Prices: Evidence from the Banking Industry. *The American Economic Review*. 81, (4): 938-945.
- HARRIS, R.J.D., 1995. *Using Cointegration Analysis in Econometric Modelling*. Prentice Hall/Harvester Wheatsheaf.
- HOFMANN B., 2000. Non-Linear Adjustment of Loan Rates to Money Market Rates: Some evidence for the Euro Area. Paper Presented at Internal ECB Seminar, 18th October.
- HARVEY, C., JENKINS, C. and THOMAS, L., 2001. *The Prerequisites for the Progress towards a Single Currency in the Common Market of Eastern and Southern Africa: Medium to Long Term Perspective Study*. [Online]. Available: <http://www.csae.ox.ac.uk/reports/pdfs/COMESA2001-rep2001-02.pdf> [Accessed 3rd March 2009].
- HAUG, A., MACKINNON, J. and MICHELIS, L., 2000. European Monetary Union: A Cointegration Analysis. *Journal of International Money and Finance*. 19: 419-432.
- HAZELWOOD, A., 1979. The End of the East African Community: What Are the Lessons for Regional Integration Schemes? *Journal of Common Market Studies*. 18: 40-58.
- HEINEMANN, F. and SCHULER, M., 2003. Integration Benefits on EU Retail Credit Markets – Evidence from Interest Rate Pass-Through. *Centre for European Economic Research*. Discussion Paper No: 02-26.
- HONOHAN, P. and LANE, P., 2000. Will the Euro Trigger More Monetary Unions in Africa? *Policy Research Working Paper 2393*. The World Bank Development Research Group Finance.
- HORVATH, R. and KOMAREK, L., 2002. Optimum Currency Area Theory: A Framework for Discussion about Monetary Integration. *Warwick Economic Research Papers* No. 647. University of Warwick.
- INGVES, S., 2004. *Monetary Policy Implementation at Different Stages of Market Development, Country Cases and Appendices – Supplementary Information*. [Online]. Available: <http://imf.org/external/np/mfd/2004/eng/102604.pdf> [Accessed 15th December 2009].
- IMF, 2005. Rwanda: Financial System Stability Assessment, Including Reports on the Observance of Standards and Codes on the Following Topics: Monetary and Financial Policy Transparency, Banking Supervision, and the FATF Recommendations for Anti-

Money Laundering and Combating the Financing of Terrorism. *IMF Country Report No. 05/309*. Washington, D.C.

- INSTITUTE FOR SECURITY STUDIES, 2006. *Profile: East African Community (EAC)*. [Online]. Available: http://www.iss.co.za/af/regorg/unity_to_union/eacprof.htm [Accessed 2nd June 2009].
- INTERBANK BURUNDI S.A., 2002. *News*. [Online]. Available: http://www.interbankbdi.com/ibb_infos/news/ibb_en_00040htm [Accessed 7th June 2009].
- JEFFERIS, K., 2007. The Process of Monetary Integration in the SADC Region. *Journal of Southern African Studies*. 33, (1): 83-106.
- JOHANSSON, J. and SVENSSON, J., 2006. *Deposit Interest Rate Rigidity and Asymmetry – A Study on the Swedish Banking Market*. [Online]. Available: <http://arc.hhs.se/download.aspx?MediumId=271> [Accessed 1st May 2009].
- KAMALA, D.B., 2006. The Achievements and Challenges of the New East African Community Co-operation. *Research Memorandum 58*. The Business School, University of Hull.
- KEZIO-MUSOKE, D., 2008. *Rwanda: Financial Sector Remains in Bullish Mood*. [Online]. Available: <http://allafrica.com/stories/200806030305.html> [Accessed 8th June 2009].
- KINYUA, J.K., 2001. *Monetary Policy in Kenya: Evolution and Current Framework*. [Online]. Available: http://www.bou.or.ug/bouwebsite/export/sites/default/bou/bou-downloads/annual_supervision/BSAnnualReports_2008.pdf [Accessed 15th December 2009].
- KREMERS, J.J.M., ERICSSON, N.R. and DOLADO, J.J., 1992. The Power of Cointegration Tests. *Oxford Bulletin of Economics and Statistics* 54, (3): 325-348.
- KWAPIL, C. and SCHARLER, J., 2009. Interest Rate Pass-Through, Monetary Policy Rules and Macroeconomic Stability. *Journal of International Money and Finance*. 1-16.
- MOJON, B., 2000. Financial Structure and Interest Rate Channel of ECB Monetary Policy. *Working Paper No. 40*. European Central Bank.
- MACHIRA, P., 2008. *Tanzania Banking Sector Records Impressive Growth in 2007/8*. IPP Media. [Online]. Available: <http://kurayangu.com/ipp/observer/2008/11/02/125562.html> [Accessed 4th June 2009].
- MAROTTA, G., 2008. Structural Breaks in the Lending Rate Pass-Through and the Euro. *Economic Modelling*. 26, (1): 1-15.
- MARUPING, M., 2005. *Challenges for Regional Integration in Sub-Saharan Africa: Macroeconomic Convergence and Monetary Coordination*. [Online]. Available: <http://www.fondad.org/uploaded/Africa%20in%20the%20World%20Economy/Fondad-AfricaWorld-Chapter11.pdf> [Accessed 28th August 2008].

- MASAWE, J., 2001. *The Monetary Policy Framework in Tanzania*. [Online]. Available: [http://www.reservebank.co.za/internet/Publication.nsf/LADV/AC53A9C359B3F4D842257051003FB55A/\\$File/tanzania.pdf](http://www.reservebank.co.za/internet/Publication.nsf/LADV/AC53A9C359B3F4D842257051003FB55A/$File/tanzania.pdf) [Accessed 10th December 2009].
- MASKAY, N.M., 2001. South Asian Monetary Integration in Light of the Optimum Currency Area Criterion of Patterns of Shocks. *South Asia Economic Journal*. 2, (2): 204-219.
- MASSON, P. and PATTILLO, C., 2005. *The Monetary Geography of Africa*. Washington, D.C.: The Brookings Institution Press.
- MISHKIN, F.S., 2005. Symposium on the Monetary Transmission Mechanism. *Journal of Economic Perspectives*. 9, (4): 3-19.
- MKENDA, K., 2001. Is East Africa an Optimum Currency Area? *Working Paper No: 41*. Department of Economics, Goteborg University.
- MONGELLI, F.P., 2002. New Views on the Optimum Currency Area Theory: What is EMU telling us? *Working Paper Series, No. 138*. European Central Bank.
- MONGELLI, F.P., 2008. European Economic and Monetary Integration and the Optimum Currency Area Theory. *European Economy Economic Papers 302*. European Commission.
- MUGOMBA, A.T., 1978. Regional Organisations and African Underdevelopment: The Collapse of the East African Community. *The Journal of Modern African Studies*. 16, (2): 261-272.
- MUNDELL, R., 1961. A Theory of Optimum Currency Areas. *The American Economic Review*. 60: 657-665.
- MUSINGUZI, P. and KATARIKAWA, M., 2001. *Monetary Policy Frameworks in Africa: The Case of Uganda*. [Online]. Available: [http://www.esaf.org/internet/Publication.nsf/LADV/F492E8991BB65FDF42257051003FC44E/\\$File/uganda.pdf](http://www.esaf.org/internet/Publication.nsf/LADV/F492E8991BB65FDF42257051003FC44E/$File/uganda.pdf) [Accessed 10th December 2009].
- MUSONDA, M.F., GODWIN, M. and DANIELSON, A., 1997. The Urge to Merge: The Revival of East African Co-operation. *SIDA Macroeconomic Report 1997: 7*. Stockholm.
- MWEGA, F.W., 2003. Chapter 10. Financial Sector Reforms in Eastern and Southern Africa. In: Mkandawire, T and Soludo, C. *African Voices on Structural Adjustment*. Ottawa, Canada: International Development Research Centre.
- NATIONAL BANK OF RWANDA, 2008. *Monetary Policy Implementation*. [Online]. Available: <http://www.bnr.rw/docs/acts/Implementation%20of%20the%20monetary%20policy.pdf> [Accessed 10th December 2009].
- NCUBE, M., 2009. *EAC – East African Community*. [Online]. Available: <http://knowledge.uneca.org/member-states/observatory-on-regional-integration/regional->

[economic-commissions-in-africa/eac-east-african-community/eac-east-african-community](#) [Accessed 31st May 2009].

NDUNG'U, S. and NGUGI, R., 2000. Banking Sector Interest Rate Spread in Kenya. *Discussion Paper 5*. The Kenya Institute for Public Policy Research and Analysis (KIPPRA).

NEIL, F., 2007. *East Africa: Rwanda, Burundi to join East African Community*. [Online]. Available: http://findarticles.com/p/articles/mi_qa5327/is_200704/ai_n21285335/print?tag=artBody:coll [Accessed 24th September 2008].

NEUMARK, D. and SHARPE, S., 1992. Market Structure and the Nature of Price Rigidity: Evidence from the Market for Consumer Deposits. *The Quarterly Journal of Economics*. 107, (2): 657-680.

NGUGI, R., 2001. An Empirical Analysis of Interest Rate Spread in Kenya. *Research Paper 106*. African Economic Research Consortium (AERC).

NGUGI, R. and KABUBO, J., 1998. Financial Sector Reforms and Interest Rate Liberalization: The Kenya Experience. *Research Paper 72*. African Economic Research Consortium (AERC).

NIELSEN, H., UANGUTA, E. and IKHIDE, S., 2005. Financial Integration in the Common Monetary Area. *South African Journal of Economics*. 73, (4): 710-721.

NKURUNZIZA, J., 2009. Why is the Financial Sector in Burundi Not Development-Oriented? Paper Presented for a Conference Organized by the *European Report on Development* 21st-23rd May 2009, Accra, Ghana.

NKURUNZIZA, J. and NGARUKO, F., 2002. Explaining Growth in Burundi: 1960-2000. *CSAE WPS/2002-03*.

OKETCH, M.L., 2009. *Bank of Uganda Tells Commercial Banks to Reduce Lending Rates*. [Online]. Available: http://www.monitor.co.ug/artman/publish/business_power/Bank_of_Uganda_tells_commercial_banks_to_reduce_lending_rates_85397.shtml [Accessed 6th June 2009].

OYEJIDE, T., 2000. Policies for Regional Integration in Africa. *African Development Bank Economic Research Papers* No. 62.

PHYLAKTIS, K., 1999. Capital Market Integration in the Pacific Basin Region: An Impulse Response Analysis. *Journal of International Money and Finance*. 18: 267-287.

POLASEK, W. and AMPLATZ, C., 2003. *The Maastricht Criteria and the Euro: Has Convergence Continued*. [Online]. Available: <http://www.ihs.ac.at/publications/eco/es-133.pdf> [Accessed 5th March 2009].

ROBSON, P., 1998. *The Economics of International Integration* (4e). London: Routledge.

- ROGERS, J.D., 2004. *Monetary and Economic Integration in Africa: Challenges and Prospects*. [Online]. Available: www.bankofsierraleone-centralbank.org/docs/MONETARYANDECONOMIC%20INTEGRATION.doc [Accessed 1st May 2009].
- ROSSOUW, J., 2006. An Analysis of Macro-Economic Convergence in SADC. *South African Journal of Economics*. 74, (3): 382-390.
- ROTHCHILD, D., 1974. From Hegemony to Bargaining in East African Relations. *Journal of African Studies*. 1, (4): 390-416.
- ROTICH, H., KATHANJE, M. and MAANA, I., 2007. A Monetary Policy Reaction Function for Kenya. Paper presented at the 13th Annual African Econometric Society Conference, 9th-11th July 2008, Pretoria, South Africa.
- RWAKUNDA, C., 2004. *Monetary Integration in East Africa*. Unpublished Masters Thesis. University of South Africa.
- SAYINZOGA, A. and SIMSON, R., 2006. Monetary Policy In Rwanda: A Cointegration Analysis. *South African Journal of Economics*. 74, (1): 65-78.
- SANDER, H. And KLEIMEIER, S., 2000. Asymmetric Adjustment of Commercial Bank Interest Rates in the Euro Area: Implications for Monetary Policy. Paper for Presentation at a conference, 5th-6th October, Groningen.
- SANDER, H. and KLEIMEIER, S., 2004. Convergence in Euro-Zone Retail Banking? What Interest Rate Pass-Through Tells Us About Monetary Policy Transmission, Competition and Integration. *Journal of International Money and Finance*. 23: 461-492.
- SANDER, H. and KLEIMEIER, S., 2006a. Interest Rate Pass-Through in the Common Monetary Area of the SACU Countries. *South African Journal of Economics*. 74, (2): 215-229.
- SANDER, H. and KLEIMEIER, S., 2006b. Convergence of Interest Rate Pass-Through in a wider Euro Zone? *Economic Systems*. 30: 405-423.
- SANDER, H. and KLEIMEIER, S., 2006c. Regional Versus Global Integration of Euro-Zone Retail Banking Markets: Understanding the Recent Evidence from Price-Based Integration Measures. *The Quarterly Review of Economics and Finance*. 46: 353-368.
- SAVILLE, A., BADER, M. and SPINDLER, Z., 2005. *South African Journal of Economics*. 73, (4): 674-693.
- SAXEGAARD, M., 2006. Excess Liquidity and Effectiveness of Monetary Policy: Evidence from Sub-Saharan Africa. *IMF Working Paper/06/115*.
- SCHOLNICK, B., 1996. Asymmetric Adjustment of Commercial Bank Interest Rates: Evidence from Malaysia and Singapore. *Journal of International Money and Finance*. 15, (3): 485-496.

- SEDDIGHI, H.R., LAWLER, K.A. and KATOS, A.V. 2000. *Econometrics: A Practical Approach*. London: Routledge.
- SOUKIAZIS, E. and CASTRO, V., 2003. The Impact of the Maastricht Criteria and the Stability Pact on Growth and Unemployment in Europe. *CEUNEUROPE Discussion Paper No. 15*. University of Coimbra.
- SOUKIAZIS, E. and CASTRO, V., 2005. How the Maastricht Criteria and the Stability and Growth Pact Affected Real Convergence in the European Union A Panel Data Analysis. *Journal of Policy Modeling*. 27: 385-399.
- STIGLITZ, J.E. and WEISS, A., 1981. Credit Rationing with Markets with Imperfect Information. *The American Economic Review*. 71, (3): 393-410.
- SWANK, O.H., 1997. Some Evidence on Policy Makers' Motives, macroeconomic Performance and Output-Inflation Trade-offs. *Applied Economics*. 29, (2): 251-258.
- TAVLAS, G., 1993. The "New" Theory of Optimum Currency Areas. *World Economy*. 16, (6): 663-685.
- TAVLAS, G., 2008. The Benefits and Costs of Monetary Union in South Africa: A Critical Survey of the Literature. *Working Paper 70*. Bank of Greece.
- TIRABASSI, E., 2009. *Tanzania Banking and Finance Sector*. [Online]. Available: http://www.tanzaniainvest.com/index.php?option=com_content&view=article&id=187&Itemid=251 [Accessed 6th June 2009].
- TJIRONGO, M., 1995. Short-Term Stabilisation versus Long-Term Price Stability: Evaluating Namibia's Membership of the Common Monetary Area. *Working Paper Series 95-18*. University of Oxford.
- TOOLSEMA, L., STRUM, J. and HAAN, J., 2002. *Convergence of Pass-Through from Money Market to Lending Rates in EMU Countries: New Evidence*. [Online]. Available: <http://ccso.eldoc.ub.rug.nl/FILES/root/2002/200206/200206.pdf> [Accessed 12th September 2008].
- TSANGARIDES, C. and QURESHI, M., 2008. Monetary Union Membership in West Africa: A Cluster Analysis. *World Development*. 36, (7): 1261-1279.
- VAUBEL, R., 1990. Currency Competition and European Monetary Integration. *The Economic Journal*. 100, (402): 936-946.
- WAKEMAN-LINN, J. and WAGH, S., 2008. *Regional Financial Integration: Its Potential Contribution to Financial Sector Growth and Development in Sub-Saharan Africa*. [Online]. Available: <http://www.imf.org/external/np/seminars/eng/2008/afrfin/pdf/wakemanlinn.pdf> [Accessed 5th September 2008].

- WEIMANN, M., 2002. *OCA Theory and EMU Eastern Enlargement. An Empirical Application*.
[Online]. Available: <http://rcswww.urz.tu-dresden.de/~wpeconom/seiten/pdf/2002/ddpe200207.pdf>. [Accessed 9th March 2009].
- WORLD BANK AFRICA REGION, 2004. *Regional Integration in Sub-Saharan Africa*.
[Online]. Available:
http://siteresources.worldbank.org/EXTAFRREGINICOO/Resources/towards_final.pdf
[Accessed 24th August 2008].
- ZHANG, Z., SATO, K. and MCALEER, M., 2003. Asian Monetary Integration: A Structural VAR Approach. *CIRJE-F-212 Discussion Paper*.

**APPENDIX A:
SUMMARY OF EMPIRICAL LITERATURE**

Table A1: Summary of Empirical Literature

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
Toolsema <i>et al.</i> (2002)	6 EMU countries (Belgium, France, Germany, Italy, the Netherlands, Spain)	1980-2000	The FM-OLS estimator and test for parameter instability was used to examine the long run relationship between money market and lending rates. The relationship was further examined in more detail using rolling regression techniques in an error correction framework.	The authors concluded that even though there were major differences in pass-through in their sample, both for the initial and long-run responses to policy-induced interest rate changes, there was evidence for convergence of monetary policy transmission.
Aziakpono <i>et al.</i> (2008)	SADC Region (15 countries)	1990-2005	Principal Component (PCA) and an Interest Rate Pass through analysis was applied to central bank interest rates as well as to deposit and loan interest rates.	The results from the study indicated that CMA banking markets are most integrated followed by the SACU countries. The authors suggest that a selective expansion of the CMA is possible with Seychelles, Zambia and Botswana being potential candidates.
Aziakpono (2006)	SACU countries	1990-2004	Cointegration and error correction techniques as well as impulse response analysis.	The study confirmed the dominant role of South Africa in the Union and showed that there was a hierarchy of integration of financial systems of each member state with South Africa, with Namibia being at the top and Botswana at the bottom of the hierarchy. The findings also suggested that integration between the financial systems was as a result of policy convergence rather than market convergence, which implied

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
				limited arbitrage opportunities between countries.
De Bondt (2005)	Euro area as opposed to country specific experiences	1996-2001	Three different empirical frameworks were used to test the robustness of empirical results. The VECM was applied to model the two stages of interest rate pass-through process. Impulse response analysis based on the VAR model was used to examine the two stages of interest rate PT, and finally a univariate ECM was used to examine the pass-through of interest rates.	The study found that the pass-through of official interest to market interest rates is complete for money market interest rates up to three months, but not for market interest rates with longer maturities. Furthermore only 50% the immediate pass-through of market interest rates to retail bank interest rates was found, whereas the final pass-through was 100% for lending rates in particular. The authors accounted for the difference between the adjustment speed of bank deposit and lending rates to be explained by credit risk considerations.
Sander and Kleimeier (2006c)	10 Euro zone countries	1995-2002	The study made use of the mortgage and corporate loan rates to investigate the integration of the euro zone retail banking markets by comparing convergence and cointegration measures. The convergence measures were exposed to a difference-in-difference methodology which allowed the identification of the impact of a single currency.	The authors' overall findings suggest that euro-zone convergence has been a result of integrating wholesale markets, and that further integration may only be possible by further integration of wholesale markets. The authors further suggest since retail-banking activities tend to be localized, competition policy in these markets will remain a major concern for policy makers in the future.
Sander and Kleimeier (2006b)	8 Central and Eastern European countries	1993-2003	The study applied the VAR and cointegration methods which	The results indicated that on average the PT in the CEECs is more

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
			allow for asymmetric and threshold adjustment and follow an automatic model selection procedure. The data used to carry out the study included retail interest rates on mortgages, consumer loans, short and long term corporate loans, current account and, time deposits and savings accounts.	complete and faster than in the aggregate euro zone. Furthermore, convergence across CEECs can be predicted with market concentration, bank health, foreign bank participation and monetary policy regime as conditioning factors. The authors did not find evidence for convergence towards the euro zone.
Sander and Kleimeier (2006a)	4 CMA countries of the South African Customs Union (SACU)	1991-2005	The study made use of two bank interest rates and two proxies of the monetary policy rate: Prime lending rates, Treasury bill rates, and discount rates. The data was used to model the PT based on a unifying empirical approach that also allowed for long-run cointegration relationships as well as asymmetric and threshold adjustment.	The results of the study stated that the banking markets of the CMA exhibit a degree of integration as the pass-through is often fast and complete. Deposit markets were found to be more heterogeneous by showing different degrees of interest rate stickiness and asymmetric adjustment in some countries, thus pointing to some degree of market imperfection.
Buigut and Valev (2005)	East African Countries (EAC) which was compared with the UK and the USA.	1970-2001	The authors focused on shocks to aggregate output growth and inflation using a VAR model. The study also compared the response of the economies to the shocks in terms of the magnitude and speed of adjustment. This was done by looking at the impulse response functions. Variance decomposition was used to identify the contribution of each shock to the movements in the	The results of the study indicated that supply and demand shocks were asymmetric, which did not support the formation of a currency union in EA at the moment. However, the speed and magnitude of adjustment to the shocks were similar across the countries which meant that further integration of the economies might lead to more favourable conditions for a monetary union. Evidence suggested that linking an EA

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
			two variables.	currency to an external anchor would be weak. Evidence however did favour the Euro as the anchor currency over the US\$ and the UK pound.
Tsangarides and Qureshi (2008)	Countries that form the WAMZ and the ECOWAS	3 overlapping periods: 1990-2004, 1995-2004 and 2000-2004	The study employed both crisp and fuzzy clustering analyses to examine the similarity between countries within and across the proposed monetary regions. They further tested the accuracy of their results using a principal component analysis.	The authors found considerable dissimilarities in the economic characteristics of West African countries. The WAMZ countries did not group with the WAEMU member countries. When West and central Africa were examined as one group, the authors found heterogeneities within the CFAF zone, and some similarities between the central African and WAMZ countries.
Aziakpono (2008a)	South Africa and other SACU countries (Botswana, Lesotho, Namibia, Swaziland)	1990-2005	The study made use of cointegration and error correction modelling techniques as well as weak exogeneity tests to examine the degree of financial and monetary autonomy and interdependence between South Africa and other SACU countries.	The results of the study identified South Africa as playing the dominant role in the union. There was a high level of dependence of other SACU countries financial systems on South Africa's financial system, suggesting that a monetary union with a single central bank (SARB) and monetary policy for the union is possible.
Nielsen <i>et al.</i> (2005)	CMA Countries	1994-2004	The study made use of the concept of the uncovered interest rate parity. To test for financial integration, the authors analyzed the impact of foreign interest rates on domestic interest rates, and for comparative purposes, other neighbouring countries such	The results indicated that Lesotho, Namibia and Swaziland were well financially integrated with the South African market, while for Botswana, Zambia, and Zimbabwe the opposite was true.

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
			as Botswana, Zambia and Zimbabwe were brought into the analysis.	
Grandes (2003)	CMA countries and Botswana	1990-2001	The author made use of a two-step econometric model based on the theory of generalized purchasing power parity (G-PPP). The authors used the bilateral real exchange rates in their tests for cointegration using the rand as the base currency for the CMA countries and Botswana.	Evidence from the study showed that CMA and Botswana form an OCA given the existence of common long-run trends in their bilateral real exchange rates.
Fielding and Shields (1999)	Members of the UEMOA and BEAC that make up the African CFA Franc Zone plus Kenya	1963-1997	The study modified the method of Blanchard and Quah (1989) in order to estimate a structural VAR representation of the macro-economy of each member of the CFA zone plus Kenya.	The results showed a high degree of correlation between inflation shocks to different CFA members but not to Kenya. Furthermore, the costs of monetary integration depend on the extent to which price and output shocks are correlated across countries, and how similar the long-run effects of the shocks are on the macro-economy.
Egert <i>et al.</i> (2007)	5 Central and Eastern European countries: the Czech Republic, Hungary, Poland, Slovakia and Slovenia, the CEE-5. European countries- Austria, Germany and Spain.	1991-2005	The study made use of a multivariate Vector Autoregression (VAR) analysis to study the transmission from the policy rate via market rates to bank retail rates. In estimating the long run pass-through, the study made use the use of Dynamic Ordinary Least Squares (DOLS) and a standard ARDL model. Cointegration tests between the	The results indicated that the pass-through is generally very low for overnight deposit rates, but becomes higher for short- to long-term deposit rates. In addition, the pass-through has been declining over time in the CEE-5, and the authors argue it will decrease further in the future. Evidence suggested that the pass-through was similar in the CEE-5 than in Spain and was higher than in

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
			monetary policy rate and retail rates were carried out to determine the size of, and mechanism underlying, the interest rate pass-through.	core euro area countries. Thus the adoption of the euro by the CEE-5 will not increase heterogeneity within the euro area with regard to interest rate pass-through.
Marotta (2008)	9 EMU countries	1993-2003	The paper ultimately allowed for multiple unknown structural breaks to investigate whether the size and speed of the pass-through of market rates into short-term lending rates have increased since the introduction of the euro. Single breaks were searched for using a supermum F testing procedure. The algorithm was then rerun from the earliest break-point to detect the successive one and so on.	With reference to the structural breaks, the study found two in four EMU countries and in the UK, and a single one in five other countries. The pattern of dates indicates national banking systems adjusting slowly to the new monetary regime and emphasizes caution in associating structural changes to the introduction of the euro. It was found that the pass-through in the last break-free period was incomplete, suggesting that a single monetary policy would not be very effective.
Mkenda (2001)	EAC (Kenya, Uganda and Tanzania)	1981-1998	The paper employed the Generalised Purchasing Power Parity (G-PPP) method and various criteria suggested by the theory of Optimum Currency Areas to investigate whether the EAC would be an optimum currency area.	The results from the G-PPP method supported the formation of a currency union in the region. The method assisted in establishing cointegration between real exchange rates in East Africa, which indicated that the three countries tend to be affected by similar shocks.
Haug <i>et al.</i> (2000)	12 European countries	1979-1995	The study employed a multivariate cointegration framework. The study looked at whether the EU countries were cointegrated with each of the four Maastricht criteria by using the	The results of the study indicated that an EMU would not be successful for all 12 original EU countries unless monetary and fiscal policies are aligned further.

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
			Johansen's Likelihood based technique for cointegrated VAR models.	
Zhang <i>et al.</i> (2003)	10 East Asian economies and the USA	1983-2000 (study included sub-periods)	The study made use of a three-variable VAR model to identify and examine the correlation of the shocks for specific sub- periods with the entire sample period. Furthermore, variance decomposition and impulse response analysis were used in the study. Considering that foreign shocks have an influence on the EA economies, the authors used transformed variables representing the ratio of EA levels to US levels to remove the effects of US shocks.	The overall findings of the study did not display strong support for forming an optimum currency area in the East Asian region. The results however implied that some sub-regions were better candidates for a currency arrangement as their disturbances were correlated and small, and those countries adjusted rapidly to shocks.
Phylaktis (1999)	6 Pacific Basin countries (Singapore, Malaysia, Hong Kong, Korea, Taiwan and Japan)	1973-1993 (study included sub-periods)	Cointegration tests were used to identify long-run relationships amongst interest rates and the speed of adjustment was measured using the impulse response analysis. Multivariate Granger causality tests were utilized to identify whether it was real interest rates of the US or of Japan that drove the interest rates in the Pacific Basin countries.	The study found evidence for real interest rate parity and capital market integration. More interestingly, the results showed greater capital market integration with Japan than with the US, thus emphasising Japan's influence in dominating the region. Results from the causality tests indicated that some of the countries in the Pacific Basin had developed close links with Japan, and in some of them such as Taiwan, shocks originating from the US were transmitted via Japan.
Ahn <i>et al.</i> (2005)	12 East Asian economies	1960-2002	The study used a structural VAR	The results show that the East Asian

<u>AUTHOR AND YEAR</u>	<u>COUNTRIES STUDIED</u>	<u>SAMPLE PERIOD</u>	<u>METHOD</u>	<u>SUMMARY OF FINDINGS</u>
			approach as well as a G-PPP to study monetary union ship in East Asia.	economies, the ASEAN 4 (Indonesia, Malaysia, Singapore and Thailand) and three Northeast Asian economies (Hong Kong SAR, Korea, and Taiwan) satisfy the macroeconomic conditions for forming an OCA.
Maskay (2001)	The South Asian Association for Regional Cooperation (SAARC), consisting of Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka)	1980-1997	Asian monetary integration in light of the OCA criterion of patterns of shocks. The model was estimated using a VAR method and impulse response functions were used to identify the response of prices to aggregate supply and demand shocks.	The results of the study suggest that SAARC member countries are not suitable for a currency area, as they did not face symmetric patterns of shocks. Thus implementation of a single currency would result in significant economic costs.

**APPENDIX B:
ASSETS AND LIABILITIES OF THE COMMERCIAL BANKS**

Table B1: Deposit Money Bank Assets and Liabilities 1990 to 2007																		
YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ASSETS: KENYA																		
TOTAL ASSETS (Mil Shilling)	59497.6	72790.9	98431.4	135391.6	180017.5	220314.5	275669.8	329759.6	359570.3	387715.7	413580.18	420134.67	453981.16	493686.42	561838.96	621038.53	722748.26	850656.01
RESERVES	5353.3	6570.9	8955.6	20870.2	31789.8	35315.6	42460.3	39736.2	34969.5	36081.1	31762.5	37061.9	34165.3	31587.7	39958.7	42261.9	49369.4	64323.6
FOREIGN ASSETS	1653.4	1975.3	3918.5	23782.8	19073.1	24593.5	24439.7	37240.4	31050.8	22871	39071.5	31049.1	42126.2	31113.5	47703.6	53033.2	62551.3	75121.2
CLAIMS ON NONFIN PUB ENTERPRISES	3197.7	3960.1	4003.4	3884.8	5173.7	4986.9	5290.3	7572.4	6922.3	6478.9	7013.12	6839.48	7846.17	6403.44	11291.3	11116.2	17662.3	11226.8
CLAIMS ON PRIVATE SECTOR	36647.7	44752	58587	61705.4	79467.1	119261	148018	186558	202592	239586	247913	239340	248536	261261	324604	351647	407265	475090
CLAIMS ON OTHER FIN INSTITUTIONS	1844.5	2003	3991.3	3522.6	2671.3	4897.3	5852.1	3175.7	2283.1	1294.2	751.65	561.08	981.81	512.59	568.75	785.6	1028.87	1270.03
CLAIMS ON NONBANK FINANCIAL INSTS	1191.1	1903.5	817.2	270.4	3505.6	4539.2	6675.6	8774.3	10608	12094.9	14719.9	15533.1	21089.9	24536.2	27505.4	32089.4	25278.5	26995.2
CLAIMS ON CENTRAL GOVERNMENT	9547.5	11561.7	18010.4	21136.1	38087.7	26416.7	42576.3	46120.5	70549.5	68414.7	71205.5	89091	98548.7	137614	109869	129475	158504	195656
CLAIMS ON LOCAL GOVERNMENT	62.4	64.4	148	219.3	249.2	304.3	357.5	582.1	595.1	894.9	1143.01	659.01	687.08	657.99	338.21	630.23	1088.89	973.18
PERCENT OF TOTAL ASSETS																		
RESERVES	9.00	9.03	9.10	15.41	17.66	16.03	15.40	12.05	9.73	9.31	7.68	8.82	7.53	6.40	7.11	6.81	6.83	7.56
FOREIGN ASSETS	2.78	2.71	3.98	17.57	10.60	11.16	8.87	11.29	8.64	5.90	9.45	7.39	9.28	6.30	8.49	8.54	8.65	8.83
CLAIMS ON NONFIN PUB ENTERPRISES	5.37	5.44	4.07	2.87	2.87	2.26	1.92	2.30	1.93	1.67	1.70	1.63	1.73	1.30	2.01	1.79	2.44	1.32
CLAIMS ON PRIVATE SECTOR	61.60	61.48	59.52	45.58	44.14	54.13	53.69	56.57	56.34	61.79	59.94	56.97	54.75	52.92	57.78	56.62	56.35	55.85
CLAIMS ON OTHER FIN INSTITUTIONS	3.10	2.75	4.05	2.60	1.48	2.22	2.12	0.96	0.63	0.33	0.18	0.13	0.22	0.10	0.10	0.13	0.14	0.15
CLAIMS ON NONBANK FINANCIAL INSTS	2.00	2.62	0.83	0.20	1.95	2.06	2.42	2.66	2.95	3.12	3.56	3.70	4.65	4.97	4.90	5.17	3.50	3.17
CLAIMS ON CENTRAL GOVERNMENT	16.05	15.88	18.30	15.61	21.16	11.99	15.44	13.99	19.62	17.65	17.22	21.21	21.71	27.87	19.56	20.85	21.93	23.00
CLAIMS ON LOCAL GOVERNMENT	0.10	0.09	0.15	0.16	0.14	0.14	0.13	0.18	0.17	0.23	0.28	0.16	0.15	0.13	0.06	0.10	0.15	0.11
LIABILITIES																		
TOTAL LIABILITIES	52164	65013.3	86543.8	106429.7	153619	183888.96	228013.48	272280.5	288966.5	301922.9	314780.7	322515.41	347584.2	391717.52	450178.86	498831.91	590022.04	727382.63
DEMAND DEPOSITS	16773	19155.3	26620.9	33664.4	34908.8	36185.6	40336.6	44708.3	46670	56410.9	64910.5	75558.6	86069.8	128297	136729	157460	206583	276969
TIME, SAVINGS & FGN CCY DEPOSITS	30570.5	37804	50002.5	64331.6	89907.5	129961	170009	206488	211161	215348	221665	224238	241727	244327	288010	316276	353834	393186
FOREIGN LIABILITIES	1697.7	1388.4	1921.7	3392.4	13143.8	5806.96	5681.28	10355.9	12122.4	15913.8	13500.9	12756.5	10953.5	8175.65	11747.5	8025.15	9382.15	26110.3
CREDIT FROM MONETARY AUTHORITIES	25	1342.3	4920.9	251.6	*	*	*	447.7	4335.2	1613.6	3635.2	2974.14	2672.53	740.19	57.04	*	*	6155.09
CREDIT FROM OTHER FIN INSTITUTIONS	*	*	*	*	10696.8	6403	8165.1	6005.4	5082.2	3879	2682.57	1675.73	1826.74	2025.92	3098.3	1482.83	2724.39	2285.13
LIAB TO NONBANK FINANCIAL INSTS	*	*	*	*	12.3	1.9	*	48.9	3.3	3.9	1.97	2.87	1.87	230.09	195.82	280.93	235	416.21
CENTRAL GOVERNMENT DEPOSITS	3097.8	5323.3	3077.8	4789.7	4949.8	5550.5	3821.5	4226.3	9592.4	8753.7	8384.56	5309.57	4332.76	7921.67	10341.2	15307	17263.5	22260.9
PERCENT OF TOTAL LIABILITIES																		
DEMAND DEPOSITS	32.15	29.46	30.76	31.63	22.72	19.68	17.69	16.42	16.15	18.68	20.62	23.43	24.76	32.75	30.37	31.57	35.01	38.08
TIME, SAVINGS & FGN CCY DEPOSITS	58.60	58.15	57.78	60.45	58.53	70.67	74.56	75.84	73.07	71.33	70.42	69.53	69.54	62.37	63.98	63.40	59.97	54.05
FOREIGN LIABILITIES	3.25	2.14	2.22	3.19	8.56	3.16	2.49	3.80	4.20	5.27	4.29	3.96	3.15	2.09	2.61	1.61	1.59	3.59
CREDIT FROM MONETARY AUTHORITIES	0.05	2.06	5.69	0.24	*	*	*	0.16	1.50	0.53	1.15	0.92	0.77	0.19	0.01	*	*	0.85
CREDIT FROM OTHER FIN INSTITUTIONS	*	*	*	*	6.96	3.48	3.58	2.21	1.76	1.28	0.85	0.52	0.53	0.52	0.69	0.30	0.46	0.31
LIAB TO NONBANK FINANCIAL INSTS	*	*	*	*	0.01	*	*	0.02	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.06	0.04	0.06
CENTRAL GOVERNMENT DEPOSITS	5.94	8.19	3.56	4.50	3.22	3.01	1.68	1.55	3.32	2.90	2.66	1.65	1.25	2.02	2.30	3.07	2.93	3.06
GDP (Mil Shilling)	195536	224232	264475	333616	400700	465654	687998	770312	850808	906928	967838	1020020	1035370	1138060	1286460	1445480	1642400	*
PERCENT OF GDP																		
CLAIMS ON PRIVATE SECTOR	18.74	19.96	22.15	18.50	19.83	25.61	21.51	24.22	23.81	26.42	25.62	23.46	24.00	22.96	25.23	24.33	24.80	*
ASSETS: TANZANIA																		
TOTAL ASSETS (Mil Shilling)	179379.3	235041.5	260102.3	428871.2	531220	665130	650186	723634	936130	1062422	1323090.31	1416604.63	1702032	2051890	2392317	3369176	4600973	6054210
RESERVES	6889.7	10289	14377	30131.2	49911	66032	72797	59710	113202	123199	172096	177329	195153	226870	310420	395425	594062	757353
FOREIGN ASSETS	11995.2	12389.5	34385.7	69782	76741	170163	181551	233556	267257	301079	410990	539063	571573	685488	683666	835640	1079580	879827

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CLAIMS ON NONFIN PUB ENTERPRISES	41422.6	56471.2	44711	49261	57182	46831	17340	16222	3064	4719	2980.31	1015.63	*	*	*	*	*	*
CLAIMS ON PRIVATE SECTOR	115483	152405	133490	186307	222978	201015	116556	166754	239861	302165	333264	403494	570668	817125	1059690	1425060	1946170	2883790
CLAIMS ON GOVERNMENT	3588.8	3486.8	33138.6	93390	124408	181089	261942	247392	312746	331260	403760	295703	364638	322407	338541	713051	981161	1533240
PERCENT OF TOTAL ASSETS																		
RESERVES	3.84	4.38	5.53	7.03	9.40	9.93	11.20	8.25	12.09	11.60	13.01	12.52	11.47	11.06	12.98	11.74	12.91	12.51
FOREIGN ASSETS	6.69	5.27	13.22	16.27	14.45	25.58	27.92	32.28	28.55	28.34	31.06	38.05	33.58	33.41	28.58	24.80	23.46	14.53
CLAIMS ON NONFIN PUB ENTERPRISES	23.09	24.03	17.19	11.49	10.76	7.04	2.67	2.24	0.33	0.44	0.23	0.07	*	*	*	*	*	*
CLAIMS ON PRIVATE SECTOR	64.38	64.84	51.32	43.44	41.97	30.22	17.93	23.04	25.62	28.44	25.19	28.48	33.53	39.82	44.30	42.30	42.30	47.63
CLAIMS ON GOVERNMENT	2.00	1.48	12.74	21.78	23.42	27.23	40.29	34.19	33.41	31.18	30.52	20.87	21.42	15.71	14.15	21.16	21.33	25.33
LIABILITIES																		
TOTAL LIABILITIES	176402.3	222241.5	388645.6	495943.5	428214	571091	589778	685260	746972	861430	1035534.94	1270581.7	1618336.75	1924032.55	2338346.1	3334268.9	4023984.8	5262440
DEMAND DEPOSITS	55083.3	75198.2	90663.1	125161	153317	183971	191551	205992	237718	247723	302602	354381	463341	560333	651451	915653	961104	1397960
TIME, SAVINGS, & FGN CCY DEPOSITS	52332.2	76261.5	116243	173624	240119	329521	372282	433200	481467	584948	702682	870711	1088900	1274040	1532390	2176180	2703090	3265570
FOREIGN LIABILITIES	4071.4	6610.9	102749	44939.5	10923	28261	4827	4878	2460	1769	4163.24	16169.7	35193	6876.55	19042.1	55234.9	97474.8	281856
CREDIT FROM CENTRAL BANK	62677.3	60685.6	73988.9	147397	1338	7585	162	12763	*	5430	1.2	*	82.95	50	*	*	*	*
GOVERNMENT DEPOSITS	2238.1	3485.3	5001.56	4822	22517	21753	20956	28427	25327	21560	26086.5	29320	30819.8	81833	135463	187201	262316	317054
PERCENT OF TOTAL LIABILITIES																		
DEMAND DEPOSITS	31.23	33.84	23.33	25.24	35.80	32.21	32.48	30.06	31.82	28.76	29.22	27.89	28.63	29.12	27.86	27.46	23.88	26.56
TIME, SAVINGS, & FGN CCY DEPOSITS	29.67	34.31	29.91	35.01	56.07	57.70	63.12	63.22	64.46	67.90	67.86	68.53	67.29	66.26	65.53	65.27	67.17	62.05
FOREIGN LIABILITIES	2.31	2.97	26.44	9.06	2.55	4.95	0.82	0.71	0.33	0.21	0.40	1.27	2.17	0.36	0.81	1.66	2.42	5.36
CREDIT FROM CENTRAL BANK	35.53	27.31	19.04	29.72	0.31	1.33	0.03	1.86	0.00	0.63	0.00	*	0.01	0.00	*	*	*	*
GOVERNMENT DEPOSITS	1.27	1.57	1.29	0.97	5.26	3.81	3.55	4.15	3.39	2.50	2.52	2.31	1.90	4.25	5.79	5.61	6.52	6.02
GDP (Mil Shilling)	830690	1086270	1369870	1725540	2298870	3020500	3767640	4703460	5571250	6432910	7268380	8274610	9431960	10677900	12365500	14209100	*	*
PERCENT OF GDP																		
CLAIMS ON PRIVATE SECTOR	13.90	14.03	9.74	10.80	9.70	6.66	3.09	3.55	4.31	4.70	4.59	4.88	6.05	7.65	8.57	10.03	*	*
ASSETS: UGANDA																		
TOTAL ASSETS (Bil)	90.95	155.99	261.36	354.11	486.31	557.57	711.12	855.99	1076.29	1270.65	1709.12	1894.92	2507.55	2768.44	3130.37	3305.2	3982.56	*
RESERVES	11.99	27.39	34.64	37.06	75.12	79.6	109.62	104.22	129.41	121.02	188.93	233.79	205.8	207.26	375.63	418.28	414.24	*
FOREIGN ASSETS	14.74	39.33	87.88	103.3	134.55	133.77	146.8	183.34	259.23	300.95	469.23	429.43	444.77	701.05	714.91	635.04	829.01	*
CLAIMS ON NONFIN PUB ENTERPRISES	12.12	23.71	27.91	32.53	51.21	56.63	65.85	65.83	63.59	70.66	115.36	141.41	192.47	212.51	264.86	365.14	452.86	*
CLAIMS ON PRIVATE SECTOR	49.36	64.57	105.08	166.95	190.69	245.82	323.18	319.96	424.82	491.9	531.35	503.51	596.5	757.27	836.45	923.75	1278.89	*
CLAIMS ON CENTRAL GOVERNMENT	2.74	0.99	5.85	14.27	34.74	41.75	65.67	182.64	199.24	286.12	404.25	586.78	868.01	890.35	938.52	962.99	1007.56	*
PERCENT OF TOTAL ASSETS																		
RESERVES	13.18	17.56	13.25	10.47	15.45	14.28	15.42	12.18	12.02	9.52	11.05	12.34	8.92	7.49	12.00	12.66	10.40	*
FOREIGN ASSETS	16.21	25.21	33.62	29.17	27.67	23.99	20.64	21.42	24.09	23.68	27.45	22.66	19.27	25.32	22.84	19.21	20.82	*
CLAIMS ON NONFIN PUB ENTERPRISES	13.33	15.20	10.68	9.19	10.53	10.16	9.26	7.69	5.91	5.56	6.75	7.46	8.34	7.68	8.46	11.05	11.37	*
CLAIMS ON PRIVATE SECTOR	54.27	41.39	40.21	47.15	39.21	44.09	45.45	37.38	39.47	38.71	31.09	26.57	25.85	27.35	26.72	27.95	32.11	*
CLAIMS ON CENTRAL GOVERNMENT	3.01	0.63	2.24	4.03	7.14	7.49	9.23	21.34	18.51	22.52	23.65	30.97	37.62	32.16	29.98	29.14	25.30	*
LIABILITIES																		
TOTAL LIABILITIES	81.46	133.35	207.56	304.66	429.06	484.69	618.27	733.04	911.59	1112.07	1392.01	1490.14	1862.39	2197.71	2397.62	2592.17	2977.38	*
DEMAND DEPOSITS	47.66	78.63	107.68	126.76	177.5	204.18	229.74	272.08	326.56	358.6	443.24	515.36	632.83	688.68	752.63	894.22	1020.61	*
TIME, SAVINGS, & FGN CCY DEPOSITS	19.4	30.84	57.88	155.49	209.41	233.3	315.37	402.46	512.42	588.01	703.62	739.4	961.11	1193.75	1356.47	1537.89	1788.3	*
FOREIGN LIABILITIES	7.83	12.11	26.27	0.75	7.44	0.08	*	2.23	2.92	38.43	73.69	55.46	71.68	49.9	48.99	19.67	59.28	*
CREDIT FROM MONETARY AUTHORITIES	4.81	9.62	7.58	10.47	6.71	8.45	0.15	7.24	23.4	27.22	22.22	20.3	21.48	20.3	60.12	35.76	37.77	*
CENTRAL GOVERNMENT DEPOSITS	1.76	2.15	8.15	11.19	28	38.68	73.01	49.03	46.29	99.81	149.24	159.62	175.29	245.08	179.41	104.63	71.42	*
PERCENT OF TOTAL LIABILITIES																		
DEMAND DEPOSITS	58.51	58.97	51.88	41.61	41.37	42.13	37.16	37.12	35.82	32.25	31.84	34.58	33.98	31.34	31.39	34.50	34.28	*
TIME, SAVINGS, & FGN CCY DEPOSITS	23.82	23.13	27.89	51.04	48.81	48.13	51.01	54.90	56.21	52.88	50.55	49.62	51.61	54.32	56.58	59.33	60.06	*

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
FOREIGN LIABILITIES	9.61	9.08	12.66	0.25	1.73	0.02	*	0.30	0.32	3.46	5.29	3.72	3.85	2.27	2.04	0.76	1.99	*
CREDIT FROM MONETARY AUTHORITIES	5.90	7.21	3.65	3.44	1.56	1.74	0.02	0.99	2.57	2.45	1.60	1.36	1.15	0.92	2.51	1.38	1.27	*
CENTRAL GOVERNMENT DEPOSITS	2.16	1.61	3.93	3.67	6.53	7.98	11.81	6.69	5.08	8.98	10.72	10.71	9.41	11.15	7.48	4.04	2.40	*
GDP (Bil Shilling)	1545.89	2152.91	3576.16	3875.6	5059.45	5855.55	6406.08	7143.43	7856.82	8748.73	9442.5	10167.3	10847.8	12756.5	14081.6	16268.3	18608.4	*
PERCENT OF GDP																		
CLAIMS ON PRIVATE SECTOR	3.19	3.00	2.94	4.31	3.77	4.20	5.04	4.48	5.41	5.62	5.63	4.95	5.50	5.94	5.94	5.68	6.87	*
ASSETS: BURUNDI																		
TOTAL ASSETS (Mil Franc)	27317.2	33878.7	34249.8	40016.1	49167.8	43616	57752.8	60106.5	72937.3	97096.3	123048.5	138309	180183.1	221408.9	252080.9	281440.4	332591	*
RESERVES	737	2524.8	2468.8	1760.9	2170.6	1289.7	1715.6	2851.7	2839.2	4753.6	3625.1	6289.1	6720.1	9307.7	17711.6	30922.8	36619.5	*
FOREIGN ASSETS	879.4	1268.7	1539.3	2553.2	4773	4760.2	7906.6	4897.6	2649.6	8427.1	14352.4	12334.1	16877.5	42990.2	55017.9	59039.2	74464.8	*
CLAIMS ON NONFIN PUB ENTERPRISES	7122.8	6338.2	5792.8	1590.5	2748.9	1321.5	1672.6	2213.3	3515.3	4538.1	3230.4	4634	5296.8	6930.3	6849.3	5174.5	9143.1	*
CLAIMS ON PRIVATE SECTOR	16437.1	22500.3	23862	31556.5	34021.7	29161.5	35885.6	39515.6	52948.4	69384.5	101356	110418	143552	158978	161387	159742	192627	*
CLAIMS ON OTHER FINANCIAL INST	1124.2	345.8	127.2	114.1	142.4	283.9	1748.3	104.3	106.3	105.4	264.5	273.2	1350.2	96.1	91.1	85.6	989.1	*
CLAIMS ON CENTRAL GOVERNMENT	1016.7	900.9	459.7	2440.9	5311.2	6799.2	8824.1	10524	10878.5	9887.6	220.1	4360.6	6386.5	3106.6	11024	26476.3	18747.5	*
PERCENT OF TOTAL ASSETS																		
RESERVES	2.70	7.45	7.21	4.40	4.41	2.96	2.97	4.74	3.89	4.90	2.95	4.55	3.73	4.20	7.03	10.99	11.01	*
FOREIGN ASSETS	3.22	3.74	4.49	6.38	9.71	10.91	13.69	8.15	3.63	8.68	11.66	8.92	9.37	19.42	21.83	20.98	22.39	*
CLAIMS ON NONFIN PUB ENTERPRISES	26.07	18.71	16.91	3.97	5.59	3.03	2.90	3.68	4.82	4.67	2.63	3.35	2.94	3.13	2.72	1.84	2.75	*
CLAIMS ON PRIVATE SECTOR	60.17	66.41	69.67	78.86	69.20	66.86	62.14	65.74	72.59	71.46	82.37	79.83	79.67	71.80	64.02	56.76	57.92	*
CLAIMS ON OTHER FINANCIAL INST	4.12	1.02	0.37	0.29	0.29	0.65	3.03	0.17	0.15	0.11	0.21	0.20	0.75	0.04	0.04	0.03	0.30	*
CLAIMS ON CENTRAL GOVERNMENT	3.72	2.66	1.34	6.10	10.80	15.59	15.28	17.51	14.91	10.18	0.18	3.15	3.54	1.40	4.37	9.41	5.64	*
LIABILITIES																		
TOTAL LIABILITIES	24625.60	28088.80	27251.10	31395.20	39878.40	33456.20	44892.40	43418.40	56628.80	78637.10	100062.10	111088.60	152623.20	182292.50	212887.90	232733.00	282880.40	*
DEMAND DEPOSITS	10398.80	12461.60	13525.30	14720.50	19094.70	18729.80	18038.00	22234.70	22180.10	34296.00	34860.20	44243.90	55838.10	72106.50	91078.60	104871.00	145068.00	*
SAVING DEPOSITS	8066.50	11146.90	10695.10	10135.20	14950.80	10680.50	16373.40	17037.50	15955.00	26144.00	30976.00	35126.20	48691.20	53090.30	52364.00	65208.10	83973.50	*
FOREIGN LIABILITIES	1891.00	1635.50	1871.70	1969.40	3154.90	3048.00	2447.10	3018.60	3796.00	4848.40	11115.30	16579.20	22887.00	33431.00	50543.20	37540.10	41367.60	*
CREDIT FROM MONETARY AUTHORITIES	4269.30	2844.80	1134.20	4044.00	2601.80	805.90	8019.90	1127.60	14517.70	13198.70	22337.50	14663.10	24866.90	9743.30	3774.70	*	*	*
GOVERNMENT DEPOSITS	0.00	0.00	24.80	526.10	76.20	192.00	14.00	0.00	180.00	150.00	773.10	476.20	340.00	13921.40	15127.40	25113.80	12471.30	*
PERCENT OF TOTAL LIABILITIES																		
DEMAND DEPOSITS	42.23	44.37	49.63	46.89	47.88	55.98	40.18	51.21	39.17	43.61	34.84	39.83	36.59	39.56	42.78	45.06	51.28	*
SAVING DEPOSITS	32.76	39.68	39.25	32.28	37.49	31.92	36.47	39.24	28.17	33.25	30.96	31.62	31.90	29.12	24.60	28.02	29.69	*
FOREIGN LIABILITIES	7.68	5.82	6.87	6.27	7.91	9.11	5.45	6.95	6.70	6.17	11.11	14.92	15.00	18.34	23.74	16.13	14.62	*
CREDIT FROM MONETARY AUTHORITIES	17.34	10.13	4.16	12.88	6.52	2.41	17.86	2.60	25.64	16.78	22.32	13.20	16.29	5.34	1.77	*	*	*
GOVERNMENT DEPOSITS	*	*	0.09	1.68	0.19	0.57	0.03	*	0.32	0.19	0.77	0.43	0.22	7.64	7.11	10.79	4.41	*
GDP (Mil Franc)	196656	204951	225857	236676	270051	249865	263075	342786	400166	455443	511039	549981	584605	644680	748486	862100	986600	*
PERCENT OF GDP																		
CLAIMS ON PRIVATE SECTOR	8.36	10.98	10.57	13.33	12.60	11.67	13.64	11.53	13.23	15.23	19.83	20.08	24.56	24.66	21.56	18.53	19.52	*
RWANDA: ASSETS																		
TOTAL ASSETS (Mil Franc)	27552.2	28899.6	31483.4	33463.9	31427.41	57418.3	67761	88864	97425	103517.29	121004	133396.5	153346.9	177294.4	243190.06	272521.4	*	*
RESERVES	1040.4	5097.2	3116.8	5778.3	6617.7	8589.7	13816	16035	11835	15844.9	10823	15496.2	13510.6	13054.7	28907	36753.4	*	*
FOREIGN ASSETS	3928.7	5422.6	6093.1	4637.4	3633.22	15565.6	20157	22293	24095	19652.4	32949	34281.3	38989.9	49768.8	60758.7	52584.4	*	*
CLAIMS ON PRIVATE SECTOR	14629.2	12121.8	15308.4	17874.8	16234.1	28381.3	28615	44948	54079	59686.4	69289	75264.2	82906	94657.5	127568	158328	*	*
CLAIMS ON GOVERNMENT	5421	5448.1	6667.4	4494.8	4311.06	4527.8	4968	5573	6995	7746.91	726.5	7344.8	14407.5	14861.8	21015	22474.6	*	*
CLAIMS ON OFFICIAL ENTITIES	2532.9	809.9	297.7	678.6	581.33	353.9	205	15	421	586.68	678	1010	3532.9	4951.6	4941.36	2381	*	*
PERCENT OF TOTAL ASSETS																		
RESERVES	3.78	17.64	9.90	17.27	21.06	14.96	20.39	18.04	12.15	15.31	8.94	11.62	8.81	7.36	11.89	13.49	*	*
FOREIGN ASSETS	14.26	18.76	19.35	13.86	11.72	27.11	29.75	25.09	24.73	18.98	27.23	25.70	25.43	28.07	24.98	19.30	*	*
CLAIMS ON PRIVATE SECTOR	53.10	41.94	48.62	53.42	51.66	49.43	42.23	50.58	55.51	57.66	57.26	56.42	54.06	53.39	52.46	58.10	*	*

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CLAIMS ON GOVERNMENT	19.68	18.85	21.18	13.43	13.72	7.89	7.33	6.27	7.18	7.48	6.00	5.51	9.40	8.38	8.64	8.25	*	*
CLAIMS ON OFFICIAL ENTITIES	9.19	2.80	0.95	2.03	1.85	0.62	0.30	0.02	0.43	0.57	0.56	0.76	2.30	2.79	2.03	0.87	*	*
LIABILITIES																		
TOTAL LIABILITIES	26671.9	27896.2	30523.1	30693.9	28680.85	53099.3	60215	79950.9	83759	88727.83	103509	111646.9	131521.87	154005.2	199319.84	229607.91	*	*
DEMAND DEPOSITS	7346.2	8586.6	11570.7	12875.9	16165	22585.8	24979	34522.9	31509	36936.4	37575	38522	45346.3	52219.7	62604.3	82523.6	*	*
TIME & SAVINGS DEPOSITS	13804.4	14878.9	14249	13355.8	8083.8	22181.4	22851	32445.3	36051	38680.4	50588	61621.9	70973.8	81352.2	113026	122063	*	*
FOREIGN LIABILITIES	902.8	1030.3	1280.9	888.9	775.5	1226.4	1378	3847.3	3816	1855.95	3546	4749.4	7886.8	12919	12724.4	11805.5	*	*
CREDIT FROM MONETARY AUTHORITIES	1398.7	600.3	469.3	719.4	286.55	1623.9	63	63	61	1550.22	2358	1352.3	2079.67	1216.3	1623.77	2058.81	*	*
CENTRAL GOVERNMENT DEPOSITS	3219.8	2800.1	2953.2	2853.9	3370	5481.8	10944	9072.4	12322	9704.86	9442	5401.3	5235.3	6298	9341.37	11157	*	*
PERCENT OF TOTAL LIABILITIES																		
DEMAND DEPOSITS	27.54	30.78	37.91	41.95	56.36	42.54	41.48	43.18	37.62	41.63	36.30	34.50	34.48	33.91	31.41	35.94	*	*
TIME & SAVINGS DEPOSITS	51.76	53.34	46.68	43.51	28.19	41.77	37.95	40.58	43.04	43.59	48.87	55.19	53.96	52.82	56.71	53.16	*	*
FOREIGN LIABILITIES	3.38	3.69	4.20	2.90	2.70	2.31	2.29	4.81	4.56	2.09	3.43	4.25	6.00	8.39	6.38	5.14	*	*
CREDIT FROM MONETARY AUTHORITIES	5.24	2.15	1.54	2.34	1.00	3.06	0.10	0.08	0.07	1.75	2.28	1.21	1.58	0.79	0.81	0.90	*	*
CENTRAL GOVERNMENT DEPOSITS	12.07	10.04	9.68	9.30	11.75	10.32	18.17	11.35	14.71	10.94	9.12	4.84	3.98	4.09	4.69	4.86	*	*
GDP (Mil Franc)	213530	239310	276490	284370	165800	339140	424130	558280	621340	644890	705680	741870	781470	955160	1137910	1331600	1611590	*
PERCENT OF GDP																		
CLAIMS ON PRIVATE SECTOR	6.85	5.07	5.54	6.29	9.79	8.37	6.75	8.05	8.70	9.26	9.82	10.15	10.61	9.91	11.21	11.89	*	*

Source: Data computed based on the International Monetary Fund IFS CD ROM

**APPENDIX C:
ADF UNIT ROOT TEST SUMMARY**

Table C1: Unit Root Tests

Country	Series	Rolling Period from January to December of the years						
		1999-2003	2000-2004	2001-2005	2002-2006	2003-2007	2004-2008	1999-2008
Panel A: Treasury Bill & Central Bank Rate								
Kenya (TB Rate)	Level	-1.26	-1.50	-2.18	-1.91	-1.80	-2.47	-2.28
	1st Difference	-3.92a	-5.74a	-5.42a	-5.10a	-4.60a	-5.26a	-7.46a
Tanzania	Level	-1.34	-3.33b	1.41	-0.60	-2.10	-3.06b	-2.65c
	1st Difference	-6.21a	-5.71a	-6.86a	-4.84a	-2.78c	-2.78c	-4.48a
Uganda	Level	-1.50	-1.93	-3.37b	-2.71c	-2.92b	-5.49a	-3.06b
	1st Difference	-6.37a	-5.92a	-4.40a	-4.52a	-4.49a	-4.50a	-8.53a
Burundi	Level	-1.40	-2.46	-1.74	-0.84	-0.25	-0.90	-0.58
	1st Difference	-7.05a	-7.60a	-7.49a	-5.26a	-5.83a	-5.60a	-9.00a
Rwanda	Level	-1.69	-1.72	-2.20	-1.36	-0.87	-2.20	-2.14
	1st Difference	-6.87a	-7.02a	-6.81a	-6.35a	-7.49a	8.35a	-10.8a
Panel B: Deposit Rate								
Kenya	Level	-2.08	-4.20a	-1.36	-1.45	-1.34	-0.94	-3.33b
	1st Difference	-6.22a	-7.17a	-6.44a	-6.06a	-4.28a	-7.99a	-8.77a
Tanzania	Level	-1.26	-2.24	-2.36	-0.90	-0.57	-1.34	-1.67
	1st Difference	-9.82a	-9.37a	-8.05a	-8.50a	-7.51a	-8.74a	-12.9a
Uganda	Level	2.50	-2.72	-3.46b	-3.09b	-4.47a	-3.75a	-4.16a
	1st Difference	-9.99a	-9.38a	-9.24a	-9.60a	-10.2a	-7.83a	-14.4a
Burundi	Level	-1.81	-1.45	-2.50	-1.81	0.46	1.88	2.86c
	1st Difference	-7.65a	-8.47a	-7.19a	-9.28a	-7.89a	3.23b	2.59c
Rwanda	Level	-2.50	-2.01	-1.14	-1.68	0.39	-0.81	-0.96
	1st Difference	-7.69a	-8.93a	-9.65a	-10.0a	-11.0a	-9.38a	-12.4a
Panel C: Lending Rate								
Kenya	Level	0.01	-1.30	-1.06	-1.75	-3.44b	-0.33	-1.85
	1st Difference	-5.70a	-7.21a	-7.13a	-6.98a	-6.76a	-7.30a	-8.21a
Tanzania	Level	-0.22	-0.95	-3.51b	-2.06	-1.86	-2.28	-1.69
	1st Difference	-7.76a	-7.57a	-7.47a	-8.09a	-9.47a	-8.78a	-11.1a
Uganda	Level	-1.48	-2.76c	-3.91a	-4.49a	-4.11a	-3.98a	-4.15a
	1st Difference	-8.84a	-10.1a	-9.98a	-7.98a	-8.96a	-7.42a	-11.4a
Burundi	Level	1.59	-1.73	-5.27a	-5.38a	-5.84a	-5.44a	-2.92b
	1st Difference	-10.0a	-9.39a	-8.58a	-8.90a	-8.99a	-9.05a	-12.0a
Rwanda	Level	-8.19a	-8.34a	-8.15a	-8.24a	-8.48a	-5.94a	-10.3a
	1st Difference	-10.9a	-8.44a	-8.54a	-9.07a	-7.67a	-11.8a	-11.3a

Note: Significance levels with regard to the rejection of the null hypothesis are indicated with a, b and c for 1%, 5% and 10% respectively.

**APPENDIX D:
KPSS UNIT ROOT TEST SUMMARY**

Table D1: Unit Root Tests

Country	Series	Rolling Period from January to December of the years						
		1999-2003	2000-2004	2001-2005	2002-2006	2003-2007	2004-2008	1999-2008
Panel A: Treasury Bill & Central Bank Rate								
Kenya (TB Rate)	Level	0.65b	0.83a	0.46c	0.16	0.39c	0.36c	0.56b
	1st Difference	0.16	0.28	0.38c	0.21	0.17	0.20	0.07
Tanzania	Level	0.52b	0.27	0.86a	0.90a	0.85a	0.26	0.38c
	1st Difference	0.12	0.83a	0.46c	0.07	0.10	0.08	0.06
Uganda	Level	0.13	0.16	0.21	0.19	0.31	0.11	0.06
	1st Difference	0.14	0.08	0.22	0.13	0.08	0.36c	0.06
Burundi	Level	0.85a	0.62b	0.24	0.46b	0.73b	0.79a	0.46c
	1st Difference	0.11	0.23	0.13	0.37c	0.17	0.14	0.35c
Rwanda	Level	0.92a	0.89a	0.58b	0.25	0.63b	0.87a	0.39c
	1st Difference	0.50b	0.50b	0.29	0.20	0.24	0.36c	0.30
Panel B: Deposit Rate								
Kenya	Level	0.88a	0.93a	0.50b	0.19	0.46c	0.56b	0.67b
	1st Difference	0.09	0.43	0.42c	0.31	0.23	0.10	0.28
Tanzania	Level	0.86a	0.61b	0.25	0.79a	0.89a	0.79a	0.35c
	1st Difference	0.17	0.42c	0.31	0.33	0.30	0.15	0.25
Uganda	Level	0.17	0.15	0.14	0.32	0.11	0.68b	0.22
	1st Difference	0.17	0.06	0.11	0.03	0.04	0.08	0.30
Burundi	Level	0.72b	0.26	0.65b	0.86a	0.78a	0.94a	0.82a
	1st Difference	0.12	0.41c	0.22	0.19	0.42c	0.44c	0.57b
Rwanda	Level	0.34	0.34	0.69b	0.71b	0.82a	0.83a	0.82a
	1st Difference	0.26	0.12	0.11	0.09	0.26	0.13	0.31
Panel C: Lending Rate								
Kenya	Level	0.82a	0.89a	0.87a	0.68b	0.35c	0.69b	1.08a
	1st Difference	0.10	0.11	0.15	0.36c	0.59b	0.24	0.22
Tanzania	Level	0.86a	0.85a	0.69b	0.21	0.67b	0.39c	0.87a
	1st Difference	0.14	0.13	0.68b	0.32	0.08	0.08	0.22
Uganda	Level	0.51b	0.52b	0.32	0.16	0.26	0.25	0.59b
	1st Difference	0.11	0.08	0.24	0.21	0.16	0.19	0.11
Burundi	Level	0.73b	0.51b	0.18	0.51b	0.60b	0.79a	0.31
	1st Difference	0.15	0.10	0.21	0.22	0.20	0.29	0.25
Rwanda	Level	0.29	0.51b	0.45c	0.31	0.09	0.41c	0.52b
	1st Difference	0.10	0.17	0.12	0.33	0.29	0.10	0.05

Note: Significance levels with regard to the rejection of the null hypothesis are indicated with a, b and c for 1%, 5% and 10% respectively.

**APPENDIX E:
COINTEGRATION ANALYSIS SUMMARY**

Table E1: Cointegration Analysis

Country	Interest Rates	Rolling Sample		Obs	K	Johansen Method				EG	Prob.	CRDW	ECM(s)		Coit?
		From	To			Trace		Max					Coeff	t-stat	
						r<0	r<1	r<0	r<1						
Kenya	Deposit Rates	1999	2003	60	7	8.8[0.38]	0.8[0.39]	8.1[0.37]	0.8[0.39]	-4.10	0.00	0.17	-0.20[0.00]	-3.80	yes
	Deposit Rates	2000	2004	60	2	21.9[0.01]	1.8[0.18]	20.1[0.01]	1.8[0.18]	-2.17	0.03	0.24	-0.29[0.00]	-4.93	yes
	Deposit Rates	2001	2005	60	9	21.7[0.01]	2.9[0.09]	18.8[0.01]	2.9[0.09]	-2.14	0.03	0.31	-0.23[0.00]	-4.26	yes
	Deposit Rates	2002	2006	60	12	21.0[0.01]	1.6[0.21]	19.4[0.01]	1.6[0.21]	-1.75	0.08	0.24	-0.20[0.00]	-3.80	yes
	Deposit Rates	2003	2007	60	2	20.8[0.01]	3.2[0.07]	17.7[0.01]	3.2[0.07]	-1.63	0.10	0.19	-0.16[0.00]	-3.43	yes
	Deposit Rates	2004	2008	60						-2.53	0.01	0.26	-0.20[0.00]	-5.20	yes
	Deposit Rates	1999	2008	120	7	11.4[0.19]	4.6[0.03]	6.8[0.51]	4.6[0.03]	-5.29	0.00	0.18	-0.21[0.00]	-5.82	yes
	Lending Rates	1999	2003	60						-2.47	0.01	0.25	-0.12[0.02]	-2.32	yes
	Lending Rates	2000	2004	60	1	10.8[0.23]	2.7[0.10]	8.0[0.38]	2.7[0.10]	-0.66	0.43	0.22	-0.14[0.00]	-3.40	yes
	Lending Rates	2001	2005	60						-0.50	0.50	0.06	-0.06[0.04]	-2.15	yes
	Lending Rates	2002	2006	60						-1.29	0.18	0.05	-0.07[0.04]	-2.14	yes
	Lending Rates	2003	2007	60						-3.43	0.00	0.08	-0.12[0.01]	-2.56	yes
	Lending Rates	2004	2008	60	1	15.7[0.05]	2.9[0.09]	12.7[0.09]	2.9[0.09]	-0.96	0.30	0.17	-0.06[0.33]	-0.99	no
	Lending Rates	1999	2008	120	2	22.8[0.00]	2.2[0.14]	20.6[0.00]	2.2[0.14]	-2.24	0.02	0.09	-0.06[0.00]	-3.76	yes
Tanzania	Deposit Rates	1999	2003	60	2	11.9[0.16]	1.9[0.16]	10.0[0.21]	1.9[0.16]	-2.07	0.04	0.28	-0.19[0.00]	-3.80	yes
	Deposit Rates	2000	2004	60						-2.09	0.04	0.28	-0.22[0.00]	-3.40	yes
	Deposit Rates	2001	2005	60	6	15.6[0.05]	0.2[0.63]	15.4[0.03]	0.2[0.63]	-2.82	0.01	0.42	-0.21[0.02]	-2.32	yes
	Deposit Rates	2002	2006	60	5	20.6[0.01]	1.7[0.19]	18.9[0.01]	1.7[10.19]	-2.49	0.01	0.39	-0.16[0.05]	-2.05	yes
	Deposit Rates	2003	2007	60	8	8.1[0.46]	0.0[0.88]	8.1[0.37]	0.0[0.88]	-2.44	0.02	0.52	-0.13[0.06]	-1.93	no
	Deposit Rates	2004	2008	60	4	23.9[0.00]	1.9[0.17]	22.1[0.00]	1.9[0.17]	-1.67	0.09	0.19	-0.10[0.03]	-2.19	yes
	Deposit Rates	1999	2008	120	1	20.3[0.01]	2.6[0.11]	17.7[0.01]	2.6[0.11]	-2.79	0.01	0.23	-0.14[0.00]	-4.01	yes
	Lending Rates	1999	2003	60	5	16.6[0.03]	0.4[0.54]	16.2[0.02]	0.4[0.54]	-0.34	0.56	0.08	-0.02[0.52]	-0.65	no
	Lending Rates	2000	2004	60	1	19.1[0.01]	3.6[0.06]	15.4[0.03]	3.6[0.06]	-0.63	0.44	0.04	-0.03[0.37]	-0.91	no
	Lending Rates	2001	2005	60	2	18.8[0.02]	0.0[0.96]	18.8[0.01]	0.0[0.96]	-3.24	0.00	0.08	-0.11[0.00]	-3.21	yes
Lending Rates	2002	2006	60	9	20.4[0.01]	0.3[0.60]	20.1[0.01]	0.3[0.60]	-1.87	0.06	0.22	-0.11[0.10]	-1.66	no	

Country	Interest Rates	Rolling Sample		Obs	K	Johansen Method				EG	Prob.	CRDW	ECM(s)		CoInt?
		From	To			Trace		Max					Coeff	t-stat	
						r<0	r<1	r<0	r<1						
	Lending Rates	2003	2007	60	4	16.8[0.03]	1.2[0.26]	15.6[0.03]	1.2[0.26]	-2.85	0.01	0.48	-0.11[0.21]	-1.26	no
	Lending Rates	2004	2008	60						-3.08	0.00	0.56	-0.17[0.08]	-1.77	no
	Lending Rates	1999	2008	120						-1.69	0.09	0.04	-0.03[0.09]	-1.69	no
Uganda	Deposit Rates	1999	2003	60	1	20.5[0.01]	3.1[0.08]	17.3[0.02]	3.1[0.08]	-4.49	0.00	0.94	-0.47[0.00]	-3.94	yes
	Deposit Rates	2000	2004	60	2	16.8[0.03]	3.8[0.05]	13.0[0.08]	3.8[0.05]	-4.57	0.00	1.06	-0.48[0.00]	-3.76	yes
	Deposit Rates	2001	2005	60	4	16.6[0.05]	3.0[0.08]	13.5[0.06]	3.0[0.08]	-4.93	0.00	1.09	-0.52[0.00]	-3.98	yes
	Deposit Rates	2002	2006	60	4	15.5[0.05]	6.8[0.01]	8.7[0.31]	6.8[0.01]	-4.64	0.00	1.07	-0.48[0.00]	-3.52	yes
	Deposit Rates	2003	2007	60	2	15.6[0.05]	2.9[0.09]	12.7[0.09]	2.9[0.09]	-5.24	0.00	1.27	-0.54[0.00]	-3.49	yes
	Deposit Rates	2004	2008	60						-1.92	0.05	0.84	-0.33[0.01]	-2.71	yes
	Deposit Rates	1999	2008	120						-5.89	0.00	0.87	-0.39[0.00]	-4.60	yes
	Lending Rates	1999	2003	60	5	15.0[0.06]	5.4[0.02]	9.5[0.24]	5.4[0.02]	-1.40	0.15	0.66	-0.22[0.05]	-2.04	yes
	Lending Rates	2000	2004	60						-3.02	0.00	0.57	-0.29[0.01]	-2.81	yes
	Lending Rates	2001	2005	60						-3.79	0.00	0.64	-0.55[0.00]	-4.60	yes
	Lending Rates	2002	2006	60	10	46.8[0.00]	3.2[0.07]	43.6[0.00]	3.2[0.07]	-4.68	0.00	1.09	-0.74[0.00]	-4.72	yes
	Lending Rates	2003	2007	60						-4.33	0.00	0.96	-0.73[0.00]	-5.09	yes
	Lending Rates	2004	2008	60	4	9.0[0.37]	0.0[0.91]	9.0[0.29]	0.0[0.91]	-3.38	0.00	0.69	-0.41[0.00]	-3.86	yes
	Lending Rates	1999	2008	120	9	18.1[0.02]	3.4[0.06]	14.6[0.04]	3.4[0.06]	-4.43	0.00	0.58	-0.21[0.00]	-3.03	yes
Burundi	Deposit Rates	1999	2003	60						-2.42	0.02	0.36	-0.14[0.07]	-1.85	no
	Deposit Rates	2000	2004	60	1	8.2[0.44]	1.0[0.31]	7.2[0.46]	1.0[0.31]	-1.37	0.16	0.32	-0.07[0.43]	-0.79	no
	Deposit Rates	2001	2005	60	1	8.3[0.44]	3.5[0.06]	4.8[0.77]	3.5[0.06]	-2.56	0.01	0.40	-0.19[0.03]	-2.23	yes
	Deposit Rates	2002	2006	60	2	7.1[0.57]	0.1[0.75]	7.0[0.49]	0.1[0.75]	-2.50	0.01	0.33	-0.15[0.05]	-1.97	yes
	Deposit Rates	2003	2007	60	2	12.7[0.13]	0.1[0.80]	12.6[0.09]	0.1[0.80]	-2.90	0.00	0.76	-0.29[0.01]	-2.58	yes
	Deposit Rates	2004	2008	60	1	18.6[0.22]	1.0[0.31]	17.6[0.01]	1.0[0.31]	1.30	0.95	0.33	0.35[0.01]	0.01	no
	Deposit Rates	1999	2008	120	1	25.7[0.00]	2.1[0.15]	23.7[0.00]	2.0[0.15]	2.74	1.00	0.29	0.26[0.00]	3.61	no
	Lending Rates	1999	2003	60	1	36.4[0.00]	3.8[0.05]	32.6[0.00]	3.8[0.05]	-2.12	0.03	0.28	-0.08[0.26]	-1.13	no
	Lending Rates	2000	2004	60	1	38.9[0.00]	3.7[0.06]	35.2[0.00]	3.7[0.06]	-1.95	0.05	0.28	-0.08[0.24]	-1.18	no
	Lending Rates	2001	2005	60	2	18.1[0.02]	3.5[0.06]	14.6[0.04]	3.5[0.06]	-5.90	0.00	1.48	-0.55[0.00]	-3.58	yes
	Lending Rates	2002	2006	60	1	29.3[0.00]	2.8[0.09]	26.5[0.00]	2.8[0.09]	-5.47	0.00	1.34	-0.61[0.00]	-3.46	yes
	Lending Rates	2003	2007	60	1	23.2[0.00]	0.8[0.39]	22.4[0.00]	0.8[0.39]	-6.99	0.00	1.79	-0.88[0.00]	-4.63	yes

Country	Interest Rates	Rolling Sample		Obs	K	Johansen Method				EG	Prob.	CRDW	ECM(s)		CoInt?
		From	To			Trace		Max					Coef	t-stat	
						r<0	r<1	r<0	r<1						
	Lending Rates	2004	2008	60						-7.34	0.00	1.92	-1.01[0.00]	-4.94	yes
	Lending Rates	1999	2008	120	3	23.2[0.00]	3.0[0.08]	20.1[0.01]	3.0[0.08]	-3.63	0.00	0.82	-0.28[0.00]	-3.53	yes
Rwanda	Deposit Rates	1999	2003	60	1	11.1[0.20]	4.3[0.04]	6.9[0.51]	4.3[0.04]	-2.47	0.01	0.18	-0.15[0.01]	-2.60	yes
	Deposit Rates	2000	2004	60	1	9.1[0.36]	2.3[0.13]	6.8[0.51]	2.3[0.13]	-2.50	0.01	0.34	-0.15[0.05]	-1.98	yes
	Deposit Rates	2001	2005	60	12	12.4[0.14]	1.5[0.22]	10.9[0.16]	1.5[0.22]	-1.05	0.26	0.23	0.00[0.99]	0.01	no
	Deposit Rates	2002	2006	60	5	21.3[0.01]	1.0[0.32]	20.3[0.01]	1.0[0.32]	-2.15	0.03	0.22	-0.12[0.04]	-2.06	yes
	Deposit Rates	2003	2007	60	1	5.4[0.76]	0.0[0.86]	5.4[0.69]	0.0[0.86]	-2.79	0.01	0.64	-0.13[0.21]	-1.26	no
	Deposit Rates	2004	2008	60	9	27.1[0.00]	3.6[0.06]	23.5[0.00]	3.6[0.06]	-2.67	0.01	0.43	-0.04[0.40]	-0.85	no
	Deposit Rates	1999	2008	120	3	10.6[0.24]	3.2[0.08]	7.5[0.44]	3.2[0.08]	-1.19	0.21	0.08	-0.01[0.60]	-0.53	no
	Lending Rates	1999	2003	60	1	36.4[0.00]	3.8[0.05]	32.6[0.00]	3.8[0.05]	-8.36	0.00	2.18	-1.20[0.00]	-5.84	yes
	Lending Rates	2000	2004	60	1	38.9[0.00]	3.7[0.06]	35.2[0.00]	3.7[0.06]	-8.60	0.00	2.22	-1.26[0.00]	-6.14	yes
	Lending Rates	2001	2005	60	2	18.1[0.02]	3.5[0.06]	14.6[0.04]	3.5[0.06]	-8.23	0.00	2.15	-1.11[0.00]	-5.58	yes
	Lending Rates	2002	2006	60	1	29.3[0.00]	2.8[0.09]	26.5[0.00]	2.8[0.09]	-8.31	0.00	2.17	-1.13[0.00]	-5.75	yes
	Lending Rates	2003	2007	60	1	23.2[0.00]	0.8[0.39]	22.4[0.00]	0.8[0.39]	-8.62	0.00	2.20	-1.08[0.00]	-5.47	yes
	Lending Rates	2004	2008	60						-6.12	0.00	1.56	-0.74[0.00]	-4.25	yes
	Lending Rates	1999	2008	120	3	23.2[0.00]	3.0[0.08]	20.1[0.01]	3.0[0.08]	-10.73	0.00	1.97	-0.97[0.00]	-7.38	yes

Notes: The Parentheses are used to indicate probability values.

EG - Engle-Granger Method.

CRDW - Cointegrating Regression Durbin-Watson.

**APPENDIX F:
LONG-RUN ROLLING REGRESSION SUMMARY**

Table F1: Long-Run Model Analysis

Country	Interest Rates	Rolling Sample		Intercept		Slope		Adj. R2	DW
		From	To	Coeff	t-stat	Coeff	t-stat		
Kenya	Deposit Rates	1999	2003	2.86	5.89	0.39	8.82	0.57	0.17
	Deposit Rates	2000	2004	1.96	6.97	0.42	13.94	0.77	0.24
	Deposit Rates	2001	2005	2.33	12.62	0.33	14.99	0.79	0.31
	Deposit Rates	2002	2006	2.41	11.31	0.33	10.61	0.65	0.24
	Deposit Rates	2003	2007	2.46	10.66	0.34	9.18	0.59	0.19
	Deposit Rates	2004	2008	1.56	6.26	0.47	12.88	0.74	0.26
	Deposit Rates	1999	2008	2.00	7.87	0.44	16.10	0.68	0.18
	Lending Rates	1999	2003	14.88	28.86	0.49	10.59	0.65	0.25
	Lending Rates	2000	2004	12.70	25.11	0.64	11.86	0.70	0.22
	Lending Rates	2001	2005	12.41	19.29	0.49	6.38	0.40	0.06
	Lending Rates	2002	2006	12.91	17.90	0.31	2.92	0.11	0.05
	Lending Rates	2003	2007	-0.10	-1.64	0.03	0.27	0.14	2.04
	Lending Rates	2004	2008	12.59	51.41	0.05	2.97	0.12	0.17
	Lending Rates	1999	2008	10.56	18.70	0.72	11.78	0.54	0.09
Tanzania	Deposit Rates	1999	2003	-0.46	-0.79	0.47	10.27	0.64	0.28
	Deposit Rates	2000	2004	-0.34	-0.54	0.41	7.96	0.51	0.28
	Deposit Rates	2001	2005	2.50	5.13	0.13	3.19	0.13	0.42
	Deposit Rates	2002	2006	0.25	0.42	0.31	7.27	0.47	0.39
	Deposit Rates	2003	2007	-2.09	-2.61	-0.05	9.66	0.61	0.52
	Deposit Rates	2004	2008	2.13	1.62	0.27	3.35	0.15	0.19
	Deposit Rates	1999	2008	0.52	0.94	0.38	9.88	0.45	0.23
	Lending Rates	1999	2003	14.04	11.34	0.08	4.08	0.21	0.08
	Lending Rates	2000	2004	15.50	9.55	0.01	1.17	0.01	0.04
	Lending Rates	2001	2005	20.57	17.18	-0.38	-3.85	0.19	0.08
	Lending Rates	2002	2006	15.83	29.73	-0.02	-1.24	0.01	0.22
	Lending Rates	2003	2007	12.54	29.14	-0.18	6.14	0.38	0.48
	Lending Rates	2004	2008	12.38	23.95	-0.20	5.58	0.34	0.56
	Lending Rates	1999	2008	17.07	16.44	-0.07	-0.02	-0.01	0.04
Uganda	Deposit Rates	1999	2003	4.24	7.54	0.28	8.12	0.52	0.94
	Deposit Rates	2000	2004	3.22	6.01	0.32	10.13	0.63	1.06
	Deposit Rates	2001	2005	2.88	5.13	0.35	9.83	0.62	1.09
	Deposit Rates	2002	2006	3.10	5.00	0.34	8.61	0.55	1.07
	Deposit Rates	2003	2007	4.92	5.71	0.25	4.76	0.27	1.27
	Deposit Rates	2004	2008	3.55	2.77	0.36	4.37	0.24	0.84
	Deposit Rates	1999	2008	4.32	8.88	0.29	9.57	0.43	0.87
	Lending Rates	1999	2003	19.08	23.60	0.13	2.59	0.09	0.66
	Lending Rates	2000	2004	18.11	22.89	0.17	3.69	0.18	0.57
	Lending Rates	2001	2005	18.43	23.42	0.12	2.36	0.07	0.64
	Lending Rates	2002	2006	18.30	29.99	0.07	1.88	0.04	1.09
	Lending Rates	2003	2007	17.27	20.83	0.13	2.62	0.09	0.96
	Lending Rates	2004	2008	15.53	14.49	0.27	3.93	0.20	0.69
	Lending Rates	1999	2008	18.24	28.90	0.14	3.50	0.09	0.58
Burundi	Deposit Rates	1999	2003	4.17	24.35	-0.13	-6.86	0.44	0.36
	Deposit Rates	2000	2004	3.69	13.79	-1.39	-2.69	0.10	0.32
	Deposit Rates	2001	2005	2.62	5.81	0.02	0.76	-0.01	0.40
	Deposit Rates	2002	2006	3.82	14.83	-0.06	-3.15	0.13	0.33
	Deposit Rates	2003	2007	4.73	48.60	-0.11	-16.06	0.81	0.76
	Deposit Rates	2004	2008	5.86	15.31	0.67	-6.30	0.40	0.33
	Deposit Rates	1999	2008	5.70	22.65	0.58	-9.87	0.45	0.29
	Lending Rates	1999	2003	3.78	2.45	-0.34	8.68	0.56	0.28
	Lending Rates	2000	2004	4.61	2.08	-0.26	5.93	0.37	0.28
	Lending Rates	2001	2005	9.44	1.97	0.60	1.84	0.04	1.34

Country	Interest Rates	Rolling Sample		Intercept		Slope		Adj. R2	DW
		From	To	Coeff	t-stat	Coeff	t-stat		
	Lending Rates	2002	2006	12.14	4.86	0.43	2.47	0.08	1.48
	Lending Rates	2003	2007	14.09	14.06	0.27	3.71	0.18	1.79
	Lending Rates	2004	2008	13.57	15.86	0.31	4.58	0.25	1.92
	Lending Rates	1999	2008	12.16	14.70	0.39	6.24	0.24	0.82
Rwanda	Deposit Rates	1999	2003	8.65	10.50	0.06	0.85	0.00	0.18
	Deposit Rates	2000	2004	11.23	23.65	-0.13	-3.66	0.17	0.34
	Deposit Rates	2001	2005	11.38	14.22	-0.27	-2.57	0.09	0.23
	Deposit Rates	2002	2006	5.80	4.89	0.24	2.69	0.10	0.22
	Deposit Rates	2003	2007	-0.05	-0.06	-0.31	10.43	0.65	0.64
	Deposit Rates	2004	2008	-0.72	-0.63	-0.23	7.71	0.50	0.43
	Deposit Rates	1999	2008	6.23	5.97	-0.15	2.33	0.04	0.08
	Lending Rates	1999	2003	16.78	17.82	-0.04	-0.54	-0.01	2.18
	Lending Rates	2000	2004	17.12	19.06	-0.07	-1.02	0.00	2.22
	Lending Rates	2001	2005	16.20	15.42	-0.01	-0.13	-0.02	2.15
	Lending Rates	2002	2006	15.99	12.06	0.00	-0.01	-0.02	2.17
	Lending Rates	2003	2007	15.25	13.87	0.05	0.61	-0.01	2.20
	Lending Rates	2004	2008	16.71	26.53	-0.06	-1.16	0.01	1.56
	Lending Rates	1999	2008	17.08	30.39	-0.08	-1.70	0.02	1.97

**APPENDIX G:
SHORT-RUN ROLLING REGRESSION MODEL SUMMARY**

Table G1: Short-Run Model Analysis

Country	Interest Rates	Rolling Sample		Intercept		Slope		Lag Dep		Adj. R2	DW	ECT _{t-1}		ML
		From	To	Coeff	t-stat	Coeff	t-stat	Coef	t-stat			Coeff	t-stat	
Kenya	Deposit Rates	1999	2003	-0.10	-1.38	0.25	5.08	0.11	1.15	0.45	2.09	-0.20	-3.80	3.68
	Deposit Rates	2000	2004	-0.14	-2.59	0.19	3.88	-0.14	-1.41	0.47	1.65	-0.29	-4.93	2.82
	Deposit Rates	2001	2005	-0.02	-0.52	0.04	1.02	0.03	0.26	0.26	1.99	-0.23	-4.26	4.16
	Deposit Rates	2002	2006	-0.01	-0.35	0.04	0.92	0.10	0.82	0.25	2.02	-0.20	-3.80	4.73
	Deposit Rates	2003	2007	0.01	0.26	0.06	1.39	0.06	1.39	0.27	2.19	-0.16	-3.43	-5.87
	Deposit Rates	2004	2008	0.04	2.13	0.09	2.40	0.03	0.31	0.45	2.07	-0.20	-5.20	4.55
	Deposit Rates	1999	2008	-0.21	-5.82	0.23	6.68	0.08	1.10	0.46	2.05	-0.21	-5.82	3.67
	Lending Rates	1999	2003	-0.11	-1.53	0.07	1.32	0.08	0.69	0.39	1.90	-0.12	-2.32	7.73
	Lending Rates	2000	2004	-0.21	-2.89	0.11	1.67	-0.04	-0.36	0.25	1.93	-0.14	-3.40	6.40
	Lending Rates	2001	2005	-0.10	-1.53	0.10	1.34	0.00	-0.03	0.10	2.05	-0.06	-2.15	13.82
	Lending Rates	2002	2006	-0.09	-1.28	0.08	0.91	0.03	0.20	0.09	2.04	-0.07	-2.14	13.83
	Lending Rates	2003	2007	-0.10	1.64	0.03	0.27	0.05	0.37	0.14	2.04	-0.12	-2.56	8.17
	Lending Rates	2004	2008	0.03	0.85	0.02	0.43	0.05	0.33	-0.03	1.85			
	Lending Rates	1999	2008	-0.06	-1.63	0.07	1.88	0.04	0.53	0.35	1.95	-0.06	-3.76	15.03
Tanzania	Deposit Rates	1999	2003	-0.09	-1.38	0.12	2.11	-0.31	-2.66	0.29	2.04	-0.19	-3.80	4.57
	Deposit Rates	2000	2004	-0.07	-0.90	0.10	1.08	-0.28	-2.28	0.26	1.98			
	Deposit Rates	2001	2005	-0.03	-0.43	0.23	1.89	0.00	-0.01	0.14	1.91	-0.21	-2.32	3.72
	Deposit Rates	2002	2006	0.04	0.54	0.07	0.86	-0.02	-0.12	0.04	1.97	-0.16	-2.05	5.67
	Deposit Rates	2003	2007	0.10	1.22	0.01	0.22	-0.05	-0.38	0.03	2.05			
	Deposit Rates	2004	2008	0.06	0.71	-0.02	-0.45	-0.13	-0.99	0.05	2.06	-0.10	-2.19	9.51
	Deposit Rates	1999	2008	-0.01	-0.19	0.03	0.83	-0.17	-1.99	0.14	2.02	-0.14	-4.01	7.13
	Lending Rates	1999	2003	-0.14	-1.62	0.07	0.90	0.07	0.90	-0.03	1.98			
	Lending Rates	2000	2004	-0.09	-1.08	0.06	0.55	0.01	0.06	-0.02	1.98			
	Lending Rates	2001	2005	-0.14	-2.01	-0.07	-0.62	-0.04	-0.35	0.12	1.87	-0.11	-3.21	8.27
	Lending Rates	2002	2006	0.00	-0.07	-0.03	-0.45	-0.02	-0.11	0.01	2.01			
	Lending Rates	2003	2007	0.01	0.24	0.02	0.48	-0.18	-1.26	0.04	1.90			

Country	Interest Rates	Rolling Sample		Intercept		Slope		Lag Dep		Adj. R2	DW	ECT _{t-1}		ML
		From	To	Coeff	t-stat	Coeff	t-stat	Coef	t-stat			Coeff	t-stat	
	Lending Rates	2004	2008	0.05	0.80	0.03	0.73	-0.19	-1.23	0.07	1.77			
	Lending Rates	1999	2008	-0.03	-1.69	0.03	0.68	-0.07	-0.74	0.01	1.92			
Uganda	Deposit Rates	1999	2003	-0.02	-0.10	0.15	2.41	-0.13	-1.06	0.31	1.96	-0.47	-3.94	1.80
	Deposit Rates	2000	2004	-0.01	-0.05	0.26	3.98	-0.11	-0.96	0.37	1.95	-0.48	-3.76	1.55
	Deposit Rates	2001	2005	-0.02	-0.12	0.28	3.53	-0.06	-0.50	0.38	1.73	-0.52	-3.98	1.40
	Deposit Rates	2002	2006	-0.05	-0.33	0.51	4.37	-0.13	-1.01	0.39	2.08	-0.48	-3.52	1.01
	Deposit Rates	2003	2007	0.01	0.04	0.49	4.20	-0.14	-1.08	0.42	2.09	-0.54	-3.49	0.94
	Deposit Rates	2004	2008	0.06	0.44	0.60	5.39	-0.27	-2.25	0.41	2.33	-0.33	-2.71	1.20
	Deposit Rates	1999	2008	-0.01	-0.08	0.23	4.29	-0.16	-1.86	0.31	2.01	-0.39	-4.60	1.99
	Lending Rates	1999	2003	-0.02	-0.12	-0.10	-1.19	-0.31	-2.57	0.29	2.10	-0.22	-2.04	4.11
	Lending Rates	2000	2004	-0.05	-0.25	0.07	0.88	-0.19	-1.59	0.21	2.07	-0.29	-2.81	3.24
	Lending Rates	2001	2005	-0.19	-1.07	-0.14	-1.38	-0.13	-1.15	0.33	2.09	-0.55	-4.60	1.56
	Lending Rates	2002	2006	0.00	-0.03	-0.21	-1.61	0.03	0.20	0.33	2.00	-0.74	-4.72	1.06
	Lending Rates	2003	2007	0.04	0.26	-0.18	-1.55	0.10	0.81	0.33	1.89	-0.73	-5.09	1.12
	Lending Rates	2004	2008	-0.06	-0.56	0.06	0.65	0.05	0.36	0.21	1.95	-0.41	-3.86	2.28
	Lending Rates	1999	2008	-0.02	-0.21	-0.07	-1.24	-0.25	-2.91	0.26	2.03	-0.21	-3.03	4.42
Burundi	Deposit Rates	1999	2003	-0.01	-1.13	-0.01	-0.26	-0.13	-0.96	0.11	2.10			
	Deposit Rates	2000	2004	0.00	0.37	-0.01	-0.20	-0.14	-0.92	-0.01	1.89			
	Deposit Rates	2001	2005	0.00	-0.03	-0.01	-0.22	-0.09	-0.65	0.06	2.01	-0.19	-2.23	5.10
	Deposit Rates	2002	2006	0.01	0.91	-0.02	-0.63	-0.12	-0.92	0.06	2.07	-0.15	-1.97	6.36
	Deposit Rates	2003	2007	0.01	1.14	-0.01	-0.29	-0.08	-0.52	0.09	1.72	-0.29	-2.58	3.38
	Deposit Rates	2004	2008	0.07	2.10	0.06	0.86	0.63	2.61	0.38	2.04			
	Deposit Rates	1999	2008	0.03	1.92	0.05	1.11	0.55	3.48	0.31	1.91			
	Lending Rates	1999	2003	0.04	0.48	0.38	1.75	-0.21	-1.13	0.09	1.90			
	Lending Rates	2000	2004	0.05	0.69	0.38	1.68	-0.16	-1.20	0.06	1.92			
	Lending Rates	2001	2005	0.04	0.24	0.83	1.06	-0.20	-1.49	0.34	2.06	-0.55	-3.46	0.30
	Lending Rates	2002	2006	-0.01	-0.05	0.55	1.12	-0.17	-1.21	0.35	2.07	-0.61	-3.58	0.74
	Lending Rates	2003	2007	-0.03	-0.19	0.38	0.95	-0.06	-0.43	0.43	2.03	-0.88	-4.63	0.65
	Lending Rates	2004	2008	0.04	0.22	0.44	1.11	0.01	0.10	0.45	1.97	-1.01	-4.94	0.55
	Lending Rates	1999	2008	0.01	0.12	0.17	0.67	-0.33	-3.80	0.28	2.12	-0.28	-3.53	2.94

Country	Interest Rates	Rolling Sample		Intercept		Slope		Lag Dep		Adj. R2	DW	ECT _{t-1}		ML
		From	To	Coeff	t-stat	Coeff	t-stat	Coef	t-stat			Coeff	t-stat	
Rwanda	Deposit Rates	1999	2003	0.03	0.81	0.02	0.35	0.02	0.16	0.06	2.01	-0.15	-2.60	6.66
	Deposit Rates	2000	2004	0.01	0.27	-0.05	1.09	-0.13	-0.98	0.06	1.99	-0.15	-1.98	6.28
	Deposit Rates	2001	2005	-0.04	-1.29	-0.07	-1.18	-0.29	-1.94	0.04	1.99			
	Deposit Rates	2002	2006	-0.04	-1.30	-0.02	-0.17	-0.25	-1.96	0.11	2.00	-0.12	-2.06	8.26
	Deposit Rates	2003	2007	-0.05	-1.30	0.01	0.04	-0.31	-2.22	0.12	1.85			
	Deposit Rates	2004	2008	-0.05	-1.16	0.04	0.59	-0.22	-1.57	0.02	1.83			
	Deposit Rates	1999	2008	-0.01	-0.45	0.02	0.46	-0.15	-1.51	0.00	1.95			
	Lending Rates	1999	2003	0.00	-0.03	0.01	0.05	0.10	0.69	0.52	1.95	-1.20	-5.84	0.82
	Lending Rates	2000	2004	-0.01	-0.13	-0.03	-0.19	0.13	0.95	0.54	1.96	-1.26	-6.14	0.77
	Lending Rates	2001	2005	-0.01	-0.12	0.07	0.43	0.04	0.26	0.52	2.01	-1.11	-5.58	0.83
	Lending Rates	2002	2006	-0.02	-0.17	-0.28	-1.06	0.03	0.19	0.53	1.98	-1.13	-5.75	0.64
	Lending Rates	2003	2007	-0.02	-0.34	-0.40	-1.33	-0.07	-0.56	0.56	1.79	-1.08	-5.47	0.55
	Lending Rates	2004	2008	0.01	0.17	0.00	-0.04	-0.05	-0.38	0.35	2.00	-0.74	-4.25	1.35
	Lending Rates	1999	2008	0.00	-0.01	0.01	0.15	-0.01	-0.07	0.48	2.01	-0.97	-7.38	1.01

APPENDIX H:
ASYMMETRIC ERROR CORRECTION TERMS AND MEAN ADJUSTMENT LAGS SUMMARY

Table H1: Asymmetric error correction terms and mean adjustment lags

Country	Interest Rates	Asymmetric error correction terms									
		Rolling Sample		ECT ⁺ _{t-1}		ECT ⁻ _{t-1}		Wald Test		ML	
		From	To	Coeff	t-stat	Coeff	t-stat	F-stat	PV	ML ⁺	ML ⁻
Kenya	Deposit Rates	1999	2003	-0.30	-3.04	-0.04	-0.23	1.28	0.26	2.60	20.97
	Deposit Rates	2000	2004	-0.37	-4.05	-0.12	-0.76	1.38	0.25	2.20	6.87
	Deposit Rates	2001	2005	-0.23	-2.08	-0.23	-2.08	0.00	0.96	4.24	4.08
	Deposit Rates	2002	2006	-0.23	-2.00	-0.18	-1.74	0.10	0.76	4.05	5.42
	Deposit Rates	2003	2007	-0.24	-1.97	-0.10	-1.16	0.50	0.48	3.88	8.85
	Deposit Rates	2004	2008	-0.17	-1.70	-0.22	-3.26	0.14	0.71	5.49	4.14
	Deposit Rates	1999	2008	-0.27	-5.20	-0.10	-1.37	2.58	0.11	2.83	7.47
	Lending Rates	1999	2003	-0.21	-2.36	0.02	0.15	1.47	0.23	4.56	48.80
	Lending Rates	2000	2004	-0.27	-4.16	0.04	0.48	6.28	0.02	3.34	22.93
	Lending Rates	2001	2005	-0.22	-2.83	0.04	0.64	4.68	0.04	4.10	26.28
	Lending Rates	2002	2006	-0.09	-1.30	-0.03	-0.36	0.16	0.69	10.09	28.40
	Lending Rates	2003	2007	-0.13	-2.32	-0.09	-0.69	0.06	0.80	7.69	10.90
	Lending Rates	2004	2008								
	Lending Rates	1999	2008	-0.16	-4.94	0.04	1.12	12.04	0.00	5.79	25.53
Tanzania	Deposit Rates	1999	2003	-0.31	-3.06	-0.07	-0.69	1.78	0.19	2.82	12.18
	Deposit Rates	2000	2004	-0.27	-4.16	0.04	0.48	6.28	0.02	3.34	22.93
	Deposit Rates	2001	2005	-0.08	-0.43	-0.34	-1.79	0.60	0.44	9.42	2.26
	Deposit Rates	2002	2006	0.02	0.13	-0.43	-2.68	3.63	0.06	61.56	2.27
	Deposit Rates	2003	2007								
	Deposit Rates	2004	2008	-0.16	-1.61	-0.03	-0.27	0.44	0.51	6.04	31.03
	Deposit Rates	1999	2008	0.16	-2.47	-0.11	-1.44	0.21	0.65	6.00	9.13

Country	Interest Rates	Rolling Sample		ECT ⁺ _{t-1}		ECT ⁻ _{t-1}		Wald Test		ML	
		From	To	Coeff	t-stat	Coeff	t-stat	F-stat	PV	ML ⁺	ML ⁻
	Lending Rates	1999	2003								
	Lending Rates	2000	2004								
	Lending Rates	2001	2005	-0.13	-2.09	-0.09	-1.02	0.07	0.80	7.46	10.18
	Lending Rates	2002	2006								
	Lending Rates	2003	2007								
	Lending Rates	2004	2008								
	Lending Rates	1999	2008								
Uganda	Deposit Rates	1999	2003	-0.73	-3.39	-0.22	-1.02	2.05	0.16	1.16	3.91
	Deposit Rates	2000	2004	-0.64	-2.91	-0.29	-1.14	0.81	0.37	1.15	2.59
	Deposit Rates	2001	2005	-0.60	-2.54	-0.43	-1.73	0.18	0.68	1.21	1.69
	Deposit Rates	2002	2006	-0.80	-3.31	-0.20	-0.89	2.47	0.12	0.61	2.42
	Deposit Rates	2003	2007	-0.93	-3.47	-0.26	-1.16	3.07	0.09	0.53	1.91
	Deposit Rates	2004	2008	-0.29	-1.32	-0.37	-1.71	0.05	0.83	1.35	1.07
	Deposit Rates	1999	2008	-0.51	-3.20	-0.28	-1.89	0.83	0.36	1.52	2.79
	Lending Rates	1999	2003	-0.18	-0.84	-0.25	-1.37	0.05	0.82	5.05	3.56
	Lending Rates	2000	2004	-0.23	-1.14	-0.35	-1.82	0.13	0.72	4.12	2.69
	Lending Rates	2001	2005	-0.57	-2.87	-0.53	-2.55	0.01	0.93	1.51	1.60
	Lending Rates	2002	2006	-0.72	-2.99	-0.77	-2.83	0.01	0.91	1.09	1.03
	Lending Rates	2003	2007	-0.69	-3.26	-0.79	-3.30	0.08	0.77	1.20	1.05
	Lending Rates	2004	2008	-0.41	-2.36	-0.42	-1.66	0.00	0.98	2.31	2.25
	Lending Rates	1999	2008	-0.21	-1.77	-0.19	-1.28	0.01	0.93	4.49	4.96
Burundi	Deposit Rates	1999	2003								
	Deposit Rates	2000	2004								
	Deposit Rates	2001	2005	-0.14	-0.84	-0.26	-1.38	0.16	0.69	7.11	3.78
	Deposit Rates	2002	2006	-0.38	-2.21	-0.01	-0.08	2.14	0.15	2.60	97.06
	Deposit Rates	2003	2007	-0.46	-1.71	-0.19	-0.98	0.46	0.50	2.16	5.26
	Deposit Rates	2004	2008								

Country	Interest Rates	Rolling Sample		ECT ⁺ _{t-1}		ECT ⁻ _{t-1}		Wald Test		ML	
		From	To	Coeff	t-stat	Coeff	t-stat	F-stat	PV	ML ⁺	ML ⁻
	Deposit Rates	1999	2008								
	Lending Rates	1999	2003								
	Lending Rates	2000	2004								
	Lending Rates	2001	2005	-0.22	-0.71	-0.79	-3.15	1.49	0.23	0.33	0.09
	Lending Rates	2002	2006	-0.26	-0.78	-0.83	-3.43	1.57	0.22	1.67	0.52
	Lending Rates	2003	2007	-0.77	-2.11	-0.92	-3.81	0.10	0.75	0.82	0.68
	Lending Rates	2004	2008	-1.00	-2.48	-1.01	-4.21	0.00	0.98	0.56	0.55
	Lending Rates	1999	2008	-0.04	-0.25	-0.48	-3.32	2.72	0.10	20.88	1.81
Rwanda	Deposit Rates	1999	2003	-0.03	-0.21	-0.26	-2.35	1.42	0.24	38.93	3.74
	Deposit Rates	2000	2004	-0.12	-0.77	-0.19	-1.15	0.07	0.79	8.17	5.02
	Deposit Rates	2001	2005								
	Deposit Rates	2002	2006	-0.10	-1.08	-0.15	-1.25	0.09	0.77	9.97	6.56
	Deposit Rates	2003	2007								
	Deposit Rates	2004	2008								
	Deposit Rates	1999	2008								
	Lending Rates	1999	2003	-1.10	-3.41	-1.16	-4.19	0.02	0.90	0.89	0.85
	Lending Rates	2000	2004	-1.31	-4.27	-1.22	-4.25	0.05	0.82	0.74	0.80
	Lending Rates	2001	2005	-1.23	-4.14	-1.00	-3.38	0.27	0.60	0.75	0.92
	Lending Rates	2002	2006	-1.15	-3.43	-1.13	-3.90	0.00	0.96	0.63	0.64
	Lending Rates	2003	2007	-1.36	-4.14	-0.86	-3.00	1.14	0.29	0.50	0.78
	Lending Rates	2004	2008	-0.83	-2.31	-0.68	-2.61	0.08	0.78	1.20	1.46
	Lending Rates	1999	2008	-1.01	-4.99	-0.94	-4.94	0.05	0.82	0.98	1.04

**APPENDIX I:
APPENDIX I: SUMMARY OF INTEREST RATE PASS-THROUGH ANALYSIS**

Table 11: Interest Rate Pass-through Analysis

Country	Interest Rates	Rolling Sample		Long-Run PT				Short-Run PT		ECT _{t-1} (s)		ML	ECT ⁺ _{t-1}		ECT ⁻ _{t-1}		ML			
		From	To	JJ	EG	CRDW	Kremers	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	ML ⁺	ML ⁻	
Kenya	Deposit Rates	1999	2003	no	yes	no	yes	0.39	8.82	0.25	5.08	-0.20	-3.80	3.68	-0.30	-3.04	-0.04	-0.23	2.60	20.97
	Deposit Rates	2000	2004	yes	no	no	yes	0.42	13.94	0.19	3.88	-0.29	-4.93	2.82	-0.37	-4.05	-0.12	-0.76	2.20	6.87
	Deposit Rates	2001	2005	yes	no	no	yes	0.33	14.99	0.04	1.02	-0.23	-4.26	4.16	-0.23	-2.08	-0.23	-2.08	4.24	4.08
	Deposit Rates	2002	2006	yes	no	no	yes	0.33	10.61	0.04	0.92	-0.20	-3.80	4.73	-0.23	-2.00	-0.18	-1.74	4.05	5.42
	Deposit Rates	2003	2007	yes	no	no	yes	0.34	9.18	0.06	1.39	-0.16	-3.43	-5.87	-0.24	-1.97	-0.10	-1.16	3.88	8.85
	Deposit Rates	2004	2008	no	no	no	yes	0.47	12.88	0.09	2.40	-0.20	-5.20	4.55	-0.17	-1.70	-0.22	-3.26	5.49	4.14
	Deposit Rates	1999	2008	no	yes	no	yes	0.44	16.10	0.23	6.68	-0.21	-5.82	3.67	-0.27	-5.20	-0.10	-1.37	2.83	7.47
Kenya	Lending Rates	1999	2003	no	no	no	yes	0.49	10.59	0.07	1.32	-0.12	-2.32	7.73	-0.21	-2.36	0.02	0.15	4.56	48.80
	Lending Rates	2000	2004	no	no	no	yes	0.64	11.86	0.11	1.67	-0.14	-3.40	6.40	-0.27	-4.16	0.04	0.48	3.34	22.93
	Lending Rates	2001	2005	no	no	no	yes	0.49	6.38	0.10	1.34	-0.06	-2.15	13.82	-0.22	-2.83	0.04	0.64	4.10	26.28
	Lending Rates	2002	2006	no	no	no	yes	0.31	2.92	0.08	0.91	-0.07	-2.14	13.83	-0.09	-1.30	-0.03	-0.36	10.09	28.40
	Lending Rates	2003	2007	no	yes	no	yes	0.03	0.27	0.03	0.27	-0.12	-2.56	8.17	-0.13	-2.32	-0.09	-0.69	7.69	10.90
	Lending Rates	2004	2008	no	no	no	no	0.05	2.97	0.02	0.43									
	Lending Rates	1999	2008	yes	no	no	yes	0.72	11.78	0.07	1.88	-0.06	-3.76	15.03	-0.16	-4.94	0.04	1.12	5.79	25.53
Tanzania	Deposit Rates	1999	2003	no	no	no	yes	0.47	10.27	0.12	2.11	-0.19	-3.80	4.57	-0.31	-3.06	-0.07	-0.69	2.82	12.18
	Deposit Rates	2000	2004	no	no	no	yes	0.41	7.96	0.10	1.08	-0.22	-3.40	4.11	-0.32	-2.43	-0.12	-0.91	6.04	15.80
	Deposit Rates	2001	2005	yes	no	yes	yes	0.13	3.19	0.23	1.89	-0.21	-2.32	3.72	-0.08	-0.43	-0.34	-1.79	9.42	2.26
	Deposit Rates	2002	2006	yes	yes	yes	yes	0.31	7.27	0.07	0.86	-0.16	-2.05	5.67	0.02	0.13	-0.43	-2.68	61.56	2.27
	Deposit Rates	2003	2007	no	no	yes	no	-0.05	9.66	0.01	0.22									
	Deposit Rates	2004	2008	yes	no	no	yes	0.27	3.35	-0.02	-0.45	-0.10	-2.19	9.51	-0.16	-1.61	-0.03	-0.27	6.04	31.03
	Deposit Rates	1999	2008	yes	no	no	yes	0.38	9.88	0.03	0.83	-0.14	-4.01	7.13	0.16	-2.47	-0.11	-1.44	6.00	9.13
Tanzania	Lending Rates	1999	2003	yes	no	no	no	0.08	4.08	0.07	0.90									
	Lending Rates	2000	2004	yes	no	no	no	0.01	1.17	0.06	0.55									
	Lending Rates	2001	2005	yes	yes	no	yes	-0.38	-3.85	-0.07	-0.62	-0.11	-3.21	8.27	-0.13	-2.09	-0.09	-1.02	7.46	10.18
	Lending Rates	2002	2006	yes	no	no	no	-0.02	-1.24	-0.03	-0.45									
	Lending Rates	2003	2007	yes	no	yes	no	-0.18	6.14	0.02	0.48									
	Lending Rates	2004	2008	no	yes	yes	no	-0.20	5.58	0.03	0.73									
	Lending Rates	1999	2008	no	no	no	no	-0.07	-0.02	0.03	0.68									
Uganda	Deposit Rates	1999	2003	yes	yes	yes	yes	0.28	8.12	0.15	2.41	-0.47	-3.94	1.80	-0.73	-3.39	-0.22	-1.02	1.16	3.91
	Deposit Rates	2000	2004	yes	yes	yes	yes	0.32	10.13	0.26	3.98	-0.48	-3.76	1.55	-0.64	-2.91	-0.29	-1.14	1.15	2.59
	Deposit Rates	2001	2005	no	yes	yes	yes	0.35	9.83	0.28	3.53	-0.52	-3.98	1.40	-0.60	-2.54	-0.43	-1.73	1.21	1.69
	Deposit Rates	2002	2006	no	yes	yes	yes	0.34	8.61	0.51	4.37	-0.48	-3.52	1.01	-0.80	-3.31	-0.20	-0.89	0.61	2.42
	Deposit Rates	2003	2007	no	yes	yes	yes	0.25	4.76	0.49	4.20	-0.54	-3.49	0.94	-0.93	-3.47	-0.26	-1.16	0.53	1.91
	Deposit Rates	2004	2008	no	no	yes	yes	0.36	4.37	0.60	5.39	-0.33	-2.71	1.20	-0.29	-1.32	-0.37	-1.71	1.35	1.07

Country	Interest Rates	Rolling Sample		Long-Run PT		Short-Run PT		ECT _{t-(s)}		ML	ECT ⁺ _{t-1}		ECT ⁻ _{t-1}		ML					
		From	To	JJ	EG	CRDW	Kremers	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	ML ⁺	ML ⁻	
	Deposit Rates	1999	2008	no	yes	yes	yes	0.29	9.57	0.23	4.29	-0.39	-4.60	1.99	-0.51	-3.20	-0.28	-1.89	1.52	2.79
	Lending Rates	1999	2003	no	no	yes	yes	0.13	2.59	-0.10	-1.19	-0.22	-2.04	4.11	-0.18	-0.84	-0.25	-1.37	5.05	3.56
	Lending Rates	2000	2004	no	no	yes	yes	0.17	3.69	0.07	0.88	-0.29	-2.81	3.24	-0.23	-1.14	-0.35	-1.82	4.12	2.69
	Lending Rates	2001	2005	no	yes	yes	yes	0.12	2.36	-0.14	-1.38	-0.55	-4.60	1.56	-0.57	-2.87	-0.53	-2.55	1.51	1.60
	Lending Rates	2002	2006	yes	yes	yes	yes	0.07	1.88	-0.21	-1.61	-0.74	-4.72	1.06	-0.72	-2.99	-0.77	-2.83	1.09	1.03
	Lending Rates	2003	2007	no	yes	yes	yes	0.13	2.62	-0.18	-1.55	-0.73	-5.09	1.12	-0.69	-3.26	-0.79	-3.30	1.20	1.05
	Lending Rates	2004	2008	no	yes	yes	yes	0.27	3.93	0.06	0.65	-0.41	-3.86	2.28	-0.41	-2.36	-0.42	-1.66	2.31	2.25
	Lending Rates	1999	2008	yes	yes	yes	yes	0.14	3.50	-0.07	-1.24	-0.21	-3.03	4.42	-0.21	-1.77	-0.19	-1.28	4.49	4.96
Burundi	Deposit Rates	1999	2003	no	no	yes	no	-0.13	-6.86	-0.01	-0.26									
	Deposit Rates	2000	2004	no	no	yes	no	-1.39	-2.69	-0.01	-0.20									
	Deposit Rates	2001	2005	no	no	yes	yes	0.02	0.76	-0.01	-0.22	-0.19	-2.23	5.10	-0.14	-0.84	-0.26	-1.38	7.11	3.78
	Deposit Rates	2002	2006	no	no	yes	yes	-0.06	-3.15	-0.02	-0.63	-0.15	-1.97	6.36	-0.38	-2.21	-0.01	-0.08	2.60	97.06
	Deposit Rates	2003	2007	no	no	yes	yes	-0.11	-16.06	-0.01	-0.29	-0.29	-2.58	3.38	-0.46	-1.71	-0.19	-0.98	2.16	5.26
	Deposit Rates	2004	2008	no	no	yes	no	0.67	-6.30	0.06	0.86									
	Deposit Rates	1999	2008	yes	no	no	no	0.58	-9.87	0.05	1.11									
	Lending Rates	1999	2003	no	no	no	no	-0.34	8.68	0.38	1.75									
	Lending Rates	2000	2004	no	no	no	no	-0.26	5.93	0.38	1.68									
	Lending Rates	2001	2005	no	yes	yes	yes	0.60	1.84	0.83	1.06	-0.55	-3.46	0.30	-0.22	-0.71	-0.79	-3.15	0.33	0.09
	Lending Rates	2002	2006	yes	yes	yes	yes	0.43	2.47	0.55	1.12	-0.61	-3.58	0.74	-0.26	-0.78	-0.83	-3.43	1.67	0.52
	Lending Rates	2003	2007	yes	yes	yes	yes	0.27	3.71	0.38	0.95	-0.88	-4.63	0.65	-0.77	-2.11	-0.92	-3.81	0.82	0.68
	Lending Rates	2004	2008	yes	yes	yes	yes	0.31	4.58	0.44	1.11	-1.01	-4.94	0.55	-1.00	-2.48	-1.01	-4.21	0.56	0.55
	Lending Rates	1999	2008	no	yes	yes	yes	0.39	6.24	0.17	0.67	-0.28	-3.53	2.94	-0.04	-0.25	-0.48	-3.32	20.88	1.81
Rwanda	Deposit Rates	1999	2003	no	no	no	yes	0.06	0.85	0.02	0.35	-0.15	-2.60	6.66	-0.03	-0.21	-0.26	-2.35	38.93	3.74
	Deposit Rates	2000	2004	no	no	no	yes	-0.13	-3.66	-0.05	1.09	-0.15	-1.98	6.28	-0.12	-0.77	-0.19	-1.15	8.17	5.02
	Deposit Rates	2001	2005	no	no	no	no	-0.27	-2.57	-0.07	-1.18									
	Deposit Rates	2002	2006	yes	no	no	yes	0.24	2.69	-0.02	-0.17	-0.12	-2.06	8.26	-0.10	-1.08	-0.15	-1.25	9.97	6.56
	Deposit Rates	2003	2007	no	no	yes	no	-0.31	10.43	0.01	0.04									
	Deposit Rates	2004	2008	yes	no	yes	no	-0.23	7.71	0.04	0.59									
	Deposit Rates	1999	2008	no	no	no	no	-0.15	2.33	0.02	0.46									
	Lending Rates	1999	2003	yes	yes	yes	yes	-0.04	-0.54	0.01	0.05	-1.20	-5.84	0.82	-1.10	-3.41	-1.16	-4.19	0.89	0.85
	Lending Rates	2000	2004	yes	yes	yes	yes	-0.07	-1.02	-0.03	-0.19	-1.26	-6.14	0.77	-1.31	-4.27	-1.22	-4.25	0.74	0.80
	Lending Rates	2001	2005	yes	yes	yes	yes	-0.01	-0.13	0.07	0.43	-1.11	-5.58	0.83	-1.23	-4.14	-1.00	-3.38	0.75	0.92
	Lending Rates	2002	2006	yes	yes	yes	yes	0.00	-0.01	-0.28	-1.06	-1.13	-5.75	0.64	-1.15	-3.43	-1.13	-3.90	0.63	0.64
	Lending Rates	2003	2007	yes	yes	yes	yes	0.05	0.61	-0.40	-1.33	-1.08	-5.47	0.55	-1.36	-4.14	-0.86	-3.00	0.50	0.78
	Lending Rates	2004	2008	no	yes	yes	yes	-0.06	-1.16	0.00	-0.04	-0.74	-4.25	1.35	-0.83	-2.31	-0.68	-2.61	1.20	1.46
	Lending Rates	1999	2008	yes	yes	yes	yes	-0.08	-1.70	0.01	0.15	-0.97	-7.38	1.01	-1.01	-4.99	-0.94	-4.94	0.98	1.04