MACROECONOMIC CONVERGENCE WITHIN SADC: IMPLICATIONS FOR THE FORMATION OF A REGIONAL MONEATRY UNION

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ABSTRACT

Given the growing effect that globalisation and integration has had upon economies and regions, the process of monetary union has become an increasingly topical issue in economic policy debates. This has been driven in part by the experience and successes of the European Monetary Union (EMU), which is widely perceived as beneficial to member countries. The Southern African Development Community (SADC) is an example of a group of countries that has realised that there are benefits that may arise from economic integration.

This paper makes use of an interest-rate pass through model to investigate whether the pass-through of monetary policy transmission in ten SADC countries has become more similar between January 1990 and December 2007 using monthly interest rate data. This is done to determine the extent of macroeconomic convergence that prevails within SADC, and consequently establish whether the formation of a regional monetary union is feasible.

The results of the empirical pass-through model were robust and show that there are certain countries that have a more efficient and similar monetary transmission process than others. In particular, the countries that form the Common Monetary Area (CMA) and the Southern African Customs Union (SACU) tend to show evidence of convergence in monetary policy transmission, especially since 2000. In addition, from analysis of the long-run pass-through, the results reveal that there is evidence that Malawi and Zambia have shown signs of convergence toward the countries that form the CMA and SACU, in terms of monetary policy transmission.

The study concludes that a SADC wide monetary union is currently not feasible based on the evidence provided from the results of the pass-through analysis. Despite this, it can be tentatively suggested that the CMA may be expanded to include Botswana, Malawi and Zambia.

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ACRONYMS

AU: African Union

ADF: Augmented Dickey Fuller

AIC: Akaike Information Criterion

CBR: Central Bank Rate

CCBG: Committee of Central Bank Governors

CM: Common Market

CMA: Common Monetary Area

CRDW: Cointegrating Durbin-Watson

CU: Customs Union

DF-GLS: Dickey Fuller Generalised Least Squares

ECB: European Central Bank

ECM: Error Correction Model

EG: Engle Granger

EMI: European Monetary Institute

EMU: European Monetary Union

EU: Economic Union

FTA: Free Trade Area

GARCH: Generalised Auto-Regressive Conditional Heteroscedasticity

GDP: Gross Domestic Product

G-PPP: Generalised Purchasing Power Parity

IFS: International Financial Statistics

IMF: International Monetary Fund

LR: Lending Rate

OCA: Optimal Currency Area

PCA: Principal Component Analysis

PP: Phillips-Perron

PPP: Purchasing Power Parity

PTA: Preferential Trade Agreement

RER: Real Exchange Rate

SACU: Southern African Customs Union

SADC: Southern African Development Community

VAR: Vector Autoregression

CHAPTER 1
INTRODUCTION

1.1. CONTEXT OF THE STUDY

From economic literature it is clear that globalisation has had a large impact on the world economy over the past three decades. However, for developing countries the forces of globalisation only became more distinct from the late 1980's and early 1990's. Furthermore, it is of interest to note that the degree to which globalisation causes domestic economies to move together (converge) within a region, such as SADC, has concerned policy makers (Kabundi and Loots, 2005:1).

Given the growing effect that globalisation and integration has had upon economies and regions, the process of forming a monetary union has become an increasingly topical issue in economic policy debates. This is believed to have been driven in part by the experience and successes of the EMU which is widely perceived as being beneficial to member countries (Jefferis, 2007:83). According to Maruping (2005:132), the basic objective that has underpinned the move toward regional integration is to centralise economic and monetary policy, and as a derivative form a monetary union. Furthermore, within Africa there have been several recent monetary integration initiatives and one of the stated goals of the African Union (AU) is to formulate a monetary union consisting of a common currency and one central bank for the entire continent by 2025 (Rossouw, 2006a:382).

This process of monetary unification is to be achieved in stages, starting with each of the sub-regions of the African continent forming regional monetary unions as intermediate goals toward an African Monetary Union (Masson and Pattillo, 2004:9). In particular, the various intermediate stages include macroeconomic convergence, monetary integration and monetary union at the regional level, following which the regional unions would eventually form a full African Monetary Union with a single central bank and a single currency (Jefferis, 2007:83). However, in order to develop such a monetary union similar to that found in the European Union (EU) it will be necessary to pursue policies that support the various stages that need to be completed.

Maruping (2005:129) maintains that although some African countries have only recently rekindled their interest in economic integration, it is interesting to note that the reason for such a renewed interest is not related to the initial decolonisation or political agendas and the desire to overcome 'artificial' boundaries. Rather, the inspiration for such a movement stems from the success of integration efforts noticed in Europe as well as the Americas. Thus, the desire to integrate tends to stem from an economic, rather than a political perspective. However, according to Hawkins and Masson (2003:4), the economic benefits that arise from the formation of a monetary union are still subject to intense debate.

SADC is an example of a group of countries that has realised that there are certain benefits that may arise from economic integration. SADC has already undergone the process of setting macroeconomic convergence criteria that will steer the region toward monetary unification and a single central bank. According to Khamfula and Tesfayohannes (2004:41), a vital step in transforming SADC into a monetary union is to establish a single central bank which will not only issue a single currency for all member nations, but will also pool their foreign exchange reserves and co-ordinate their monetary policies. To consider matters regarding the establishment of a single central bank the Committee of Central Bank Governors (CCBG) of SADC has been given the responsibility of monitoring the progression of macroeconomic convergence within the region. This is an essential role as satisfactory progress is vital if the goals of forming a monetary union by 2016 and the introduction of a single currency by 2018 within SADC are to be achieved (Rossouw, 2006a:382).

Traditionally, macroeconomic convergence has focused on certain maximum allowable levels for some key economic indicators that are related to fiscal discipline and monetary and financial stability (Maruping, 2005:136). While macroeconomic convergence is an important stage in the development of a monetary union, there is debate as to the level of convergence that has to occur prior to the union taking place, as well as how much can follow after the union is formed. Jefferis (2007:89) suggests that because the macroeconomic indicators are primarily monetary in nature (inflation, interest rates and exchange rates), there are arguments that convergence should come prior to monetary union, as otherwise convergence will be abruptly forced as the union takes effect. However, it has been argued for reasons such as structural factors that convergence may

follow monetary union, hence, making convergence endogenous (Jefferis, 2007:90). Furthermore, Jefferis (2007:90) suggests that this argument remains controversial, although, it is important to understand that both extensive monetary and structural convergence is a prerequisite for monetary union.

The majority of studies that have been conducted with regard to macroeconomic convergence and monetary unification among SADC countries lack an empirical component (cf. McCarthy 2002; Khamfula and Tesfayohannes 2004; Maruping 2005; Rossouw 2006a; Rossouw 2006b and Jefferis 2007). A critical point that is highlighted in the above-mentioned studies is that macroeconomic convergence is clearly a requisite for monetary union. Furthermore, it is believed that a SADC monetary union is a possibility. However, McCarthy (2002:26) believes that SADC is not ready for this step in regional integration and he suggests that given the current conditions in Southern Africa, macroeconomic stability is preferable to macroeconomic convergence and monetary integration. The limited empirical research, as well as the conflicting views of the studies at hand that relate to macroeconomic convergence and the viability of the formation of a SADC monetary union call for further research on this issue. Such a study should ascertain the extent of macroeconomic convergence that exists amongst the SADC and, subsequently determine whether the formation of a regional monetary union is currently feasible.

1.2. OBJECTIVES OF THE STUDY

The primary objective of this research is to determine the extent of macroeconomic convergence amongst the countries that form SADC so as to analyse the viability of the proposed initiative to form a regional monetary union amongst the SADC countries. The secondary goal is to propose useful policy suggestions relating to the development of regional monetary integration between SADC members.

In terms of methodology, the extent of macroeconomic convergence is to be determined by analysing whether the countries that constitute SADC have similar monetary policy transmission processes. Thus, an examination of whether the pass-through of monetary policy has become more similar over time is necessary. This will be achieved through the estimation of an interest rate pass-through model. The interest rate pass-through model

was primarily chosen as the empirical method to be used in this study owing to data limitations regarding the majority of the variables that constitute the SADC convergence criteria.

1.3. ORGANISATION OF THE STUDY

This study consists of five chapters. Chapter Two provides a review of the existing theoretical and empirical literature on the issues relating to macroeconomic convergence and the formation of a monetary union. Chapter Three describes the data used in the study as well as provides an outline of the analytical framework (interest rate pass-through model) that is used for the empirical analysis. Chapter Four presents the results of the estimation of the interest rate pass-through model. Finally, Chapter Five provides a summary of the findings, discusses policy implications and suggestions, highlights the limitations of this study and gives proposals for future research.

CHAPTER 2
THEORY AND LITERATURE REVIEW

2.1. INTRODUCTION

This chapter outlines the conceptual definition of economic integration so as to put the notion of economic integration and convergence into perspective. Hence, the different forms of official economic integration arrangements are discussed and this is then narrowed down to the ultimate goals of both the AU and SADC. Moreover, the theoretical costs and benefits that relate to the formation of a monetary union are considered, as it is necessary that the net benefits outweigh the costs of monetary union if the integration initiative is to be worthwhile. In addition, the convergence criteria for economic and monetary union are compared and discussed in terms of both the international experience, relating to the Maastricht Criteria, as well as the SADC criteria that have already been set by the CCBG. The issues on meeting these criteria are also briefly analysed. In addition to the convergence criteria, a discussion regarding interest rate pass-through is included. Finally, a review of existing empirical literature relating to both African and SADC monetary union issues is conducted.

2.2. ECONOMIC INTEGRATION IN CONTEXT

2.2.1. *Conceptual Definition of Economic Integration*

Balassa (1987:43) defined economic integration both as a "process and as a state of affairs". If considered as a process, economic integration encompasses the set of political and economic measures "designed to eliminate discrimination between economic units that belong to different national states" (Balassa 1987:43). Moreover, if interpreted as a state of affairs, "it represents the absence of various forms of discrimination between national economies" (Balassa, 1987:43). Hence, from this definition it becomes evident that economic integration can be viewed as the path that is followed to decreasing levels of economic discrimination among countries.

In addition to the simple conceptual definition of economic integration it is necessary to explore the different forms of official economic integration arrangements that exist. These different forms entail various degrees of discrimination between partner countries

and also between themselves and third parties. Moreover, in summary, these different degrees of integration involve some sacrifice by the individual countries of a proportion of their autonomy in economic policy making as all of them abolish discrimination among their members (Cardoso and Ferreira, 2000:403). The most common forms of economic integration arrangements that are referred to in the literature are discussed below:

Preferential Trade Agreements (PTAs):

According to Arguello (2000:4), these are arrangements through which member nations receive reductions on tariffs or preferential treatment with regard to quantitative restrictions on their levels of trade with other member countries while upholding their normal level of trade restrictions against third parties. Generally, these types of agreements apply only to a group of products and are unilaterally granted.

Free Trade Areas (FTAs):

Under a FTA member countries eliminate trade barriers amongst themselves, however, they maintain their individual national trade barriers against third parties. Normally, strict rules of origin as well as expensive customs inspection are a necessary condition to prevent trade deflection (Arguello, 2000:5). In addition, Appleyard and Field (2001:351) note that the FTA is the most common integration scheme.

Customs Unions (CUs):

Member countries remove all barriers to trade among themselves and adopt a common set of tariffs that is to be applied to third parties. Consequently, under such an arrangement the adoption of both intra-CU rules of origin and the need for customs inspection become obsolete (Arguello, 2000:5). Furthermore, the group that consists of the customs union acts as one body in the negotiations of all trade agreements that are conducted with non-member countries (Appleyard and Field, 2001:352).

Common Markets (CMs):

The common market will comprise of all characteristics that define a customs union, however, it also allows for the full mobility of factors of production. However, member countries will define common policies that will regulate factor flows with third parties. According to Appleyard and Field (2001:352), the free movement of labour and capital

between member countries represents a higher level of economic integration, however, at the same time a further reduction in the national autonomy of the individual economies is relinquished. Arguello (2000:5) believes that the need for domestic policy harmonisation is more compelling in a common market as compared to the case of a customs union. However, it should be noted that there is no formal obligation for member countries to move in this direction.

Economic Unions (EUs):

Arguello (2000:5) and Appleyard and Field (2001:352) describe an economic union as the most comprehensive form of economic integration. Although an economic union comprises the characteristics of a customs union, an economic union implies the complete harmonisation of monetary, fiscal, industrial, and welfare policies as well as the establishment of a common pattern of foreign relations. Furthermore, Appleyard and Field (2001:352) note that when an economic union adopts a common currency, it becomes a monetary union.

In terms of the above forms of economic integration, four of the SADC countries namely: Lesotho, South Africa, Swaziland and Namibia form the CMA and thus, operate under a fixed exchange rate system with the South African Rand as anchor currency. In addition, Botswana and the four CMA countries form the SACU, which has an independent exchange rate system but is indirectly linked to the Rand through a currency basket (Aziakpono *et al.*, 2007:5). Hence, it is clear that some of the SADC countries have already begun to form economic links in terms of the above-mentioned forms of economic integration arrangements.

In addition to the above-mentioned types of economic integration arrangements, Jefferis (2007:85-86) identifies four main ‘stylised’ stages of monetary integration. It is necessary to have an understanding of these stages of integration considering that it is SADC’s primary goal to achieve full economic cooperation that includes a free trade area as well as the move toward the establishment of a monetary union by 2016 and a single currency by 2018. Moreover, Maruping (2005:133) highlights that one of the envisaged goals of the AU is to formulate a monetary union for the entire continent that encompasses having a common currency and central bank by 2025. The stylised stages can be characterised

principally by the nature of exchange rate policy, which in turn has direct implications for monetary policy as well as a host of other policies.

The stages are discussed below.

Stage 1 – There is no monetary integration and there is no attempt to link or co-ordinate the monetary policies of the different countries. However, national monetary policies may move together if the countries experience similar economic structures and/or experience similar external shocks. In addition, exchange rates would be freely floating and countries will posses national monetary policy autonomy (Jefferis, 2007:86).

Stage 2 – There is weak monetary integration whereby exchange rates are linked by means such as where a managed float constrains exchange rates within a predetermined range or alternatively through a system of a crawling peg arrangement. Jefferis (2007:86) notes that such exchange rate linkages may restrict the independence of national monetary policies, however, the extent of this restriction will be dependant upon the extent of capital mobility. Therefore, if capital controls are maintained then a certain degree of monetary autonomy will remain.

Stage 3 – There is strong monetary integration whereby the exchange rates of national currencies are pegged to each other (either with allowances for adjustments or, more strongly, with a binding peg). If there is full capital mobility, which has been made possible by the existence of no capital controls and well developed national capital markets, a common monetary policy may be pursued for all countries that are party to the arrangement. Jefferis (2007:86) warns that if monetary policy is not co-ordinated effectively at this stage then the consequent result will be unsustainable capital flows that would inevitably make the exchange rate peg impossible to maintain[1].

Stage 4 – There is full monetary union (the aim of SADC), whereby this is the result of the culmination of the process of monetary integration. In such a monetary union all member states are to make an irrevocable commitment to the monetary union as well as adopt a single common currency[2] and a single central bank will be solely responsible for the management of monetary policy. The implication of this is that individual member

[1] According to Jefferis (2007:86), the inconsistency of a monetary policy target and an exchange rate target coupled with capital mobility is frequently referred to as 'the impossible trinity'.
[2] This single common currency may be an existing currency or a completely new one.

states have no autonomous monetary or exchange rate policy with regard to other member states of the union, although they do (collectively) vis-à-vis non-members (Jefferis, 2007:87).

The remaining sections of the chapter will focus on the concepts of both economic convergence and monetary union, as these initiatives are the goals of both SADC as well as the African Union.

2.3. COSTS AND BENEFITS ARISING FROM MONETARY UNION

Glick (1991:1) clearly expresses that the formation of a monetary union will entail both costs and benefits for member countries and therefore, it is important that these are reviewed and understood as they have implications for either the success or failure of a monetary union.

The following section draws heavily on literature from various authors (cf. Glick, 1991; Kaufmann, 1996; Afxentiou, 2000; Hawkins and Masson, 2003; Tethalova, 2004; Maruping, 2005; Saville *et al.*, 2005; Tavlas, 2007; Jefferis, 2007) who have undertaken studies that relate to the experience of the formation of the European Monetary Union in terms of the costs and benefits that result as individual countries abandon their own monetary unit in favour of a common unit as the formation of a monetary union occurs.

2.3.1. *Potential Benefits of a Monetary Union*

Various economic benefits have been identified that can result from the formation of a monetary union. Afxentiou (2000) and Jefferis (2007) identify the following benefits of monetary union: (1) the reduction in transactions costs, (2) elimination of the risk of exchange rate volatility across members, (3) reduced costs of financial services arising from the large size of available pools of financial assets (benefits relating to the exploitation of economies of scale), and (4) providing an 'agency of restraint' that will serve to reduce the ability of governments to pursue irresponsible and destabilising macroeconomic policies. Maruping (2005:136) notes that the resultant benefits of macroeconomic convergence and ultimately monetary union are conferred upon members both individually as well as collectively through achieving a more stable macroeconomic outlook via more sustainable fiscal deficits and public indebtedness, external current

account deficits, 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 transactions costs

This is the most obvious benefit of a monetary union recognised by authors such as Kauffmann (1996), Agbeyegbe (2003), Tethalova (2004), Maruping (2005) and Jefferis (2007). According to Tethalova (2004:19), the introduction of a common currency has the ability to significantly reduce or even remove transactions costs associated with trading goods and services between the countries of the monetary union with different monies. Furthermore, companies will be faced with lower costs as a result of the common currency as a result of not having to fulfil the task of multi-currency bookkeeping. In addition, further positive effects may stem from holding fewer foreign currency reserves as well as from the fact that there will be a smaller number of goods prices owing to the existence of the single currency in the region that represents the monetary union. Thus, from these reduced transactions costs, higher output and consumption gains may be realised, thereby, improving welfare. More specifically, Kaufmann (1996:3) states that the reduced direct and indirect transactions costs will "add permanently possibly 1-2 percent to GDP of the member states." Hence, it is evident that this is a significant potential benefit that could positively contribute to the economies of the member states of the proposed monetary union.

ii. Elimination of the risk of exchange rate volatility across members

According to Afxentiou (2000:251), the absence of convertibility of one currency into another is beneficial, particularly for small transactions as well as for tourism. However, the benefit of zero exchange rate volatility tends to be downplayed in today's globalised financial economy as a result of the extent to which integrated financial markets and foreign exchange hedging practices already exist so as to provide people with protection from currency fluctuations and uncertainty (Afxentiou, 2000:251). In addition, Tavlas (2007:6) stresses that a reduction in exchange rate volatility will have the effect of increasing cross-border trade and investment, hence, improved economic growth may be apparent.

iii. Benefits relating to the exploitation of economies of scale

In terms of the benefits relating to the exploitation of economies of scale, Tavlas (2007:7) indicates that these are essentially derived from the move toward monetary integration. This is achieved through mechanisms such as the enlargement of the foreign exchange market. This decreases both the volatility of prices and the ability of speculators to influence prices within the market and thus, to disrupt the conduct of monetary policy. The elimination of the need for reserves so as to conduct intra-area transactions and improved allocational efficiency of financing to the extent that both borrowers and lenders are provided with a broader spectrum of financial instruments which will also allow borrowers, lenders and equity investors to make more efficient investment choices in terms of duration and risk (Tavlas, 2007:8).

iv. Providing an 'agency of restraint'

The benefit in relation to the provision of an 'agency of restraint' is potentially important as well as relevant for certain SADC countries that have a history of reckless public finances and general macroeconomic mismanagement. The reason for this is that it is potentially a means of achieving central bank independence as macroeconomic policy will be delegated to a supernatural monetary authority (Jefferis, 2007:90). In addition, although the quality of macroeconomic policymaking within the SADC region has improved in recent years, a well-designed and functional monetary union could help reinforce these gains through centralised and more stringent policy formulation and implementation. Jefferis (2007:90) also believes that a further dimension of the agency of restraint argument is that monetary union will prevent exchange rate adjustments from being utilised as a 'quick fix' to achieve improvements, which are essentially superficial. The resulting benefit is that economic efforts will rather be focussed on long-term fundamentals, which will enhance economies of scale as well as efficiency.

Furthermore, Buigut (2006:301) suggests that a benefit of fixing a national currency to a low inflation currency is essentially the enhanced anti-inflationary credibility of national monetary policies. However, this benefit is more likely to be achieved through the formation of a supranational monetary authority acting as an agency of restraint as this will tend to reduce the degree of monetary mismanagement that is prevalent in most African countries. Hawkins and Masson (2003:5) are of the opinion that sovereign states

tend to forgo an independent currency by handing over the control of monetary policy to a regional or foreign central bank. This is perceived as an indirect way of attaining the benefits that accompany central bank independence[3].

From the basis of monetary policy moving out of control of the sovereign state and rather being centrally coordinated, the governments of members of a monetary union effectively become committed to a monetary rule. Hence, sovereign political discretion over monetary policy is removed (Saville *et al.* 2005:684). Evidence has shown that this essentially results in lower country risk premiums, reduced exchange rate risk, lower price inflation, lower real interest rates and higher rates of economic growth (cf. Kaufmann, 1996; Fink and Salvatore, 1999).

2.3.2. *Costs of a Monetary Union*

While the gains that accrue to the member nations and the citizens of member nations are welcomed, it seems to be clear that every benefit has a corresponding cost. Hence, it is important to determine whether the net benefits justify the formation of a monetary union. Saville *et al.* (2005:684) suggest that despite the costs of monetary union, the evidence suggests that, on balance, countries that agree to join a monetary union tend to enjoy net economic benefits. However, because of the fact that unionisation is a multi-lateral arrangement, each country needs to consider the feasibility of entry into a monetary union.

Moreover, according to Maruping (2005:131), the process of monetary integration can be plagued by both perceived or real losses and gains among member countries and this may result in disputes as well as a sense of loss of national sovereignty. Hence, successful integration will require strong and loyal commitment in terms of implementing the agreed arrangements as well as fair mechanisms that will allow for the arbitration of disputes and the equitable distribution of the costs and benefits of the integration arrangement. Moreover, the balance of benefits is heavily dependent upon the structure of the economies involved in the union. For example, the extent of potential savings from lower transactions costs and reduced exchange rate uncertainty is dependent upon the extent of trade amongst members of the monetary union (Maruping, 2005:131). The major costs of

[3] A lack of central bank independence is believed to be a primary reason for the poor performance of monetary policies in emerging economies (Hawkins and Masson, 2003:5).

a loss of monetary and fiscal policy as a stabilising tool and the loss of revenues from seignorage are discussed below.

i. The loss of monetary and fiscal policy as a stabilising tool

According to Tethalova (2004:18), the primary cost of receiving the host of economic benefits of monetary union arises at the macro level. This is essentially because while foregoing floating exchange rates, individual members of the monetary union need to realise that they will have to forgo the possibility of dampening business cycle fluctuations through the use of country specific counter-cyclical monetary policy, such as the use of the exchange rate as a tool of macroeconomic stabilisation. This arises as the monetary union will be under the influence of the common monetary policy as implemented by the single central bank of the monetary union. However, the monetary union will naturally retain control of the exchange rate changes as an instrument in its dealings with the rest of the world.

In addition, Glick (1991:2) emphasises that the cost of losing monetary policy as a stabilising tool is least when macroeconomic disturbances affect all members of the union at the same time and in the same manner. This situation is most likely to occur when there is a high degree of macroeconomic convergence and integration amongst the union countries. However, if union members are subject to idiosyncratic or asymmetric shocks, this could exacerbate the problems or losses that may result from foregoing national control over monetary, exchange rate and fiscal policies (Jefferis, 2007:91).

Furthermore, according to Jefferis (2007:88), the Optimum Currency Area (OCA) literature poses arguments that within a monetary union, members should be granted additional flexibility with regard to fiscal policy so as to compensate for the loss of autonomy in terms of policy instruments (monetary and exchange rate policies) so as to be able to respond to economic shocks. However, it is stressed that this argument is not widely accepted based on two main reasons. Firstly, the problem of public debt sustainability will tend to arise as a result of using fiscal expansion to compensate for negative shocks. Secondly, a budget deficit in one union member may result in negative externalities for other members if additional borrowing and recourse to capital markets to fund the deficit induces union-wide interest rates to increase (Jefferis, 2007:88). Hence, this is clearly a potential problem in any monetary union that is characterised by centralised monetary policy decision-making that is decentralised.

Jefferis (2007:88) suggests that such concerns resulted in the implementation of limits on budget deficits under the EMU, which essentially aim to constrain the use of fiscal policy as a mechanism of stabilisation by the EMU member states. Hence, in such a situation none of the three main levers of macroeconomic policy, namely, monetary, exchange rate and fiscal policy is fully available to individual national governments within a monetary union. Therefore, this gives rise to an adjustment problem relating to the issue of how to effectively respond to economic shocks, specifically asymmetric shocks across monetary union members. However, Jefferis (2007:88) emphasizes that common shocks can be resolved by union-wide monetary and exchange rate adjustments.

ii. The loss of revenues from seignorage

Afxentiou (2000:250) highlights that granting monetary control to a single central bank will deprive each member of revenues from seignorage. However, Afxentiou (2000:250) believes that the loss of seignorage will mainly affect the countries of the union that are plagued with high inflation rates. Naturally, these countries will tend to be those nations who print money so as to finance their budget deficits instead of borrowing money in the financial markets. Hence, the specific criteria that must be satisfied prior to the formation of economic and monetary union that relate to the inflation rates of possible members is an important indicator as to whether the country in question will benefit from joining the monetary union.

2.4. CONVERGENCE CRITERIA FOR ECONOMIC AND MONETARY UNION

2.4.1. *Introduction*

The dominance of the Maastricht criteria, which formed the basis of the largely successful EMU, has had the implication that other convergence criteria specific to certain regions such as SADC have been influenced by the Maastricht criteria. Thus, the macroeconomic convergence criteria of SADC tend to bear a resemblance to those that were instituted under the Maastricht Treaty. However, when setting macroeconomic convergence criteria, specific regional differences are taken into account. The Maastricht criteria and the SADC convergence criteria are discussed in more detail below.

2.4.2. *Maastricht Criteria*

According to Springer (1996:281), the ratification of the Maastricht Treaty in late 1993 paved the way for the most complicated as well as controversial treaty in the history of European integration. The treaty contains several provisions that are relevant to monetary union, both in the body as well as in the attached protocols. However, what is important is that the Maastricht Treaty contains the convergence criteria that guide the commission and the European Monetary Institute (EMI) in selecting which countries are eligible to become members of the EMU.

However, Afxentiou (2000:248) notes that, strictly speaking, the Maastricht criteria have had little to do with convergence and goes on to define convergence as "a process which unifies technological and non-rival domains, preparing institutionally and structurally laggard countries to catch up with those at the forefront''. Hence, Afxentiou (2000:248) believes that the Maastricht criteria are basically rules that have been set out so as to ensure price and fiscal stability. Moreover, if the rules are to be effective in terms of ensuring monetary and fiscal stability then the Maastricht criteria must operate within an environment that is characterised by economic homogeneity and not by internal or external economic disparities. Thus, an environment of this nature will satisfy the key conditions for an optimal currency area (Afxentiou, 2000:248).

Polasek and Amplatz (2003:4) simplify the description of the Maastricht Treaty by describing it as merely containing important macroeconomic requirements in order to become a member of and participant in the EMU while Afxentiou (2000:249) highlights the five conditions or criteria by which a country is admitted to the union. These conditions are outlined below.

An inflation rate no more than 1.5 percentage points above the average of the three countries with the lowest inflation rates;

1. Nominal long-term interest rates not exceeding 2 percentage points of those of the three countries with the lowest inflation rates;
2. No exchange rate realignment for at least two years;
3. A government budget deficit not in excess of 3 percent of each country's GDP; and
4. A gross debt to GDP ratio that does not exceed 60 percent.

Afxentiou (2000:249) notes that the first three convergence criteria are intended to ensure monetary stability by ensuring a fixed exchange rate regime among member countries. In contrast, the last two criteria are designed to reinforce the stability of the Euro, thus, protecting the European Union from threats of inflation, which may be a result of government budget deficits. Springer (1996:283) stresses that the criteria listed above are not an infallible guide to which member states will participate in the monetary union and that the criteria may be strictly observed or may merely serve as an indicator. Thus, a country in which the trends are moving in the right direction could be declared ready for membership to the union.

Although the criteria mentioned above appear to be sound and economically prudent, Springer (1996:283) notes that the Maastricht convergence criteria have been attacked by critics on a number of grounds. The most notable weakness of the criteria stems from the fact that if governments adopt the severe policies that are needed in order to meet the criteria then economic development could be hampered. For example, Springer (1996:283) suggests that anti-inflationary policies necessary for convergence can result in declining investments when interest rates are used to curb spending. Furthermore, slower modernisation of the economy, less competitiveness, and increased unemployment are likely outcomes as a result of increasing interest rates so as to control inflation.

2.4.3. *SADC Convergence Criteria*

According to Rossouw (2006b:156), SADC has already undergone the process of setting macroeconomic convergence criteria that will steer the region toward monetary unification and a single central bank. Masson and Pattillo (2005:114) note that the convergence criteria that have been agreed upon for SADC serve as a set of indicators that will allow monitoring of progress towards economic convergence of the region. Moreover, Rossouw (2006a:383) highlights that the goals of macroeconomic convergence in SADC are aligned with the ultimate goal of the economic integration of Africa.

According to Rossouw (2006b:157), convergence goals and criteria have been set for 2008, 2012, 2015 and 2018, with more challenging goals set for later periods (See Table 2.1 below). These convergence criteria and goals are set out in a memorandum of

understanding, agreed to by the Ministers of finance of countries in the SADC region. The initial criteria set for 2008 are the following:

1. SADC countries should have single-digit inflation rates;
2. A budget deficit of less than 5 percent of GDP;
3. The nominal value of public and publicly guaranteed debt, as a ratio of GDP, should not exceed 60 percent;
4. Foreign reserves should be equal to three months imports; and
5. Central bank credit to the government should not exceed 10 percent of the previous years tax income (Rossouw, 2006b:157).

Moreover, according to Gaolathe (2004:5), co-operation aimed at achieving effective macroeconomic convergence in SADC as well as regional integration is enhanced by the harmonisation of both legal and operational frameworks of the SADC central banks, the SADC payment, clearance and settlement systems, as well as the co-ordination of training of central bank officials. The CCBG of the SADC has been given the responsibility of monitoring the progression of macroeconomic convergence within the region. This is an essential role as satisfactory progress is vital if the goal of a monetary union and a single central bank within SADC is to be achieved by 2016 (Rossouw, 2006a:382).

In addition to the criteria outlined above, Maruping (2005:141) notes that SADC has set the following milestones for tracking progress in harmonisation and convergence processes among its member nations: elimination of exchange controls by 2005; establishments of a free trade area by 2006; establishment of a customs union by 2010; establishment of a common market by 2012; and establishment of a monetary union by 2016. Hence, it is clear that these criteria pose intricate challenges upon the monetary policies and activities of the SADC countries respective central banks.

Table 2.1: Macroeconomic Convergence Criteria and Goals for SADC

Criterion	2008	2012	2015	2018
Inflation Rate	Single digits	5%	5%	3%
Budget Deficit	5% or less of GDP	3% of GDP as anchor, with a range of 1%	3% of GDP as anchor, with a range of 1%	3% of GDP as anchor, with a range of 1%
Government Debt	Less than 60% of GDP	Less than 60% of GDP	Less than 60% of GDP	Less than 60% of GDP
Foreign Reserves	3 months import cover	More than 6 months import cover	More than 6 months import cover	More than 6 months import cover
Central bank Credit to the Government	Less than 10% of the previous years tax income	Less than 10% of the previous years tax income	Less than 5% of the previous years tax income	Less than 5% of the previous years tax income

Notes: Government Debt is defined as Government's domestic and foreign debt and debt guaranteed by government.

Source: Adapted from Rossouw (2006b:157).

2.4.4. *Assessment of Macroeconomic Convergence in SADC*

Table 2.2 highlights the achievement of convergence criteria set for 2008 by each of the SADC countries included in this study based on 2004 data.

Table 2.2 Achievement by 2004 of Macroeconomic Convergence goals set for 2008

Country	Inflation Rate (Single Digits)	Budget Deficit (<5% of GDP)	Government Debt (<60% of GDP)	Foreign Reserves (3Months Imports)	Central Bank Credit to Govt. (<10% of Tax Income)
Botswana	7.80	-0.2	5.00	17.0	0.00
Lesotho	5.10	-5.2	53.7	5.7	5.90
Malawi	11.5	-6.4	163.9	2.3	60.0
Mozambique	9.10	**	**	5.4	0.00
Namibia	3.90	-1.6	35.1	**	0.00
South Africa	1.40	-1.9	36.0	5.0	5.30
Swaziland	3.40	-3.6	24.1	2.0	5.30
Tanzania	4.10	-3.3	88.9	8.0	10.4
Zambia	18.0	-1.7	**	1.3	36.1

Notes: ** Figures not available.

Source: Adapted from Rossouw, (2006b:158).

In respect of inflation, Table 2.2 shows that only two countries had not achieved the 2008 goal of single digits by 2004. These countries are Malawi and Zambia. The SADC countries showed the greatest degree of convergence in terms of the goal relating to containing budget deficits, however, the methods for calculating such figures should be

considered. It is evident that there is divergence rather than convergence between the government debt figures for those countries that had the necessary data available. This is clear as the figure ranged from 5.0 per cent in Botswana to 163.9 per cent in Malawi as shown in Table 2.2. With respect to foreign reserves, it is apparent that not all countries had achieved the goal of maintaining 3 months import cover, however, significant progress has been made in Botswana and Tanzania in this regard. By 2004 central bank credit to the government as a percentage of the previous year's tax income ranged between zero (Botswana, Mozambique and Namibia) and 60 per cent in Malawi which thus, indicates that the achievement of this goal may still take some time.

In summary, the review of theoretical literature highlights that there are potential benefits that are to be gained through the process of moving toward monetary unification. However, it is clearly recognised that the process of forming a monetary union should only be pursued if the net benefits outweigh the costs. Moreover, it is clear that the macroeconomic convergence criteria that have already been set by SADC bear a resemblance to those that were instituted under the Maastricht Treaty in late 1993. However, although the Maastricht criteria were successful in aiding the movement toward European Monetary Union it must be stressed that the economic conditions found in the SADC countries are vastly different to those found in Europe. Hence, the Maastricht criteria may be used as a guideline, but the SADC criteria must remain focused on the current situations faced in the SADC countries that aim to form a monetary union. However, the fact that the SADC criteria are of a similar nature to those of the Maastricht Treaty provides evidence that the CCBG has considered monetary unification efforts in other regions so as to learn from their experiences.

2.5. REVIEW OF EMPIRICAL LITERATURE

Various economists have attempted to empirically model the formation of a monetary union (cf. Bayoumi and Ostry, 1998; McCarthy, 2002; Matsaseng and Viegi, 2003; Polasek and Amplatz, 2003; Grandes, 2003; Agbeyegbe, 2003; Khamfula and Huizinga, 2004; Yehoue, 2005; Kabundi and Loots, 2005; Maruping, 2005; Buigut, 2006; Karras, 2006; Buigut and Valev, 2006; Jefferis, 2007; Aziakpono *et al.,* 2007). However, according to Agbeyegbe (2003:1), only a few papers discuss issues relating to monetary integration in SADC (cf. Agbeyegbe, 2003 and Aziakpono *et al.,* 2007). Despite this,

lessons may be learnt and comparisons may be made from previous studies relating to the formation of monetary unions in general. However, it should be noted that the majority of studies that relate to monetary integration are of a theoretical and comparative static nature[4], and hence, there is the need to continue to add to the relatively small amount of empirical literature relating to monetary integration in sub-Saharan Africa.

The rest of this section will review various empirical studies that have been conducted on the SADC as well as Africa in terms of economic and monetary integration and the main findings and empirical results are presented and analysed. The studies will firstly be considered in terms of the empirical methodology used and then the empirical findings will be discussed and compared. Moreover, a discussion that considers the convergence of pass-through from money market (or central bank rates) to lending rates in some of the EMU countries will be conducted. This is necessary as it has become clear that the major reason for the lack of thorough empirical work regarding convergence within the SADC region is due to the lack of available data that is consistent and comparable between all the countries within the region.

According to Tavlas (2007:9), all studies differ in terms of the empirical methodologies, countries considered, dependent and conditioning variables (in regression studies), as well as the particular sample periods used. Hence, the results of the studies are not strictly comparable. Thus, in an attempt to help distinguish between the findings and make useful comparisons, the studies relating to SADC that are discussed are grouped into five broad methodological approaches: (1) studies that deal with correlations of real growth rates; (2) studies that consider correlations of shocks; (3) studies that consider correlations of exchange rates or of terms of trade; (4) studies utilising price-based measures, and (5) studies utilising pass-through as a measure of convergence. However, for the purposes of this study, in the cases where authors have considered countries in other regions of Africa (apart from studies relating to pass-through as a measure of convergence), the discussion will be focussed on the results that relate to monetary union in southern Africa.

2.5.1. *Correlations of Output Growth Rates*

[4] See for example, Khamfula and Tesfayohannes (2004), Maruping (2005), McCarthy (2005), Rossouw (2006a) and Jefferis (2007) etc.

According to Tavlas (2007:10), empirical studies that detail correlations of real *per capita* growth rates aim to present information that relate to the subsequent underlying shocks because apart from the impact of trends, disturbances in output are primarily driven by shocks. Hence, cyclical movements in output are resultant of specific shocks.

In this field, Bayoumi and Ostry (1998) attempted to measure the size and correlation of underlying economic disturbances as well as intraregional trade across sub-Saharan Africa. The authors calculated bilateral correlations of growth rates for 11 southern African economies for the period 1963-1989 by regressing the growth of real output *per capita* (measured as the change in the logarithm of real *per capita* GDP) upon it own first and second lags. The residuals from this regression were then taken to represent the underlying real output disturbances. Although no attempt was made to identify the source of these disturbances, the size of these underlying disturbances were calculated using the standard deviation of the residuals and then the correlations of these disturbances was assessed. Correlations across the 11 southern African countries revealed that 5 of the 55 correlations were positive and significant, although, the results tend to make little geographical sense. However, the most salient feature of the findings was the lack of significant correlations between South Africa and its neighbouring countries (which form part of the CMA). Hence, it is clear that the findings of the study indicate that there is minimal evidence that the sub-Saharan African countries would benefit in the near future from the formation of larger currency unions.

In a similar light, Karras (2006) calculated correlations of detrended output growth for 37 African countries (of which 10 were SADC countries[5]) using real GDP based on purchasing-power-parity (PPP) over the periods 1960-2000 and 1980-2000. Karras (2006) essentially used three different methods to detrend the output series of each country and estimate its cyclical component. The three methods were (1) first differencing, (2) the Hodrick-Prescott (HP) filter proposed by Hodrick and Prescott (1980), and (3) the Band-pass filter proposed by Baxter and King (1995). However, unlike Bayoumi and Ostry (1998) who aimed to calculate bilateral output correlations among country pairs, Karras (2006) estimated correlations of each country's cyclical output against the SADC total. The results revealed that three of the eight sets of

[5] Dem. Rep. Congo, Lesotho, Madagascar, Mozambique, Mauritius, Malawi, Tanzania, South Africa, Zambia, Zimbabwe.

correlations were above 0.40 (those for Mozambique, Zambia and Zimbabwe), thus, indicating that these three countries represent an optimal currency area with South Africa.

Although the above studies provide some insight into monetary unification in southern Africa, Tavlas (2007:10) highlights that the approaches followed by both Bayoumi and Ostry (1998) and Karras (2007) are limited in the sense that the authors do not explicitly distinguish between disturbances to output growth and the policy responses to these disturbances. In addition, Bayoumi and Ostry (1998) made no attempt to determine whether the source of the disturbances were related to factors such as domestic economic policies, external shocks, political instability and/or civil unrest.

In addition, Kabundi and Loots (2005:9) conducted a study making use of a dynamic factor model to investigate the impact of increasing trade on the co-movement of the business cycle between South Africa and the SADC countries. The real growth rate (represented by annual real GDP data) was used to analyse the co-movement between the South African business cycle and the rest of SADC covering the period 1980-2002. It should be noted that Tanzania was not included in the study owing to data restrictions.

According to Kabundi and Loots (2005:6), in the generalised dynamic factor model each time series is assumed to be composed of two unobserved components: the common components, which are driven by a small number of common shocks to the entire panel, and idiosyncratic components, which are specific to a particular variable and orthogonal with the common components. The specific notion behind this common component analysis is that only a small number of random variables determine the co-movement of the business cycles in question.

The empirical results of the study revealed that the strongest correlation for the entire period exists between South Africa and Mozambique, followed by weaker correlations between South Africa and Angola, Zambia, Lesotho, Mauritius and Swaziland. However, Kabundi and Loots (2005:14) found that with the rest of the SADC economies, no co-movement exists. The authors attributed this finding to the fact that the correlation analysis is constrained by the absence of more frequent data. Amongst the countries that form SACU, there is strong evidence of co-movement from the early 1990's onwards. Finally, strong co-movement is evident between South Africa and Zimbabwe until 1998 owing to the strong trade relations that once exited between the countries. The study thus,

identified three factors as possible sources of synchronisation of business cycles within the SADC region, namely intra-regional trade, the European Union as a major trading partner and the world business cycle. Finally, although co-movement in the region was shown to exist, Kabundi and Loots (2005:22) believe it was weaker than expected and is mainly driven by outside forces such as trade with the European Union.

2.5.2. *Correlations of Output Shocks*

Yehoue (2005) made use of an econometric method to extract the underlying disturbances from real output for 53 African countries (including all 14 SADC countries) for the period 1980-2000. It should be noted that Yehoue (2005) estimated autoregressive equations for levels of real GDP. The author utilised a three-step autoregressive estimation procedure. The three steps in the procedure were as follows: (1) the growth of *per capita* GDP was regressed upon its own first and second lagged values, (2) the underlying disturbances were calculated using the regression residuals, and (3) the correlations of the disturbances among the respective countries were obtained.

In a similar vain to Karras (2007), Yehoue (2005) estimated correlations or co-movements of shocks for each of the SADC countries against the SADC as a whole. From the findings it was revealed that all of the co-movements were positive and significant and hence, his findings were generally supportive of the possibility of forming a monetary union in the SADC region. However, the path to a common currency would be gradual in nature. Moreover, it should be noted that the results of the study made no attempt to account for the non-stationarity that is believed to be typically present in output data expressed in levels. Hence, the results may reflect specification errors that will result from the presence of non-stationarity.

In an attempt to identify separate supply and demand shocks and evaluate the potential for forming monetary unions in 21 Eastern and southern Africa countries, Buigut and Valev (2006) made use of a two-step structural vector autoregression (VAR) model. For most of these countries, the data covered the sample period from 1971-2002. However, where data was limited the sample period was reduced to the period 1980-2002. Real GDP growth was used to measure the changes in output, while the changes in the implicit GDP deflator represent price changes. For each country, the first difference of the natural log of real GDP and the implicit GDP deflator were used for estimation. It should be

noted that the data for Zimbabwe was found to be unstable and, hence, this country was not included in this study.

The study also aimed to identify and compare macroeconomic shocks to the various countries considered in the study with a focus of the shocks to aggregate output growth and inflation. More specifically, to recover the underlying shocks, the VAR identification scheme developed by Blanchard and Quah (1989) and Bayoumi and Eichengreen (1992) was utilised. This identification scheme is based on the aggregate demand-aggregate supply (AD-AS) framework. Within this model the supply side and demand side shocks can be recovered for all prospective members of the monetary union from the estimation of a finite order VAR. The optimal lag length to be used in the model is chosen in such a way that the residuals approximate white noise. If the correlations from the estimations are positive then they are considered as symmetric and if negative, the correlations are regarded as asymmetric. Naturally, the more symmetric the shocks, the more feasible it becomes for a group of countries to form a monetary union. The results of the supply shocks showed that South Africa has significant correlations in the supply shocks it faces with those faced by its neighboring states of Lesotho, Swaziland and Mozambique. However, based on the correlations and geographical proximity that were revealed in the study, Buigut and Valev (2006) tentatively suggest a tripolar route to monetary union with the first region comprising that of the southern cone of Africa, consisting of the existing CMA, expanding northwards to include Botswana, Mozambique and Zambia. Finally, considering the question of an external anchor-currency, the authors find no evidence to support linking a Southern African (SADC) currency to any of the hard currencies.

A further study by Buigut (2006) extends to the study conducted by Buigut and Valev (2006) by utilising the methodology of decomposing shocks using a VAR model while incorporating cluster analysis to the model. Cluster analysis essentially encompasses a number of diverse algorithms and methods for grouping objects into respective categories based on a set of measurements in such a way that the degree of association between members of a cluster is strong and weak between members of a different cluster. Hence, this study by Buigut (2006) utilises a number of these algorithms to group Eastern and Southern African countries into monetary clusters using a set of variables motivated by Optimal Currency Area (OCA) theory and nominal convergence criteria. Hence, each

cluster of countries that is generated describes, in terms of the variables used, the country groupings which would be most suitable for monetary union.

The study used the correlations of shocks derived from the Blanchard-Quah methodology (as in the Buigut and Valev (2006) study discussed previously) while also considering each region's specific features by analysing three separate scenarios. These scenarios are outlined as follows: (1) the countries are grouped without making reference to an anchor economy; (2) South Africa assumes the role of the anchor economy (as is currently the case in the CMA) and (3) the euro is assigned the role of the anchor currency as in the CFA zone. The respective variables that are used in the cluster analysis include trade integration among the economies concerned, debt-service ratios, public debt ratios, tax revenue ratios, and inflation rates. The results of the study conclude that there is support for a monetary union in southern Africa, under the assumption that the South African Rand was the anchor currency for a small group of countries consisting of Botswana, Lesotho, Namibia, South Africa and Swaziland. Under scenarios (2) and (3) described above, Buigut (2006) found that a group of four countries was suitable for a monetary union, namely; Botswana, Namibia, South Africa and Swaziland.

2.5.3. *Correlations of Exchange Rates or Terms of Trade*

Under this grouping of studies, Jefferis (2007) calculated correlations of exchange rates, inflation rates and interest rates of 12 SADC countries (Madagascar and Zimbabwe were excluded from the analysis) over two sub periods ranging from 1990-1996 and 1997-2002. More specifically, the coefficients of bilateral exchange rates against the South African Rand as well as interest rate and inflation rate differentials in relation to South Africa were used as the variables in the study. Jefferis (2007:96) highlights that there is no particular reason for choosing these sub periods although many countries did experience extensive economic reform programmes during these periods. In the analysis it was assumed that South Africa would be the key member of any regional monetary union. The indicators that were used in the study were chosen because they are of specific relevance to monetary union. Hence, Jefferis (2007:96) notes that prior to monetary union, exchange rates must have been relatively stable for several years and no significant divergences in inflation and interest rates between potential monetary union members. The findings from the study revealed that eight countries comprise what Jefferis (2007) termed a 'convergence group'; these being Botswana, Lesotho, Mauritius,

Mozambique, Namibia, Swaziland, Tanzania and South Africa. It should be noted, however, that Tavlas (2007:18) believes that although Jefferis (2007) was able to infer from his results that an eight member convergence group is viable, Jefferis (2007) did not provide any formal analysis of the sets of data used in the study and it also appeared that the convergence group was casually based upon the inspection of the data.

An earlier study by Grandes (2003) made use of a more complex statistical procedure than Jefferis (2007). The author made use of a two-step econometric model that was based on the theory of generalized purchasing power parity (G-PPP). The purpose of this was twofold; (1) to determine whether the CMA has been close to forming an OCA, and (2) to determine what the costs and benefits are for the member countries that belong to the CMA. In the first step of the procedure the null hypothesis of bilateral real exchange rates (RER) was tested so as to determine whether there exists a long run relationship between the RER in the CMA countries. This was done so as to determine whether the CMA members form an OCA. In the second step a panel data model was developed with the aim of determining which cost and which benefit factors have empirically influenced the need of different RER adjustments, i.e. a deviation from G-PPP (for instance when external shocks occur). The sample period of the study spans from the year 1990 to 2001 and monthly data was used. The author provides two reasons for the choice of period, i.e. (1) it was the time when Namibia became independent, though it formally joined the CMA in 1992, and (2) a new political era began in South Africa after the end of the apartheid regime. Essentially, Grandes (2003) tested for cointegration among bilateral exchange rates using the South African Rand as the base currency for the four CMA countries and Botswana. If the relationships from the cointegration tests were found to be stationary it was inferred that the real exchange rate exhibited common trends. The econometric evidence from the study suggest that the CMA and Botswana do indeed form an OCA given the existence of the common long-run trends in their bilateral exchange rates. Hence, the findings of Grandes (2003) are similar to those found by Buigut (2006). Finally, Grandes (2006) also highlights that there are further microeconomic efficiency gains that can still be accrued if the countries considered in the study continue forward and develop a fully-fledged monetary union.

A study conducted by Agbeyegbe (2003) investigates the feasibility of a monetary union in SADC by examining evidence of nominal exchange rate and inflation convergence.

The study applies the methodology of time varying (Kalman Filter) analysis to study nine non-CMA member countries of SADC, and based on the analysis determines whether the member countries point towards a direction of being able to join a new single currency system. The empirical analysis focuses on two variables (inflation and exchange rate) partly because these variables have received most attention in previous studies and partly because of data availability. The methodology adopted in the study follows Hall, Robertson and Wickens (HRW) (1992) who in their study of measuring convergence of European Community countries, clarified the concept of convergence and in doing so introduced an approach based on time varying parameter analysis to establish economic convergence. The data used by Agbeyegbe (2003) to test for exchange rate convergence was monthly data for the period spanning 1992:2 – 2000:11. Using the South African Rand as the anchor currency the empirical results suggest differing (non)convergence among the non-CMA countries to the South African Rand. For all but one country, the results show that there is no evidence of movement towards the Rand rate, the exception being Malawi's Kwacha. Turning to inflation convergence, the monthly data covered the period 1980:2 - 2000:07. The results of the tests based on the augmented Dickey-Fuller (ADF) and the Elliott, Rothenberg and Stock (ERS) optimality test do not provide evidence in support of non-stationarity for both the individual inflation rates and the differential rates between each non-CMA country and the averages of the CMA countries. Hence, the results reveal that inflation rates in the non-CMA countries do not converge to the average of the CMA countries. Thus, this non-convergence of the nominal exchange rate and the consumer price inflation rate suggest that the chances of SADC member countries satisfying some form of Maastricht-type criteria in forming a monetary union is relatively low.

Finally, a study by Khamfula and Huizinga (2004) aimed to investigate whether a monetary union is desirable among the countries of the SADC community. A Generalised Auto-Regressive Conditional Heteroscedasticity (GARCH) model was employed to consider the share of the variation in real exchange rates (RER's) *vis-à-vis* South Africa that can be explained by the divergence in monetary and fiscal policies. The data for the study runs from 1980-1996 and the data for RER are constructed using monthly seasonally adjusted exchange rates and inflation rates. Owing to the scarcity of data, Angola, Mozambique, Seychelles and the Democratic Republic of Congo were excluded from the study. The econometric procedure followed by the authors included three steps;

(1) after calculating bilateral exchange rates against the South African Rand, each bilateral rate was seasonally adjusted with the use of dummies. The authors calculated two sets of residuals, one for the monthly data and one for the quarterly data, (2) each of the residuals were regressed upon their own lags so as to generate estimates of unanticipated residuals, (3) the squares of these unanticipated residuals were used as measures of underlying shocks. It should also be noted that the monthly residuals were characterised as the short-run case and the quarterly residuals were representative of the long-run case.

The results of both the short-run and long-run cases suggest that the conditional variances of the RER disturbances between South Africa and most other SADC countries are comparable and, hence, the following countries would be suitable to form a monetary union; South Africa, Botswana, Lesotho, Malawi, Mauritius, Namibia, Swaziland and Zimbabwe. That said, it should be noted that the results revealed low degrees of symmetry of RER shocks across most of the economies considered. This clearly indicates that the costs of forming a monetary union would generally be higher than the relative benefits. Thus, in terms of policy perspectives Khamfula and Huizinga (2004:713) warn that SADC as a whole should not form a monetary union in the near future, as the countries are too different to form an optimal currency area. Furthermore, Kamfula and Huizinga (2004:710) believe that the evidence from the study reveals that a serious obstacle to regional integration in southern Africa appears to be the dominant position of South Africa.

2.5.4. *Studies Using Price-Based Measures*

Aziakpono *et al.* (2007) investigate the state, development, and drivers of banking market integration in the member countries of the SADC by employing interest rate data. In an attempt to investigate the monetary and banking market integration in SADC, the methods of principal component analysis (PCA) and interest rate pass-through were applied to central bank interest rates as well as to deposit and loan interest rates. According to Aziakpono *et al.* (2007:3) it was more appropriate to analyse co-movements of interest rates by PCA as it is possible to also identify groups of countries for which interest rates move in the same direction. Thus, from this stance if central bank rates move together and monetary policy rates are transmitted to retail rates in a uniform manner in the various countries under study, then the banking market appears to be

integrated (Aziakpono *et al.*, 2007:3). The results of the study confirmed the authors' expectations that the CMA banking markets are most integrated followed by the SACU countries. There was also evidence in the study that suggests that the level of integration increases over time for each region and interest rate. The study also subjected the entire SADC region to further analysis focusing on the period between 2000-2005 where there is evidence of growing integration with the aim of sorting the countries into groups that are becoming integrated based on similarities of their movements. Hence, the countries that are converging to the CMA countries become the focus so as to determine whether an expanded CMA is viable, which will consequently shed light on the prospect for a SADC-wide monetary union. There is evidence that some countries are converging with the CMA toward the end of the sample period. From the evidence found in the analysis Aziakpono *et al.* (2007:29) propose that a selective, yet cautionary expansion of the CMA is possible. More specifically, Seychelles, Zambia and Botswana are potential first candidates. Despite this, Aziakpono *et al.* (2007:29) warn that such an expansion requires not only more policy coordination and nominal convergence but financial market imperfections need to be addressed as well.

2.5.5. *Studies Using Pass-Through as a Measure of Convergence:*

Toolsema *et al.* (2002) examines whether the pass-through of monetary policy measures in six EMU countries[6] have become more similar over time, i.e. whether or not there is convergence in monetary transmission. This is an important issue as it has been argued that asymmetries in monetary transmission across the countries in the euro area may seriously hamper the common monetary policy of the ECB (cf. Dornbusch et *al*., 1998). The sample period of the study is 1980-2000. Toolsema *et al.* (2002) note that the difficulty in conducting such research is finding interest rates that are comparable across countries. In terms of methodology, firstly, the long-run relationship between money market lending rates is estimated using the Fully Modified ordinary Least Squares (FM-OLS) estimator and test parameter for instability following Hansen (1992). As these tests indicate that certain changes have occurred over time, an Error Correction Model (ECM) is then applied with a moving window in which the number of observations remains the same. For each regression that is conducted, one observation at the beginning of the window is dropped and one is added at the end of the window. The findings of the study

[6] The six EMU countries considered in the study include: Belgium, France, Germany, Italy, the Netherlands, and Spain.

show that differences in pass-through exist in the sample considered, both in terms of initial as well as long-run responses to policy-induced interest rate changes. Despite this, there is some (weak) evidence for convergence of monetary policy transmission.

2.6. SUMMARY AND CONCLUSION

From a theoretical point of view the most common forms of economic integration were placed in context and it became clear that amongst the SADC countries (particularly the CMA and SACU countries) there has already been significant progress in economic integration agreements. Moreover, various authors (c.f. Glick, 1991; Kaufmann, 1996; Afxentiou, 2000; Hawkins and Masson, 2003; Tethalova, 2004; Maruping, 2005; Saville *et al.* 2005; Tavlas, 2007; Jefferis, 2007) have highlighted and conducted studies that refer to the importance of the costs and benefits that are associated with the formation of a monetary union. The consensus from these studies is that an effort to form a monetary union should only be undertaken if the net benefits of such an economic commitment are positive.

The macroeconomic convergence criteria that provide guidelines in determining which countries are eligible for membership of the monetary union of both the Maastricht Treaty and the SADC were discussed and it is evident that the SADC convergence criteria appear to be similar to those that were implemented under the Maastricht Treaty. Despite this, a major challenge of further empirical studies relating to macroeconomic convergence in SADC is that there is a considerable lack of consistent data that allows for comparisons between countries.

From a review of the empirical literature the results of the studies remain mixed, which provides the need for further studies relating to macroeconomic convergence and the formation of a monetary union within SADC. Although the studies that were reviewed provide some insight into monetary unification in southern Africa, many of the approaches used in the studies are limited in terms of methodological approaches as well as data constraints which limited the number of southern African countries that could be included in the studies (c.f. Bayoumi and Ostry, 1998; Khamfula and Huizinga, 2004; Karras, 2006). Moreover, there had been little use of the interest rate pass-through

methodology as a means to measure macroeconomic convergence in SADC and hence, this thesis aims to fill this gap in the literature.

CHAPTER 3
DATA AND METHODOLOGY

3.1. INTRODUCTION

It would be recalled that the primary objectives of this study as stated in Chapter 1 is to determine the extent of macroeconomic convergence amongst the countries that form the SADC so as to analyse the viability of the proposed initiative to form a regional monetary union amongst the SADC countries.

This chapter outlines the analytical framework that is used in order to provide empirical evidence to the objectives of the study. In addition, the specific variables and data used in the study will be explained. The chapter is organised as follows: Section 3.2 discusses issues relating to the data used in the study as well as considering some of the data limitations that influenced the methodology and empirical model used. Section 3.3 explains the empirical pass-through model and the econometric procedure, and finally Section 3.5 concludes the chapter.

3.2. DATA

A major difficulty of a study involving developing African countries is the lack of sufficient data that is comparable across countries. For the countries that were analysed, it was a formidable challenge to find such data. It was not possible to find consistent and comparable time series data for the variables that form the SADC convergence criteria (inflation rate, budget deficit, government debt, foreign reserves and central bank credit to the government) and this may be the reason for the lack of empirical studies that relate directly to such variables within SADC. Moreover, according to Allen and Ndikumana (2000:139), macroeconomic time series for developing countries such as those of the SADC are generally sparse and when available they are usually recorded annually, which limits the number of observations to include in a study. In addition, Allen and Ndikumana (2000:139) note that conducting a study on a region such as SADC presents particular difficulties in that the availability of consistent country specific data is usually only available after the respective countries became independent nations, which dates back to the mid-1960's up until 1990 for Namibia. To effectively test whether or not there is evidence of macroeconomic convergence it would be beneficial to have a reasonably long time series as well as a uniform set of data across the countries under analysis.

Owing to such data limitations and the need to use uniform data that is comparable across the countries this study uses interest rate data. These were obtained from International Monetary Fund (IMF) International Financial Statistics CD ROM May 2008. The interest rates series used are: the Bank rate (CBR) and the lending rate (LR). The Bank rate is the rate at which central banks lend or discount eligible paper for depository institutions (line 60 of the IMF IFS) and the lending rate represents the prime lending rate of the major commercial banks (line 60p). The regression sample includes only ten countries[7] for which consistent and comparable data was available.

The estimation period runs from January 1990 to December 2007 and the analysis makes use of a rolling sample period of six years (72 observations). Therefore, the analysis considered 13 rolling samples from January 1990 to December 1995, January 1991 to December 1996 and so on until January 2002 to December 2007. Toolsema *et al.* (2002:9) suggest that the idea behind the rolling window approach is to generate results that should indicate whether monetary transmission has converged over time in the country under consideration. Moreover, according to Aziakpono and Wilson (2008:20), the rolling window analysis is useful as it allows us to trace the dynamic development of the interest rate pass-through over time.

3.3. EMPIRICAL PASS-THROUGH MODEL

According to Sander and Kleimeir (2006:2), a widely used methodology to investigate the effectiveness of the monetary transmission process is interest rate pass-through estimation as it is able to determine how fast and how complete changes in monetary policy rates are passed onto bank lending rates. However, it is crucial to note that the speed and completeness of such interest rate pass-through depends upon variables such as the banking market structure as well as potential information asymmetries.

The pass-through methodology used in this study is closely based on Aziakpono and Wilson (2008). Thus, the primary model representing the relationship between the central bank rate and the lending rate for the countries under analysis is specified as follows:

$$LR_t = \alpha_0 + \alpha_1 CBR_t + \varepsilon_t \quad \text{.....(1)}$$

[7] The countries included are: Botswana, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia.

where CBR_t represents the exogenously determined central bank rate and LR_t represents the endogenously determined commercial bank retail rate, which is a lending rate; ε_t is the stochastic error term; while α_0 and α_1 are the intercept and slope parameters respectively. The *a priori* expectation is that $0 \leq \alpha_1 \leq 1$. According to Aziakpono *et al.* (2007:13) and Sorensen and Werner (2006:21), if $\alpha_1 = 1$ this implies full or perfect (one-to-one) pass-through of the central bank rate to the lending rate in the long-run. However, issues such as switching costs, information asymmetries, credit demand functions that are not fully elastic, imperfect competition and other financial market imperfections can cause imperfect or limited pass-through which will be represented by $\alpha_1 < 1$ (Aziakpono *et al.*, 2007:13). On the other hand, if $\alpha_1 > 1$ this implies a form of over-shooting and this can be an indication that banks are not rationing the supply of credit but are rather increasing lending rates so as to compensate for higher risks and this may be due to credit risk factors that are reflective of information asymmetries between banks and their respective borrowers (Aziakpono *et al.*, 2007:13).

3.3.1. *Econometric Procedure*

The econometric procedure to be followed when estimating Equation 1 depends upon the time series properties of the data. Hence, it is necessary to determine whether the interest rates are either stationary or non-stationary at levels and whether or not they are cointegrated[8]. Thus, the natural starting point of the analysis is to conduct unit root tests. The reason behind this is that it is well known that a regression analysis using non-stationary variables is vulnerable to produce spurious results and, thus, standard asymptotic econometric theory used for regression analysis cannot be applied (Hamori and Tokihisa, 1997:245). There are various methods that can be used to test for the stationarity of time-series data (cf. Dickey and Fuller 1981; Said and Dickey 1984; Phillips and Perron 1988; and Kwiatkowski *et al.*, 1992). This study uses the Dickey-Fuller Generalised Least Squares (DF-GLS) test and the Phillips-Perron (PP) test to test for unit root.

If the interest rate series are found to be stationary at levels then Equation 1 is estimated using Ordinary Least Squares (OLS). However, if the unit root tests reveal that the series

[8] The underlying idea behind cointegration is that non-stationary time series (such as interest rates) can move apart in the short-run, but will return to an equilibrium relation in the long-run (Toolsema et al., 2002:9).

are not stationary at levels, but stationary at first difference, then cointegration tests will be conducted in order to determine whether or not the CBR and the LR of the respective country are cointegrated. If the stationary series of the CBR and the LR are found not to be cointegrated, then Equation 1 will be estimated with first difference series so as to avoid the problem of spurious regression. Thus, Equation 2 will be estimated in such an instance:

$$\Delta LR_t = \delta_0 + \delta_1 \Delta CBR_{it} + \varepsilon_t \text{ .....(2)}$$

where Δ represents the first difference of either the CBR or the LR, while δ_0 and δ_1 represent the short-run intercept and slope coefficients respectively. The slope coefficient, δ_1, will be interpreted as the short-run pass-through for the respective country.

If the CBR and the LR are found to be cointegrated, then an error correction model (ECM) as in Aziakpono and Wilson (2008) will be estimated to determine the extent of the pass-through as well as how long it will take for the LR to adjust to changes in the CBR. The specification of the ECM follows in Section 3.3.2.

Before the details of the ECM are discussed it is necessary to briefly outline the tests that are conducted in order to determine whether or not the CBR and the LR are cointegrated. Following Aziakpono and Wilson, (2008) four types of tests are conducted to provide robust evidence of whether or not LR and CBR are cointegrated, namely: (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 test. Cointegration is considered to exist if at least two of the above test statistics are significant at the 10% level or one test statistic at the 5% level of significance and secondly, following Kremers, Ericsson and Dolado (1992), cointegration is considered to exist when the coefficient of the lagged error correction term (ECT_{t-1}) is significant at the 5% level.

Kremers *et al.* (1992:341) illustrate how a statistic based upon the estimation of an error-correction model can be approximately normally distributed when no cointegration is present, despite the fact that the equivalent Dickey-Fuller statistic has non-normal

asymptotic distribution. Thus, with cointegration, the ECM statistic is able to generate more powerful tests than those based upon the Dickey-Fuller statistic that is applied to the residuals of a static cointegrating relationship. Hence, in this study cointegration is considered to exist if the coefficient of the lagged error correction term is significant at the 5% level even if the other tests indicate that cointegration does not exist. This decision is based purely on the premise that the error correction based test has proved to be more powerful (Kremers *et al.*, 1992).

3.3.2. *The Error Correction Model*

If cointegration between the CBR and the LR is found from the tests mentioned above, an ECM of the relationship between these two interest rates would be estimated to examine the short-run dynamics. The ECM to be estimated is represented by Equation 3 and has the following form:

$$\Delta LR_t = \delta_0 + \delta_1 \Delta LR_{t-1} + \beta_1 \Delta CBR_{it} + \sigma EC_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

where Δ represents the first difference of the respective interest rate, ε_t is the white noise error term and σ is the coefficient of the error correction term, which subsequently measures the degree of adjustment to equilibrium. According to Aziakpono and Wilson (2008:25) a coefficient of the EC_{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 pass-through and δ_1 is the coefficient of the lagged dependent variable, i.e. the lending rate.

From Equation 3 above following Aziakpono and Wilson (2008), the mean adjustment lag (ML) is computed as follows:

$$ML = (1 - \beta_1) / \sigma \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

Equation 4 above represents the mean adjustment lag, which is a measure of the degree of rigidity for the symmetric error correction model. According to Aziakpono and Wilson (2008:25) high rigidity is indicated by a ML that is high and this consequently indicates a slow adjustment of the LR to policy-induced changes in the CBR. Similarly, if the ML is low then the adjustment of the LR to policy induced changes in the CBR are much

quicker and thus, there is a lower degree of rigidity in the symmetric error correction model. Hence, the ML is essentially a measure of the speed of adjustment to which the LR will respond to changes in the CBR.

The short-run and long-run pass-through parameters as well as the mean adjustment lags for the 13 rolling sample will be graphically plotted in order to examine whether or not the pass-through from policy induced changes in the CBR to the LR has become more similar over time, i.e. whether there is convergence in monetary transmission among the SADC countries. If it is evident that convergence has occurred, then the formation of a monetary union becomes more feasible.

3.4. CONCLUSION

This chapter outlines the empirical method that is used in this study. The econometric procedure described in Section 3.4 will be used in an attempt to determine the extent of macroeconomic convergence within SADC through analysing whether the degree of interest rate pass-through has become more similar over time for the countries included in the study. The results of the estimation procedure are presented in the following chapter.

CHAPTER 4
EMPIRICAL RESULTS

4.1. INTRODUCTION

This chapter presents the results of the empirical pass-through model described in Chapter 3. Firstly, a preliminary analysis of the data is undertaken and the descriptive statistics and correlations between the CBR and the LR are presented in Section 4.2. Section 4.3 provides a summary of the results of the unit root tests while Section 4.4 presents the findings from the cointegration analysis. Section 4.5 and Section 4.6 provides a discussion of the results of the pass-through model for SADC as well as SACU and the CMA. Finally, Section 4.7 concludes and a summary of the interest rate pass-through analysis is provided in Table 4.3A of the chapter Appendix.

4.2. PRELIMINARY ANALYSIS

Table 4.1 reports the banking market concentration for the 10 SADC countries included in the analysis. This table is compiled to gain insight into the degree of banking sector competition as this has an effect upon interest-rate pass-through.

Table 4.1. Bank Concentration

YEAR	BOTS	LES	MAD	MAL	MOZ	NAM	SA	SWA	TAN	ZAM
1990	*	*	*	*	*	*	1	*	*	*
1991	1	*	*	*	*	*	0.88	*	*	*
1992	1	*	*	*	*	1	0.74	*	*	1
1993	0.97	*	*	*	*	1	0.75	*	*	0.85
1994	0.97	*	1	*	*	1	0.77	*	*	0.93
1995	0.97	1	1	*	*	1	0.76	*	*	0.86
1996	0.97	*	*	0.99	0.95	0.83	0.76	*	1	0.82
1997	0.98	*	*	0.96	0.90	0.82	0.74	1	0.81	0.93
1998	1	*	1	1	0.97	0.82	0.73	*	0.72	0.68
1999	1	*	0.85	0.92	0.91	0.78	0.72	1	0.72	0.69
2000	0.98	1	0.81	0.86	0.90	0.80	0.71	0.92	0.72	0.66
2001	0.97	1	0.83	0.86	0.89	0.83	0.74	0.91	0.70	0.62
2002	0.95	1	0.81	0.86	0.85	0.91	0.74	0.80	0.68	0.61
2003	0.84	1	0.81	0.86	0.80	0.86	0.76	0.76	0.58	0.58
2004	0.77	1	0.94	0.92	1	0.93	0.76	1	0.62	0.64

Notes: * represents years for where no data is available

Source: Adapted from Beck, Demirguc-Kunt and Levine (2000) and updated by authors in 2006

Bank concentration represented in Table 4.1 is calculated as the assets of the three largest banks as a share of assets of all commercial banks of the respective countries. A bank

concentration index close to 1 indicates a country with a high bank concentration and thus, competition within the banking sector will be relatively low. Moreover, a low bank concentration index indicates a less concentrated banking sector and therefore, a higher degree of banking sector competition. From Table 4.1 it is clear that the degree of bank concentration is relatively high in the majority of the countries, however, the 2004 figures indicate that bank concentration is highest in Lesotho, Mozambique, Swaziland, Madagascar and Namibia while Tanzania and Zambia have the lowest bank concentration followed by South Africa and Botswana.

Table 4.2 below reports the country-specific descriptive statistics that relate to the central bank rates and lending rates of the countries included in the study.

Table 4.2:Descriptive Statistics

Bank Rates										
	BOTS	LES	MAD	MAL	MOZ	NAM	SA	SWA	TAN	ZAM
Mean	13.4	15.4	14.0	31.6	20.9	13.2	13.1	11.9	18.6	34.0
Median	14.0	15.5	12.0	27.0	9.95	12.8	13.0	12.0	14.6	27.9
Maximum	15.3	22.0	33.0	75.3	69.7	21.3	21.9	18.0	67.5	123.0
Minimum	6.50	10.8	7.00	11.0	9.95	7.00	7.00	7.00	7.82	6.46
Std. Dev.	1.77	2.37	6.26	13.3	20.0	4.11	3.66	2.92	10.8	24.2
Lending Rates										
	BOTS	LES	MAD	MAL	MOZ	NAM	SA	SWA	TAN	ZAM
Mean	14.5	16.5	28.3	37.5	22.0	16.5	16.4	15.0	23.7	44.9
Median	14.8	17.0	26.5	33.0	20.5	16.7	16.3	14.5	22.0	41.1
Maximum	16.8	25.0	45.0	65.0	33.5	24.8	25.5	21.0	48.0	139.3
Minimum	7.50	11.5	24.2	20.0	16.5	10.5	10.5	10.5	12.8	18.3
Std. Dev.	2.03	2.87	4.90	12.3	3.42	3.79	3.60	2.77	9.11	21.9

Source: Estimates by author.

Although the descriptive statistics are in essence self-explanatory, from a visual inspection it is evident that when considering SADC as a whole, there seems to be similarities in the reported figures amongst the SACU countries (Botswana, Lesotho, Namibia, South Africa and Swaziland) as well as similarities for other SADC countries (Madagascar, Malawi, Mozambique, Tanzania and Zambia). For example, the mean and standard deviation of both the central bank rates and the lending rates of the SACU countries are well below those of the non-SACU member countries. For example, the mean bank rate for South Africa is 13.05% while the mean bank rate for Zambia is 33.97%. Similarly, the mean lending rate for South Africa is 16.36% while the mean lending rate for Zambia is 44.87%. Hence, this provides some insight into the degree of

homogeneity as well as convergence that may be evident in terms of the pass-through analysis. Thus, it is likely that the results for the countries that form the SACU and the CMA will be different to those of the non-member countries. Hence, it is expected that differing degrees of interest rate pass-through over the estimation period may be found for these groups of countries. However, this will become clearer from the interpretation of the respective pass-through results.

Table 4.3 below provides the correlation between the CBR with the LR in level series for the 10 SADC countries that were analysed in the study.

Table 4.3: Central Bank Rate versus Lending Rate Correlations

CBR versus LR (Level Series)	Correlations
Botswana	0.948
Lesotho	0.794
Madagascar	0.537
Malawi	0.963
Mozambique	0.503
Namibia	0.968
South Africa	0.994
Swaziland	0.997
Tanzania	0.708
Zambia	0.726

Source: Estimates by author.

It is clear from Table 4.3 that the pairwise correlations between the central bank rates and the lending rates for the SACU countries tend to be significantly higher than those of the other countries that form the SADC, with the exception of Malawi. This may be due to these countries following South African monetary policy due to the CMA arrangement, and as a result the transmission of monetary policy may be similar in these countries.

4.3. UNIT ROOT TESTS

The detailed results for the unit root tests are reported in Table B1 in Appendix B. Tests were conducted for a unit root in both the CBR and the LR for each rolling window used in the analysis. Both the Dickey-Fuller Generalised Least Squares (DF-GLS) and the Phillips-Perron (PP) tests were conducted for both series in levels and in first differences. The results for the series in levels strongly suggest that null hypothesis (H_0) of unit root cannot be rejected for the vast majority of the rolling windows and this is a first sign of the expected non-stationarity of the interest rates over the analysed period. However,

from the results of the hypothesis of a unit root in the first difference of both the CBR and the LR, it becomes clear that both tests strongly reject the null hypothesis (H_0) of a unit root. This implies that the interest rates that are under consideration are I(1) variables.

4.4. COINTEGRATION ANALYSIS

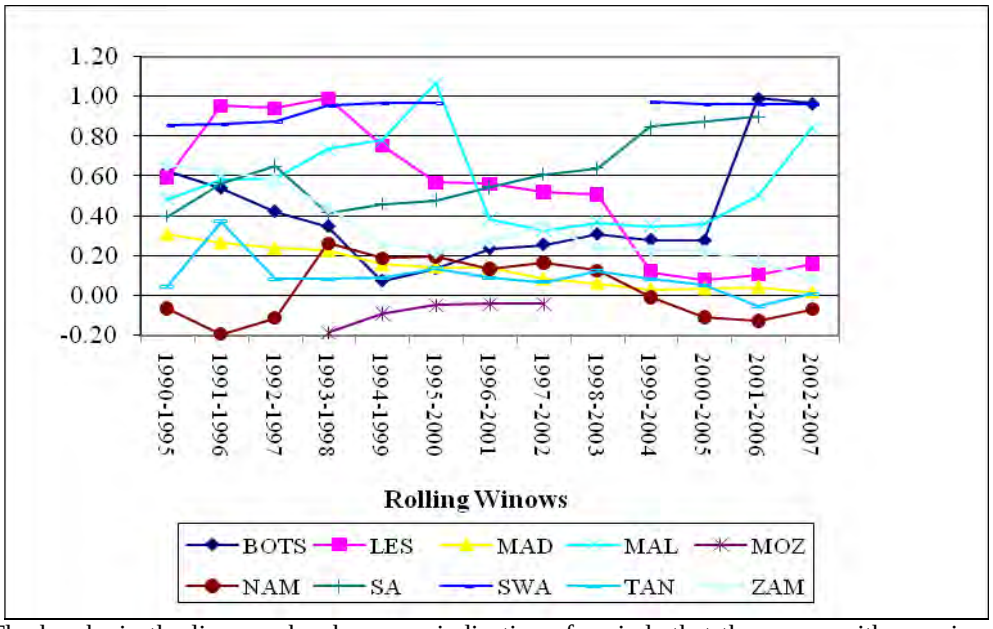
Since both series of interest rates (CBR and LR) are found to be integrated of the same order, i.e. they are integrated of order I(1) as shown by the unit root tests, they can be tested to determine whether a stable long-run relationship exists between them. As mentioned in the previous Chapter, four types of cointegration tests were undertaken to determine if a long-run relationship exists between the CBR and the LR over the various rolling windows. The results of these tests are reported in Table C1 in Appendix C. As can be seen from the results of the respective cointegration tests, a long-run cointegrating relationship is found to exist for almost all of the rolling window periods under analysis for the ten SADC countries included in the study. Since the existence of a long-run relationship has been established between the CBR and the LR, the short-run dynamics of the pass-through model can be established within an error-correction model. However, an error-correction model cannot be estimated for the periods where cointegration is not present.

4.5. RESULTS OF THE ROLLING REGRESSION MODEL

The results for the regressions have been estimated for a sample period of 18 years from January 1990 to December 2007. More specifically rolling sample periods of six years (72 observations) were estimated to track the dynamic development of the interest rate pass-through over time. Summaries of the long-run and short-run rolling regression models are presented in Tables D1 and E1 respectively of the Appendix. Figures 4.1 – 4.9 below report the results of the rolling regression estimation for the short-run pass-through (δ_1), the long-run pass-through (α_1) and the mean adjustment lag (ML) for SADC, SACU and the OTHER countries.

4.5.1. Short-*Run Pass-Through (δ_1): SADC, SACU and OTHER*

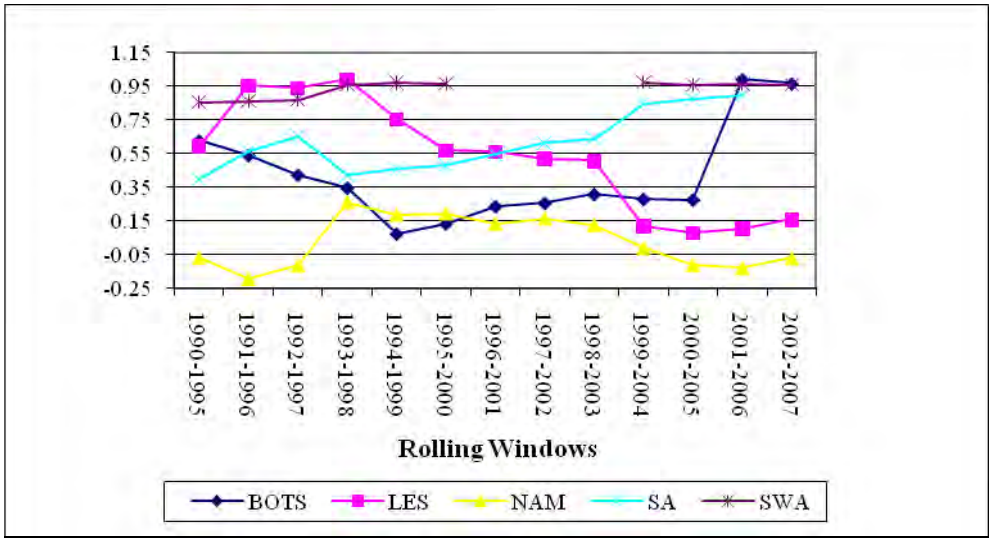
Figure 4.1. Short-Run Pass-Through (δ_1): SADC



Note: The breaks in the line graphs above are indicative of periods that there were either an insufficient number of data observations to estimate the model or the series were representative of a near singular matrix. This note also applies to Figures 4.2 and 4.3 below.

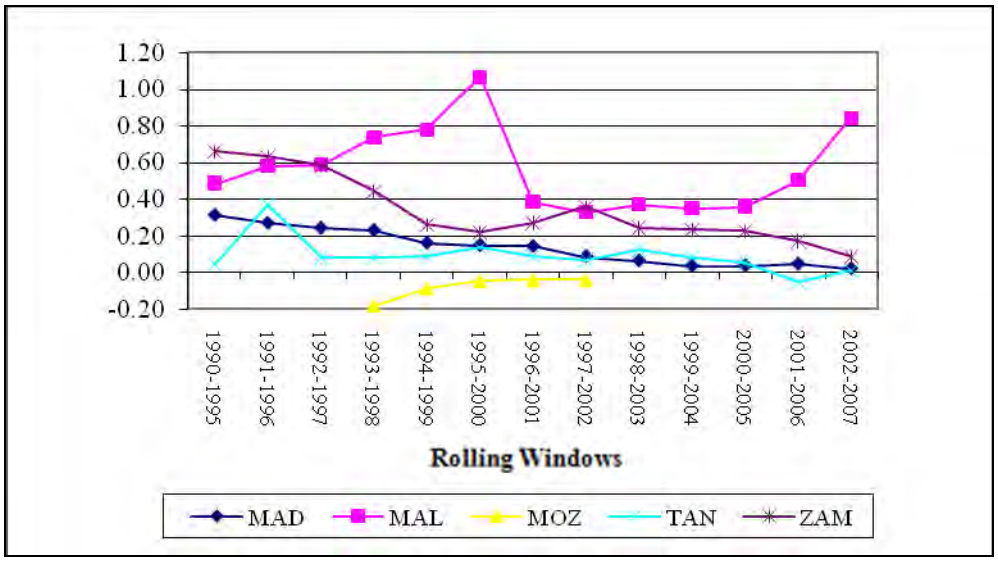
Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

Figure 4.2. Short-Run Pass-Through (δ_1): SACU



Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

Figure 4.3. Short-Run Pass-Through (δ_1): OTHER



Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

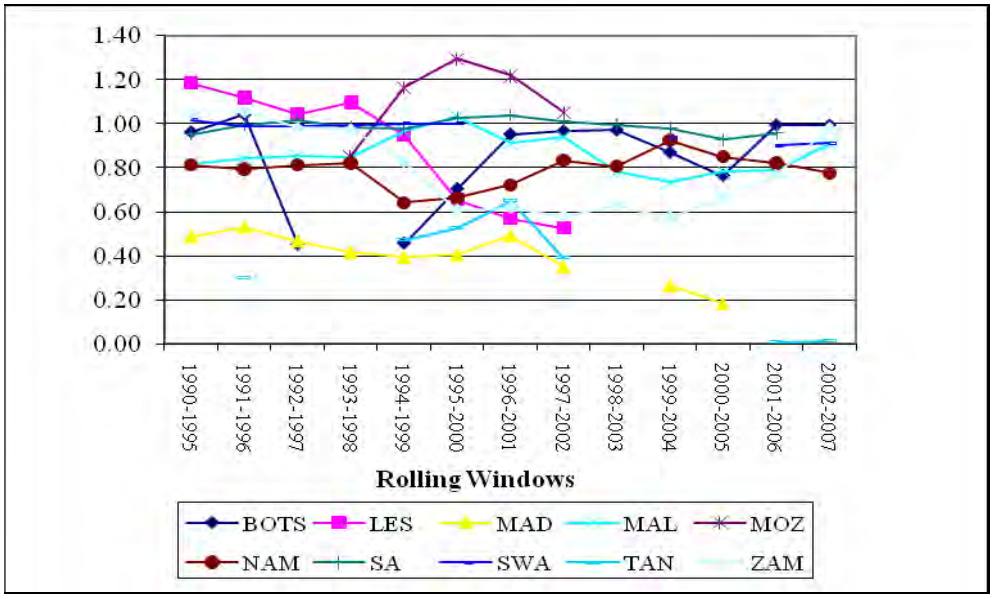
As mentioned in the previous chapter, the short-run pass-through (δ_1) measures the immediate adjustment of the lending rate to changes in the policy induced central bank rate. Figure 4.3 illustrates that for countries such as Madagascar and Tanzania, the short-run pass-though has shown tendencies to be relatively stable over time. However, from Figure 4.1 it is clear that the short-run pass-through of Lesotho initially increased but then substantially decreased towards the levels of pass-through in Madagascar, Namibia, Tanzania and Zambia. The short-run pass-through in South Africa and Swaziland remain consistently above those in the other countries over the majority of the estimation period, while after the 2000-2005 rolling window the short-run pass through of Botswana and Malawi rise to levels similar to those of South Africa and Swaziland. Owing to limited data for Mozambique, the short-run pass-through was only estimated for five rolling windows and it is clear that the degree of pass-through remains well below those for all other countries.

It should be reiterated that a short-run pass-through coefficient with a value of δ_1 that is significantly < 1 indicates that the interest rate adjustment process is sluggish, owing to factors such as interest rate stickiness. Hence, from Figures 4.1, 4.2 and 4.3 it is evident that interest rate adjustment in the short-run is sluggish in Lesotho, Madagascar, Mozambique, Namibia, Tanzania and Zambia particularly in the latter rolling windows post 1999. However, more favourable results with regard to immediate interest rate

adjustment are found in Botswana and Malawi from 2002 onwards. The short-run pass-through for South Africa continuously improved from 1993 onwards to levels similar to those of Botswana and Swaziland in the final rolling windows. Finally, Swaziland tended to show a much quicker and more stable short-run pass-through over the entire estimation period in comparison to the other countries.

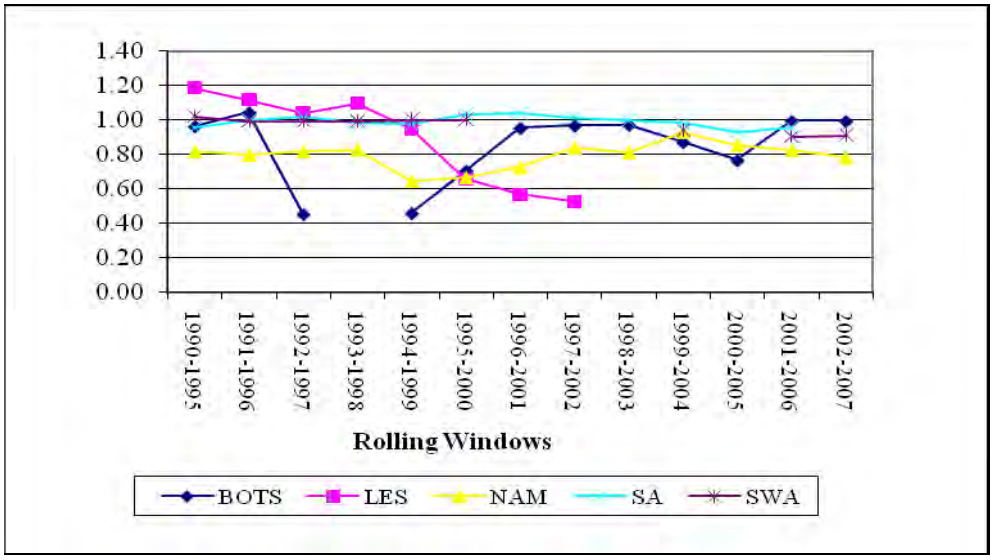
4.5.2. *Long-Run Pass-Through* (α_1): *SADC, SACU and OTHER*

Figure 4.4. Long-Run Pass-Through (α_1): SADC



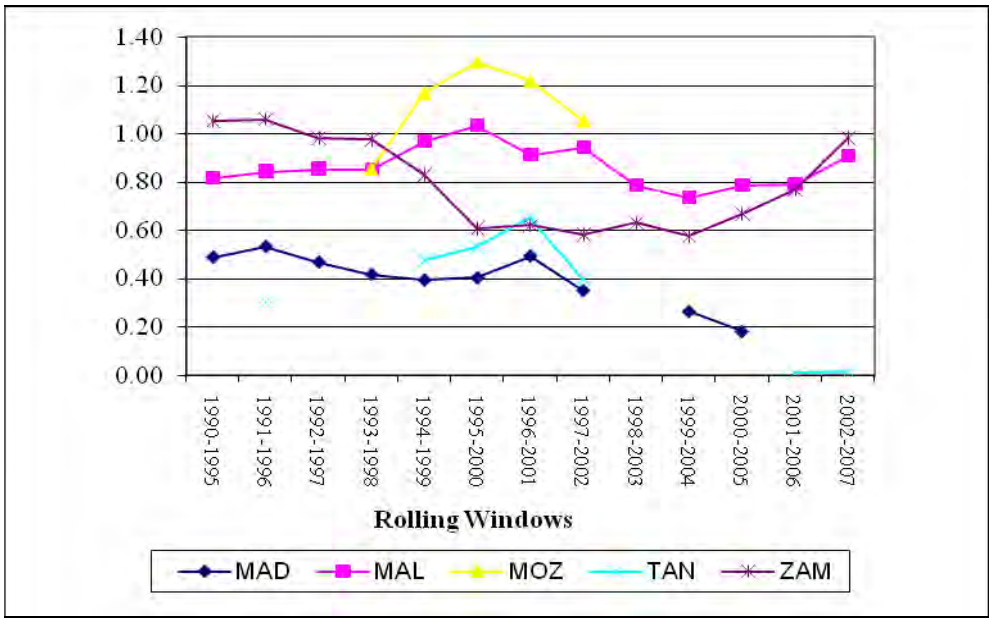
Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

Figure 4.5. Long-Run Pass-Through (α_1): SACU



Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

Figure 4.6. Long-Run Pass-Through (α_1): OTHER



Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

Figure 4.4 above shows that there is evidence that the long-run pass-through in Botswana, Malawi, Namibia, South Africa, Swaziland and Zambia tend to move towards similar levels over the estimation period, particularly in the 2002-2007 rolling window. Therefore, this finding suggests that there is evidence of convergence of the long-run pass-through parameters in these countries. However, similarly to the short-run pass-through represented in Section 4.5.1, this development becomes more visible from the start of the 1996-2001 rolling window for Botswana, Malawi, Namibia, South Africa, Swaziland and Zambia.

The long-run pass-through for Lesotho falls to levels lower than those in the countries mentioned above from 1994-2000, as shown in Figures 4.4 and 4.5. Long-run pass-through coefficients could not be estimated for Lesotho from 1998 onwards since there was no cointegrating relationship between the LR and the CBR. One possible explanation for the lower degree of long-run pass-through in Lesotho compared to the other SACU countries may stem from the degree of banking market concentration in the country. The figures from Table 4.1 clearly show that the banking market in Lesotho is highly concentrated[9] and, therefore, the level of competition in the banking sector is low. Thus, there is no pressure on the commercial banks to react quickly to policy-induced changes in the CBR. Thus, the monetary transmission process is likely to be slower and more

[9] The bank concentration index is 1 for all years where data is available.

inefficient compared to a country where banking sector competition is rife. Hence, this is an example of interest rate stickiness. In addition Aziakpono *et al.* (2007:16) note that the financial system in Lesotho was in a state of distress from the mid-1990's owing to poor management as well as political interference in the banking sector which resulted in reckless lending. This resulted in the liquidation of two of the largest banks[10] in Lesotho, which further increased the concentration of the banking sector and reduced competition. Finally, a further insight as to why the long-run pass-through in Lesotho is considerably lower compared to the other SACU countries may be due to the degree of financial and monetary interdependence between Lesotho and South Africa. Aziakpono, (2008) conducted a study whereby the relationship between interest rates (including the LR) in Lesotho and the CBR in South Africa was analysed. The author examined the extent to which the money market in Lesotho is directly affected by the South African policy stance. The results revealed that Lesotho is dependent on the policy stance in South Africa more than its domestic monetary policy stance, and therefore, this may be a further explanation for the the relatively inefficient domestic monetary policy transmission in Lesotho (Aziakpono, 2008:207). If this is the case, it would mean that Lesotho and the other SACU countries are converging in their monetary policy transmission.

Although there is evidence of convergence of the long-run pass-through for Botswana, Malawi, Namibia, South Africa, Swaziland and Zambia, there is a clear pattern of divergence for Madagascar and Tanzania whose long-run pass-through parameters fall to significantly low levels of 0.2 and 0.02 respectively for the final rolling windows that could be estimated for each country, as shown in Figure 4.6. These levels of pass-through are evidently well below those for countries that represent the convergence group. Moreover, these low values of the long-run pass-through are an indication of imperfect or limited interest rate pass-through as well as being a signal that market imperfections plague the economies of these countries. More specifically, it is likely that information asymmetries, switching costs, credit demand functions that are not fully elastic as well as other country specific financial market imperfections prevail in these countries.

The estimation results revealed that no country produced a long-run pass-through coefficient (α_1) > 1 for the final rolling window that was able to be estimated for each respective country. Thus, there was no overshooting and therefore, there is no indication

[10] Lesotho Agricultural Development Bank in 2000 and the Lesotho bank in 2001.

that banks are not rationing the supply of credit but are rather increasing lending rates so as to compensate for higher risks that are primarily due to credit risk factors that are reflective of information asymmetries between banks and their respective borrowers. However, there were periods where all the countries except for Madagascar, Namibia and Tanzania overshot, i.e. where (α_1) > 1, in previous rolling windows of the estimation period.

It is again, important to mention that if the value of a long-run pass-through coefficient (α_1) = 1, this implies that full or perfect (one-to-one) pass-through of the policy induced central bank rate to the lending rate has occurred. From the results of the estimation a movement toward near perfect long-run pass-through can be observed for Botswana, Malawi, South Africa, Swaziland and Zambia. However, it should be recalled that the mean interest rates (CBR and LR) in Malawi and Zambia are very high compared to those in the SACU countries.

Thus, in sum the results reveal relatively similar degrees of pass-through for the SACU (with the exception of Lesotho) as well as for Zambia and Malawi. However, there is evidence of somewhat heterogeneous pass-through for the remaining countries under analysis. According to Sorensen and Werner (2006:25), an explanation for such heterogeneity between the degree of pass-through between countries are the differing degrees of competition in the banking sectors (as mentioned above) of each country, as well as country specific factors of the financial structures.

4.5.3. *Mean Adjustment Lag (ML): SADC, SACU and OTHER*

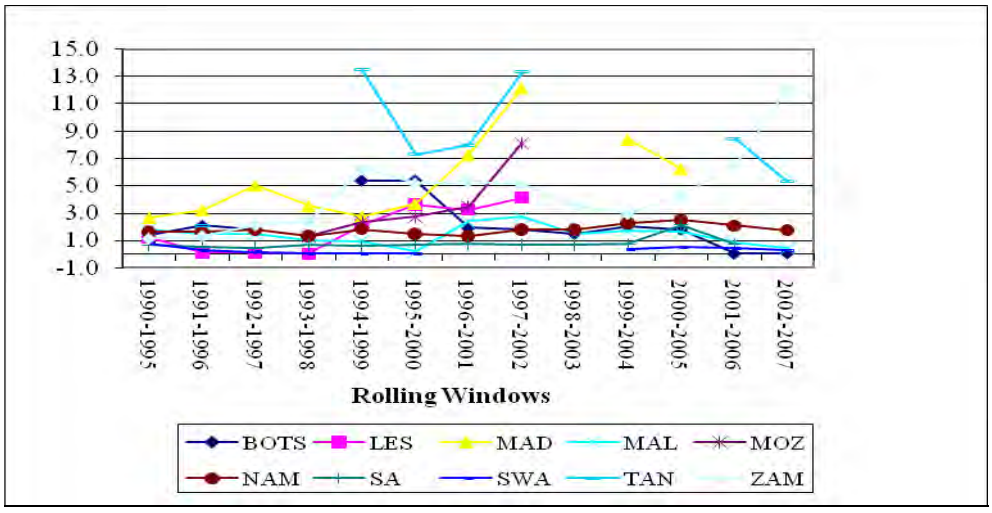
The question of how long it would take for full adjustment of the long-run interest rate pass-through to be attained is given by the mean adjustment lag. Thus, the mean adjustment lag indicates the exact time it takes for the transmission process in the long-run to be completed, as well as showing whether the process is sluggish or fast (Aziakpono, 2006:15).

Figures 4.7, 4.8 and 4.9 below illustrate the speed of transmission as measured by the mean adjustment lag (ML) of the LR to policy-induced changes in the CBR. The ML is calculated as stated in Equation (4) in Chapter 3. It should be noted that the speed of adjustment may only be estimated for rolling windows where a cointegrating relationship

between the LR and the CBR was found. This is because the error correction model (ECM) could not be estimated in cases where a cointegrating relationship is not found. Hence, this explains the reason for the breaks in the line graphs above for countries such as Botswana, Lesotho, Madagascar, Mozambique Swaziland and Tanzania, in some of the rolling windows.

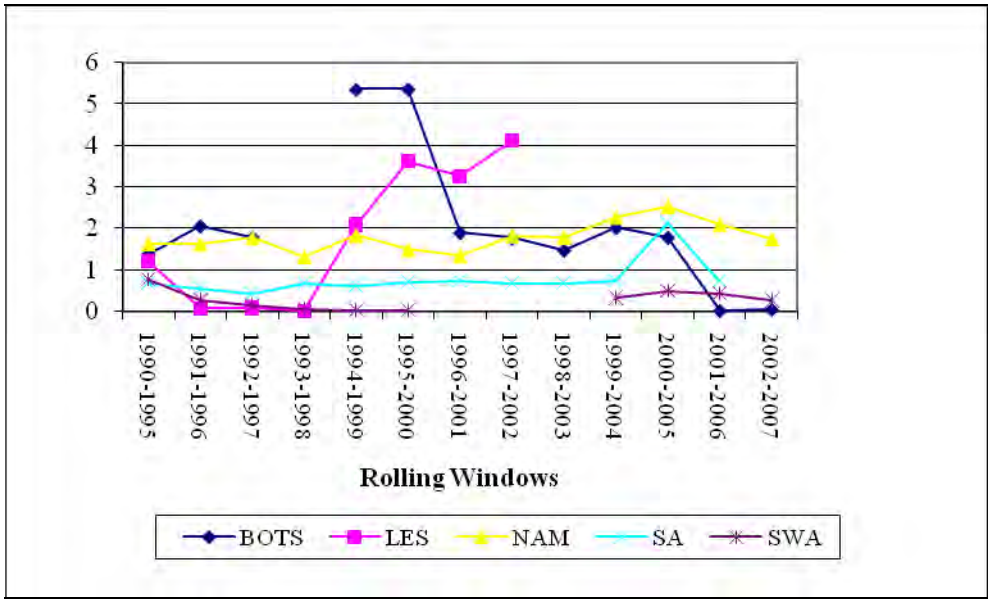
It is apparent that the ML tends to be relatively low and stable over the estimation period for Malawi, Namibia, South Africa and Swaziland. However, a diverging speed of adjustment is noticeable for countries such as Madagascar, Mozambique, Tanzania and Zambia. It is interesting to note that although the results show that the long-run pass-through in Zambia is high and tends towards those of the SACU countries, it takes a longer time for the pass-through to be accomplished. This is an indication of rigidity in the market owing to country specific market imperfections. The ML of Botswana increased to relatively high levels compared to the other SACU countries during the 1994-1999 and the 1995-2000 rolling window, however, the ML decreased to levels similar to those of Malawi, Namibia, South Africa and Swaziland from 2000 onwards. From the results of the computed ML it is evident that Botswana, Malawi, Swaziland and South Africa recorded the fastest LR adjustments with the transmission process being completed within a month of a change in the CBR. Thus, although there is a relatively strong degree of convergence over time in terms of the ML between the countries that form the SACU and Malawi, it is still evident that there remains a degree of variation amongst the other countries included in the analysis.

*Figure 4.7.*Mean Adjustment Lag (ML) in the ECM model: SADC



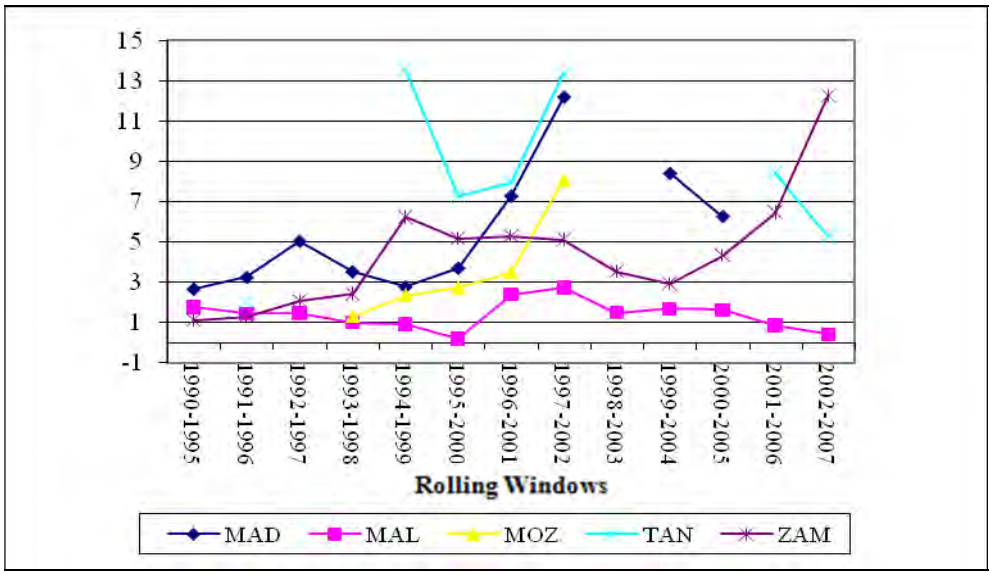
Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

*Figure 4.8.*Mean Adjustment Lag (ML) in the ECM model: SACU



Source: Computed based on data from the IMF International Financial Statistics CD-ROM

*Figure 4.9.*Mean Adjustment Lag (ML) in the ECM model: OTHER



Source: Computed based on data from the IMF International Financial Statistics CD-ROM.

4.6. CONCLUSION

From interpretation of the short-run pass-through (δ_1), the long-run pass-through (α_1), and the mean adjustment lag (ML) it is clear that there are countries that show tendencies of convergence over the estimation period in terms of the pass-through of monetary policy. A 'convergence group' consisting of Botswana, Lesotho, Malawi, Namibia, South

Africa, Swaziland and, to some extent, Zambia has been identified. It is interesting to note that the values of the correlation coefficients presented in the correlation matrix between the CBR and the LR for the countries that form the 'convergence group' mentioned above are the six highest values and range from 0.948 – 0.997. Thus, although not all the SADC countries considered show similar degrees of pass-through over time, from the results that were generated it could be tentatively suggested that an initial group of countries consisting of Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland and Zambia could form an intermediate monetary union which will essentially be an expansion of the existing CMA. The results of this paper differ slightly from other studies (cf. Bayoumi and Ostry, 1998 and Kabundi and Loots, 2005), however, they are similar to those of Khamfula and Huizinga (2004) who used a GARCH model, and Aziakpono *et al.* (2007) who used Principal Component Analysis as well as interest rate pass-through to examine the feasibility of a southern African monetary union. Khamfula and Huizinga (2004) propose that it would be possible for Botswana, Lesotho, Malawi, Mauritius, Namibia, Swaziland and South Africa to form a monetary union, while Aziakpono *et al.* (2007) suggest that the CMA may be expanded to include Botswana, the Seychelles and Zambia. This study did not include Mauritius or the Seychelles owing to data limitations, however, similar results to Khamfula and Huizinga (2004) and Aziakpono *et al.* (2007) may have been found if data was available. Thus, based on the findings of these studies (the current one and those of Khamfula and Huizinga (2004) and Aziakpono *et al.* (2007), it is possible that the CMA could be expanded to include Botswana, Malawi, Mauritius and Seychelles.

APPENDIX TO CHAPTER 4

4.7. SUMMARY OF INTEREST RATE PASS-THROUGH ANALYSIS

Table A 4.1: Summary of Inertest Rate Pass-Through Analysis

Country	Rolling Sample		Cointegration?				Long-run PT		Short-run PT		ECM(s)		ML
	From	To	JJ	EG	CRDW	Kremers	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	
Botswana	Jan-90	Dec-95	yes	no	yes	yes	0.96	29.6	0.63	7.46	-0.27	-3.68	1.38
	Jan-91	Dec-96	yes	no	yes	yes	1.04	11.3	0.54	4.51	-0.22	-2.21	2.05
	Jan-92	Dec-97	yes	yes	yes	yes	0.45	7.56	0.42	4.78	-0.32	-4.02	1.78
	Jan-93	Dec-98	yes	no	yes	no	0.46	10.0	0.35	3.39			
	Jan-94	Dec-99	yes	no	yes	yes	0.46	6.36	0.08	0.83	-0.17	-2.80	5.35
	Jan-95	Dec-00	yes	no	yes	yes	0.70	10.8	0.14	2.53	-0.16	-3.11	5.36
	Jan-96	Dec-01	yes	yes	yes	yes	0.95	26.6	0.24	4.67	-0.40	-5.58	1.89
	Jan-97	Dec-02	yes	yes	yes	yes	0.97	33.6	0.26	4.94	-0.42	-5.65	1.76
	Jan-98	Dec-03	yes	yes	yes	yes	0.97	33.9	0.31	5.74	-0.47	-5.92	1.47
	Jan-99	Dec-04	yes	yes	yes	yes	0.87	23.0	0.28	5.83	-0.36	-4.23	2.01
	Jan-00	Dec-05	yes	yes	yes	yes	0.76	18.5	0.28	6.00	-0.41	-4.64	1.78
	Jan-01	Dec-06	yes	yes	yes	yes	0.99	243.4	0.99	80.9	-0.87	-7.25	0.01
	Jan-02	Dec-07	yes	yes	yes	yes	0.99	200.9	0.97	73.6	-0.85	-7.21	0.04
Lesotho	Jan-90	Dec-95	yes	yes	yes	yes	1.18	10.4	0.59	1.99	-0.34	-2.91	1.20
	Jan-91	Dec-96	yes	yes	yes	yes	1.12	12.3	0.95	3.22	-0.72	-4.24	0.06
	Jan-92	Dec-97	yes	yes	yes	yes	1.04	10.8	0.94	3.07	-0.75	-4.42	0.08
	Jan-93	Dec-98	yes	yes	yes	yes	1.10	16.6	0.99	6.41	-0.80	-5.12	0.01
	Jan-94	Dec-99	yes	no	yes	yes	0.95	18.0	0.75	8.08	-0.12	-1.35	2.09
	Jan-95	Dec-00	yes	no	no	yes	0.66	8.41	0.57	6.69	-0.12	-1.89	3.61
	Jan-96	Dec-01	yes	no	no	yes	0.57	8.22	0.56	6.58	-0.13	-2.10	3.25
	Jan-97	Dec-02	yes	no	no	yes	0.53	8.65	0.52	6.77	-0.12	-1.93	4.10
	Jan-98	Dec-03	yes	no	no	no	0.58	7.98	0.51	6.26			
	Jan-99	Dec-04	yes	no	no	no	0.63	8.02	0.12	1.24			
	Jan-00	Dec-05	yes	no	no	no	0.71	7.09	0.08	1.28			
	Jan-01	Dec-06	yes	no	no	no	1.04	7.33	0.11	1.40			
	Jan-02	Dec-07	yes	no	no	no	0.83	6.65	0.16	1.80			
Madagascar	Jan-90	Dec-95	yes	yes	yes	yes	0.49	27.2	0.31	3.64	-0.26	-2.66	2.65
	Jan-91	Dec-96	yes	no	yes	yes	0.53	25.2	0.27	3.83	-0.23	-3.33	3.23
	Jan-92	Dec-97	yes	no	no	yes	0.47	15.8	0.24	3.42	-0.15	-3.00	5.02
	Jan-93	Dec-98	yes	no	no	yes	0.42	16.7	0.23	3.14	-0.22	-3.69	3.51
	Jan-94	Dec-99	yes	no	yes	yes	0.39	18.0	0.16	2.37	-0.30	-4.51	2.76
	Jan-95	Dec-00	yes	no	no	yes	0.40	17.3	0.15	2.32	-0.23	-4.12	3.69
	Jan-96	Dec-01	yes	no	no	yes	0.49	15.8	0.14	2.49	-0.12	-2.84	7.26
	Jan-97	Dec-02	yes	no	no	yes	0.35	4.50	0.09	1.67	-0.08	-2.29	12.16
	Jan-98	Dec-03	yes	no	no	no	0.31	7.97	0.06	1.79			
	Jan-99	Dec-04	yes	no	no	yes	0.27	7.23	0.03	1.08	-0.12	-2.96	8.38
	Jan-00	Dec-05	yes	no	no	yes	0.18	7.31	0.04	0.97	-0.15	-3.16	6.25

Table A 4.1: Summary of Inertest Rate Pass-Through Analysis

Country	Rolling Sample		Cointegration?				Long-run PT		Short-run PT		ECM(s)		ML
	From	To	JJ	EG	CRDW	Kremers	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	
	Jan-01	Dec-06	yes	no	no	no	0.23	5.84	0.04	0.62			
	Jan-02	Dec-07	yes	no	no	no	0.30	1.32	0.02	0.06			
Malawi	Jan-90	Dec-95	yes	yes	yes	yes	0.82	22.0	0.49	2.98	-0.29	-3.58	1.76
	Jan-91	Dec-96	yes	no	yes	yes	0.84	26.2	0.58	4.89	-0.29	-3.57	1.43
	Jan-92	Dec-97	yes	no	yes	yes	0.85	22.5	0.59	4.89	-0.29	-3.54	1.44
	Jan-93	Dec-98	yes	no	yes	yes	0.85	20.5	0.74	6.96	-0.27	-3.28	0.99
	Jan-94	Dec-99	yes	no	yes	yes	0.97	21.7	0.78	7.11	-0.24	-3.10	0.92
	Jan-95	Dec-00	yes	no	yes	yes	1.03	23.3	1.07	11.2	-0.37	-5.08	0.18
	Jan-96	Dec-01	yes	no	yes	yes	0.91	24.7	0.38	5.69	-0.26	-3.12	2.37
	Jan-97	Dec-02	yes	no	yes	yes	0.94	24.6	0.33	5.05	-0.25	-3.22	2.72
	Jan-98	Dec-03	yes	no	yes	yes	0.79	18.4	0.37	5.99	-0.43	-4.84	1.47
	Jan-99	Dec-04	yes	no	yes	yes	0.73	22.3	0.35	5.95	-0.39	-3.93	1.67
	Jan-00	Dec-05	yes	no	yes	yes	0.78	28.9	0.36	6.30	-0.40	-4.29	1.61
	Jan-01	Dec-06	yes	no	yes	yes	0.79	32.5	0.50	9.19	-0.59	-7.40	0.84
	Jan-02	Dec-07	yes	no	yes	yes	0.91	116.8	0.84	25.1	-0.40	-4.06	0.40
Mozambique	Jan-90	Dec-95											
	Jan-91	Dec-96											
	Jan-92	Dec-97											
	Jan-93	Dec-98	yes	no	yes	yes	0.86	4.09	-0.18	-0.37	-0.91	-2.93	1.30
	Jan-94	Dec-99	yes	no	yes	yes	1.17	6.24	-0.09	-0.23	-0.46	-2.91	2.35
	Jan-95	Dec-00	yes	yes	yes	yes	1.30	7.73	-0.05	-0.15	-0.38	-3.31	2.73
	Jan-96	Dec-01	yes	no	yes	yes	1.22	7.42	-0.04	-0.14	-0.30	-3.06	3.48
	Jan-97	Dec-02	yes	no	yes	yes	1.05	5.17	-0.04	-0.14	-0.13	-1.83	8.10
	Jan-98	Dec-03											
	Jan-99	Dec-04											
	Jan-00	Dec-05											
	Jan-01	Dec-06											
	Jan-02	Dec-07											
Namibia	Jan-90	Dec-95	yes	yes	yes	yes	0.82	16.0	-0.06	-0.38	-0.65	-5.80	1.63
	Jan-91	Dec-96	yes	yes	yes	yes	0.80	13.9	-0.19	-0.90	-0.74	-5.92	1.62
	Jan-92	Dec-97	yes	yes	yes	yes	0.81	11.4	-0.11	-0.56	-0.63	-5.65	1.77
	Jan-93	Dec-98	yes	yes	yes	yes	0.82	12.9	0.26	1.73	-0.56	-5.25	1.32
	Jan-94	Dec-99	yes	no	yes	yes	0.64	10.7	0.19	1.20	-0.44	-4.49	1.83
	Jan-95	Dec-00	yes	yes	yes	yes	0.66	16.5	0.20	1.25	-0.54	-5.26	1.49
	Jan-96	Dec-01	yes	yes	yes	yes	0.72	22.7	0.14	0.89	-0.64	-5.93	1.35
	Jan-97	Dec-02	yes	no	yes	yes	0.84	23.3	0.17	1.36	-0.46	-5.90	1.82
	Jan-98	Dec-03	yes	no	yes	yes	0.81	20.7	0.13	1.04	-0.49	-6.26	1.79
	Jan-99	Dec-04	yes	no	yes	yes	0.93	18.5	-0.01	-0.05	-0.45	-5.93	2.26
	Jan-00	Dec-05	yes	no	yes	yes	0.85	17.7	-0.11	-0.72	-0.44	-5.93	2.52
	Jan-01	Dec-06	yes	no	yes	yes	0.82	18.5	-0.13	-0.92	-0.54	-7.16	2.09
	Jan-02	Dec-07	yes	no	yes	yes	0.78	20.2	-0.07	-0.46	-0.61	-7.17	1.75
South Africa	Jan-90	Dec-95	yes	yes	yes	yes	0.95	60.6	0.40	5.67	-0.89	-10.2	0.67
	Jan-91	Dec-96	yes	yes	yes	yes	1.00	44.3	0.57	6.73	-0.80	-8.05	0.55

Table A 4.1: Summary of Inertest Rate Pass-Through Analysis

Country	Rolling Sample		Cointegration?				Long-run PT		Short-run PT		ECM(s)		ML
	From	To	JJ	EG	CRDW	Kremers	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	
	Jan-92	Dec-97	yes	yes	yes	yes	1.02	47.2	0.65	8.15	-0.81	-7.90	0.43
	Jan-93	Dec-98	yes	yes	yes	yes	0.98	42.2	0.42	5.58	-0.85	-9.27	0.68
	Jan-94	Dec-99	yes	yes	yes	yes	0.98	41.1	0.46	6.32	-0.87	-9.22	0.62
	Jan-95	Dec-00	yes	yes	yes	yes	1.03	40.5	0.48	6.05	-0.73	-8.12	0.71
	Jan-96	Dec-01	yes	yes	yes	yes	1.04	47.1	0.55	7.01	-0.62	-7.01	0.73
	Jan-97	Dec-02	yes	yes	yes	yes	1.01	49.7	0.61	8.17	-0.57	-6.26	0.68
	Jan-98	Dec-03	yes	no	yes	yes	1.00	47.4	0.64	8.80	-0.54	-5.90	0.67
	Jan-99	Dec-04	yes	no	yes	yes	0.98	48.8	0.85	13.8	-0.21	-3.00	0.73
	Jan-00	Dec-05	yes	no	no	yes	0.93	48.7	0.87	27.6	-0.06	-1.55	2.12
	Jan-01	Dec-06	yes	yes	no	yes	0.96	64.6	0.90	30.9	-0.14	-2.86	0.74
	Jan-02	Dec-07											
Swaziland	Jan-90	Dec-95	yes	no	yes	yes	1.02	39.0	0.86	19.7	-0.19	-3.07	0.76
	Jan-91	Dec-96	yes	yes	yes	yes	0.99	91.1	0.86	22.9	-0.53	-5.41	0.26
	Jan-92	Dec-97	yes	yes	yes	yes	0.99	166.6	0.87	29.1	-0.84	-7.49	0.15
	Jan-93	Dec-98	yes	yes	yes	yes	0.99	201.4	0.96	85.9	-0.83	-16.1	0.05
	Jan-94	Dec-99	yes	yes	yes	yes	1.00	445.3	0.97	110.1	-0.99	-8.31	0.03
	Jan-95	Dec-00	yes	yes	yes	yes	1.00	457.6	0.97	110.5	-1.00	-8.36	0.03
	Jan-96	Dec-01											
	Jan-97	Dec-02											
	Jan-98	Dec-03											
	Jan-99	Dec-04	yes	no	no	yes	0.94	128.0	0.97	65.4	-0.08	-1.65	0.32
	Jan-00	Dec-05	yes	no	no	yes	0.90	134.3	0.96	57.5	-0.08	-1.49	0.48
	Jan-01	Dec-06	yes	no	no	yes	0.90	144.2	0.96	61.2	-0.09	-1.49	0.42
	Jan-02	Dec-07	yes	no	no	yes	0.91	157.3	0.96	61.1	-0.14	-2.18	0.26
Tanzania	Jan-90	Dec-95	yes	no	yes	no	0.27	8.78	0.04	0.80			
	Jan-91	Dec-96	yes	no	yes	yea	0.30	8.81	0.37	5.56	-0.31	-2.13	2.05
	Jan-92	Dec-97	yes	no	yes	no	0.33	10.2	0.08	1.80			
	Jan-93	Dec-98	yes	no	no	no	0.39	9.30	0.08	1.88			
	Jan-94	Dec-99	yes	no	no	yes	0.48	10.6	0.09	2.47	-0.07	-1.84	13.5
	Jan-95	Dec-00	yes	yes	no	yes	0.53	12.4	0.14	3.19	-0.12	-2.89	7.29
	Jan-96	Dec-01	yes	no	no	yes	0.65	7.44	0.09	1.83	-0.11	-4.09	7.95
	Jan-97	Dec-02	yes	no	no	yes	0.40	4.94	0.07	1.36	-0.07	-2.35	13.4
	Jan-98	Dec-03	yes	no	no	no	0.46	6.05	0.12	2.09			
	Jan-99	Dec-04	yes	no	no	no	0.31	2.72	0.08	1.07			
	Jan-00	Dec-05	yes	no	no	no	-0.01	-0.13	0.05	0.47			
	Jan-01	Dec-06	yes	no	no	yes	-0.32	-4.07	-0.05	-0.70	-0.12	-3.00	8.44
Zambia	Jan-90	Dec-95	yes	yes	yes	yes	1.05	31.17	0.66	7.33	-0.31	-2.84	1.12
	Jan-91	Dec-96	yes	yes	yes	yes	1.06	33.71	0.63	7.87	-0.28	-3.06	1.31
	Jan-92	Dec-97	yes	yes	yes	yes	0.98	31.1	0.58	8.10	-0.20	-2.90	2.09
	Jan-93	Dec-98	yes	yes	yes	yes	0.98	31.8	0.44	6.82	-0.23	-3.83	2.42
	Jan-94	Dec-99	yes	no	yes	yes	0.83	16.5	0.26	5.79	-0.12	-2.85	6.23
	Jan-95	Dec-00	no	no	no	yes	0.61	10.9	0.22	2.86	-0.15	-2.77	5.16

Table A 4.1: Summary of Inertest Rate Pass-Through Analysis

Country	Rolling Sample		Cointegration?				Long-run PT		Short-run PT		ECM(s)		ML
	From	To	JJ	EG	CRDW	Kremers	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	
	Jan-96	Dec-01	no	no	no	yes	0.62	11.2	0.27	3.08	-0.14	-2.26	5.3
	Jan-97	Dec-02	yes	no	no	yes	0.58	8.05	0.36	3.26	-0.13	-1.94	5.12
	Jan-98	Dec-03	yes	no	yes	yes	0.63	11.1	0.24	2.80	-0.21	-2.30	3.54
	Jan-99	Dec-04	yes	no	yes	yes	0.58	16.7	0.23	3.18	-0.26	-3.32	2.93
	Jan-00	Dec-05	yes	no	yes	yes	0.67	18.4	0.22	3.40	-0.18	-3.21	4.32
	Jan-01	Dec-06	yes	no	yes	yes	0.77	21.3	0.17	2.75	-0.13	-2.92	6.46
	Jan-02	Dec-07	yes	no	no	yes	0.98	16.5	0.09	1.43	-0.07	-2.61	12.2

Notes: JJ – Johansen maximum likelihood method, CRDW – cointegrating regression Durbin-Watson, EG - Engle-Granger, PT – pass-through, MAL – mean adjustment lag calculated as Equation 4 in the previous chapter. In cases where results for the entire rolling window were not reported this indicates that there was either an insufficient observations to estimate the model or the series were representative of a near singular matrix in which the model could not be estimated.

Source: Estimates by author.

CHAPTER 5
CONCLUSION

5.1. SUMMARY OF FINDINGS

This thesis examined how the pass-through of central bank rates to lending rates has evolved over time in an attempt to determine the extent of convergence in terms of monetary policy transmission for ten SADC countries for the sample period from January 1990 to December 2007. The results of the estimation of the empirical-pass through model clearly show that there are certain countries that have a more stable and efficient monetary transmission process than others. In particular, the countries that form the SACU (with the exception of Lesotho) tend to show evidence of convergence in monetary policy transmission over the estimation period, especially for periods following the 2000-2005 rolling window.

In addition, results from the analysis of the long-run pass-through analysis reveal that there is evidence that Malawi and Zambia have shown signs of convergence toward the degree of pass-through in Botswana, Mozambique, Namibia, South Africa, and Swaziland. Thus, it is clear that using the degree of interest-rate pass-through as a measure of macroeconomic convergence the results reveal that the development of the extent of convergence is not similar for all the countries included in the study. Moreover, although differences in pass-through exist in the sample of countries that was analysed, in terms of the short-run and long-run pass-through as measured by responses of the lending rate to policy-induced changes in the central bank rate, there is some evidence for convergence of monetary policy transmission.

However, the results of this study are similar to those of Khamfula and Huizinga (2004) and Aziakpono *et al.* (2007) in that there are similarities with regard to the countries that are perceived as being able to form an intermediate monetary union prior to the formation of a SADC monetary union. The primary conclusion of this study is that a SADC wide monetary union is currently not feasible based on the evidence provided from the empirical results of the pass-through analysis. Despite this, based on the results of the pass-through model, it can be tentatively suggested that the CMA may be expanded to include Botswana, Malawi and Zambia. Combining this result with the findings of Khamfula and Huizinga (2004) and Aziakpono *et al.* (2007), possibly, Mauritius and

Seychelles may further be added to an expanded CMA. However, requirements of such an expansion include more stringent policy coordination procedures as well as measures aimed at addressing any country specific financial market imperfections that may exist.

In terms of policy implications relating to monetary unification it is important to realise that gradualism in designing, as well as implementing a regional integration arrangement such as a monetary union is of the utmost importance. Thus, for the non-converging countries, the immediate goal of financial and macroeconomic stability should be pursued relentlessly in an attempt to catch up to the convergence group of countries mentioned above. Finally, owing to the diverse nature of the SADC countries, in terms of the levels of economic development, it would be advisable that the more advanced member states of the region take initiatives to control and monitor credible policy formulation and implementation. This will ensure that the remaining countries are able to reach similar levels of economic and financial development before a region wide monetary union is formed in the future.

5.2. LIMITATIONS OF THE STUDY

The analysis provided in this report would not be complete without stating some of the limitations of this study. Although the results of the study are generally robust, the major limitation of this study was that the pass-through of monetary policy transmission was the only measure that was used to determine the extent of macroeconomic convergence amongst the ten countries that were analysed. This limitation of the study is, however, predominantly due to the limited availability of consistent and complete data for the variables that form the SADC convergence criteria (inflation rate, budget deficit, government debt, foreign reserves and central bank credit to the government). Hence, it was not possible to present any empirical evidence relating to these SADC convergence variables in this report. In addition, the analysis also only focused on the transmission of the CBR to the LR due to time constraints. Future studies could examine the pass-through to other interest rates. Despite these limitations, the study still provides some useful insights into the progress of macroeconomic convergence and the goal of forming a monetary union in SADC. Thus, the study has contributed to the limited literature on the subject of monetary unification in sub-Saharan Africa in general and the SADC countries in particular.

5.3. RECOMMENDATIONS FOR FURTHER RESEARCH

As mentioned earlier in this study, the majority of papers concerning the issue of monetary integration in SADC focus primarily on descriptive statistics that relate to the majority of the SADC convergence criteria that have been set out by the CCBG. Therefore, there is limited empirical literature relating to monetary unification in the SADC. Hence, as sufficient and consistent data becomes available it will be necessary to conduct empirical research that makes use of the SADC convergence criteria variables in an attempt to better understand the true extent of the degree of macroeconomic convergence that exists in the region. This will, therefore, allow researchers to propose more credible policy suggestions relating to the future formation of a regional SADC monetary union.

APPENDIX A:
SUMMARY OF EMPIRICAL LITERATURE

Table A1: Summary of Empirical Literature

Author and Year	Countries considered in the study	Sample Period	Empirical Approach	Summary of findings
Bayoumi and Ostry (1997)	11 SADC countries (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe).	1963-1989	Estimated second order autoregressions of *per capita* growth, thus, residuals represent underlying real output disturbances. Correlations of shocks across countries were calculated from the residuals.	5 out of 55 correlations relating to the southern African countries were positive and significant, however, the results tend to make little geographical sense owing to the distinct lack of significant correlations between South Africa and its neighbouring countries.
Agbeyegbe (2003)	9 SADC countries (excludes all 4 CMA countries)	1992 – 2000 (Exch. Rate) and 1980 – 2000 (Infl. Rate)	Applied the methodology of time varying (Kalman Filter) analysis to study nine, non CMA, member countries of SADC, and based on the analysis to determine whether the member countries point towards a direction of being able to join a new single currency system. The methodology adopted in the study follows Hall, Robertson and Wickens (HRW) (1992).	Exchange Rate - results suggest differing (non) convergence among the non-CMA countries to the rand. For all but one country, the results show that there is no evidence of movement towards the rand rate, the exception being Malawi's Kwacha. Inflation Rate – results do not provide evidence in support of non-stationarity for both the individual inflation rates and the differential rates between each non-CMA country and the averages of the CMA countries. Hence, the results reveal that inflation rates in the non-CMA countries do not converge to the average of the CMA countries.
Grandes (2003)	The 4 CMA countries plus Botswana.	1990 - 2001	The author made use of a two-step econometric model that was based on the theory of generalised purchasing power parity (G-PPP). Essentially,	The econometric evidence from the study suggest that the CMA and Botswana do indeed form an OCA given the existence of the common long-run

Author and Year	Countries considered in the study	Sample Period	Empirical Approach	Summary of findings
			Grandes (2003) tested for cointegration among bilateral exchange rates, using the rand as the base currency for the four CMA countries and Botswana.	trends in their bilateral exchange rates.
Khamfula and Huizinga (2004)	10 SADC countries (excludes Angola, Mozambique, Seychelles and the democratic republic of Congo)	1980 - 1996	A Generalised Auto-Regressive Conditional Heteroscedasticity (GARCH) model was employed to consider the share of the variation in real exchange rates (RER's) vis-à-vis South Africa that can be explained by the divergence in monetary and fiscal policies. The residuals from the autoregressive model were used to estimate unanticipated component of bilateral RER against the South African rand.	The results of both the short-run and long-run cases suggest that the conditional variances of the RER disturbances between South Africa and most other SADC countries are comparable and, hence, the following countries would be suitable to form a monetary union; South Africa, Botswana, Lesotho, Malawi, Mauritius, Namibia, Swaziland and Zimbabwe. That said, it should be noted that the results revealed low degrees of symmetry of RER shocks across most of the economies considered. This clearly indicates that the costs of forming a monetary union would generally be higher than the relative benefits.
Kabundi and Loots (2005)	13 SADC countries (Tanzania was excluded because of lack of data).	1980 - 2002	The study made use of a dynamic factor model to investigate the impact of increasing trade on the co-movement of the business cycle between South Africa and the SADC countries. The real growth rate (represented by annual real GDP data) was used to analyse the co-movement between the South African business cycle and the SADC covering the period 1980-2002.	The empirical results of the study revealed that the strongest correlation for the entire period exists between South Africa and Mozambique, followed by weaker correlations between South Africa and Angola, Zambia, Lesotho, Mauritius and Swaziland. Amongst the SACU countries strong evidence of co-movement exists from the early 1990's onwards. Strong co-movement is evident between South Africa and Zimbabwe until 1998. In conclusion, the study identified three factors as possible sources of synchonisation of business cycles within the SADC region, namely intra-regional trade, the European Union as a major trading partner and the world business cycle.

Author and Year	Countries considered in the study	Sample Period	Empirical Approach	Summary of findings
Buigut (2006)	20 African countries including all SADC countries except for Zimbabwe	Data for the variables used in the study was averaged over various sub periods between 1990-2003 depending on availability	To recover the underlying shocks, the VAR identification scheme developed by Blanchard and Quah (1989) was used, however, cluster analysis was applied to variables such as correlations of demand and supply shocks, trade intensity, debt service ratio, public debt ratio, tax revenue ratio and the inflation rate.	The results of the study conclude that there is support for a monetary union in Southern Africa, under the assumption that the Rand was the anchor currency, for a small group of countries consisting of Botswana, Lesotho, Namibia, South Africa and Swaziland. Under scenarios (2) and (3) described above Buigut (2006) found that a group of four countries was suitable for a monetary union, namely; Botswana, Namibia, South Africa and Swaziland.
Buigut and Valev (2006)	21 African countries including all SADC countries except for Zimbabwe	1971-2002 and 1980-2002	Utilised a two-step VAR model. More specifically, to recover the underlying shocks, the VAR identification scheme developed by Blanchard and Quah (1989). Real GDP growth was used to measure the changes in output, while the changes in the implicit GDP deflator represent price changes. For each country, the first difference of the natural log of real GDP and the implicit GDP deflator were used for estimation.	The results of the supply shocks showed that South Africa has significant correlations in the supply shocks it faces with those faced by its neighboring states of Lesotho, Swaziland and Mozambique. However, based on the correlations and geographical proximity that were revealed in the study Buigut and Valev (2006) tentatively suggest a tripolar route to monetary union with the first region comprising that of the southern cone consisting of the existing CMA, expanding northwards to include Botswana, Mozambique and Zambia
Karras (2007)	37 African countries of which 10 were SADC countries (Dem. Rep. Congo, Lesotho, Madagascar, Mozambique, Mauritius, Malawi,	1960 – 2000 (IFS) and 1980 –2000 (Penn World Table Stats)	Calculated correlations of detrended output growth using real GDP based on purchasing-power-parity real exchange rates. Used three different filter methods to detrend the output series of each country and estimate its cyclical component. The three methods were (1) first differencing, (2) the Hodrick-Prescott (HP) filter, and (3) the Band-pass filter. Estimated correlations of each country's cyclical output against the SADC total.	Three of the eight sets of correlations were above 0.40 (those for Mozambique, Zambia and Zimbabwe), thus, indicating that these three countries represent an optimal currency area with South Africa.

Author and Year	Countries considered in the study	Sample Period	Empirical Approach	Summary of findings
	Tanzania, South Africa, Zambia, Zimbabwe)			
Jefferis (2007)	12 SADC countries (Excluding Madagascar and Zimbabwe)	1990-1996 and 1997-2002	The study examined the correlations of bilateral exchange rate changes against the South African rand as well as considering bilateral (nominal) interest rate and inflation rate differentials vis-à-vis South Africa.	Based on the findings from the correlations and differentials of the variables used the author identified what was termed a 'convergence group' which consists of 8 SADC countries. However, the term convergence group was not defined within the study.
Aziakpono et al., (2007)	14 SADC countries	1990-2005	In an attempt to investigate the monetary and banking market integration in SADC the method of principal component analysis (PCA) and an empirical pass-through model was applied to central bank interest rates as well as to deposit and loan interest rates.	The results of the study confirmed the authors' expectations that the CMA banking markets are most integrated followed by the SACU countries. There was also evidence in the study that suggested that the level of integration increases over time for each region and interest rate. The study also subjected the entire SADC region to further analysis focusing on the period between 2000-2005 where there is evidence of growing integration with the aim of sorting the countries into groups that are becoming integrated based on similarities of their movements. From the evidence found in the analysis Aziakpono et al., (2007:29) suggest that a selective, yet cautionary expansion of the CMA is possible. More specifically, Seychelles, Zambia and Botswana are potential first candidates.

Key to abbreviations: CMA – Common Monetary Area, GARCH – Generalised Auto-Regressive Conditional Heteroscedasticity, GDP – Gross Domestic Product, G-PPP – Generalised Purchasing Power Parity, OCA – Optimal Currency Area, PCA – Principal Component Analysis, RER – Real Exchange Rate, SACU – Southern African Customs Union, SADC – Southern African Development Community, VAR – Vector Autoregressive

Source: Compiled by author.

APPENDIX B:
UNIT ROOT TEST SUMMARY (Bank Rates and Lending Rates)

Table B1: Unit Root Tests (Bank Rates)

Country	Test	Series	1990-1995	1991-1996	1992-1997	1993-1998	1994-1999	1995-2000	1996-2001	1997-2002	1998-2003	1999-2004	2000-2005	2001-2006	2002-2007
Botswana	DF-GLS*	Level	-0.43	-1.08	-1.21	-0.92	-1.61	-1.12	-0.85	0.09	-0.63	-1.12	-2.36[b]	-1.07	-1.44
		1st Diff	-8.39[a]	-7.28[a]	-8.14[a]	-7.10[a]	-10.3[a]	-11.5[a]	-12.2[a]	-11.7[a]	-9.25[a]	-12.2[a]	-12.3[a]	-6.99[a]	-4.52[a]
	PP*	Level	-2.65[c]	-2.09	-1.96	-1.86	-1.50	-1.74	-1.22	-0.53	-1.96	-2.48	-2.82[c]	-1.66	-2.00
		1st Diff	-8.41[a]	-10.0[a]	-8.08[a]	-8.02[a]	-9.99[a]	-11.7[a]	-13.2[a]	-12.8[a]	-12.1[a]	-12.6[a]	-12.4[a]	-7.01[a]	-7.16[a]
	DF-GLS**	Level	-1.00	-1.16	-1.67	-2.85[c]	-1.64	-1.16	-1.77	-3.67[b]	-3.01[c]	-1.80	-2.89[c]	-1.40	-1.54
		1st Diff	-8.74[a]	-7.42[a]	-8.43[a]	-7.10[a]	-5.27[a]	-11.8[a]	-12.3[a]	-11.9[a]	-10.6[a]	-12.2[a]	-12.3[a]	-7.01[a]	-4.54[a]
	PP**	Level	-1.34	-1.86	-4.47	-2.94	-1.30	-1.76	-2.73	-4.02[b]	-2.79	-2.46	-2.83	-1.71	-1.96
		1st Diff	-9.26[a]	-10.1[a]	-8.44[a]	-8.04[a]	-9.92[a]	-14.5[a]	-13.7[a]	-13.2[a]	-13.3[a]	-12.9[a]	-12.5[a]	-6.97[a]	-7.14[a]
Lesotho	DF-GLS*	Level	-1.06	-1.25	-0.97	-1.36	-0.97	-1.46	-1.46	-1.70[c]	-1.65[c]	-0.45	-0.63	-0.76	-1.32
		1st Diff	-7.86[a]	-7.55[a]	-7.95[a]	-8.21[a]	-8.27[a]	-8.25[a]	-8.25[a]	-8.22[a]	-8.20[a]	-8.28[a]	-8.27[a]	-8.19[a]	-7.95[a]
	PP*	Level	-1.80	-1.31	-2.14	-1.45	-1.68	-2.45	-1.52	-1.73	-1.73	-1.37	-1.95	-1.11	-1.40
		1st Diff	-7.82[a]	-7.57[a]	-7.90[a]	-8.19[a]	-8.24[a]	-8.19[a]	-8.19[a]	-8.16[a]	-8.14[a]	-8.27[a]	-8.25[a]	-8.16[a]	-7.89[a]
	DF-GLS**	Level	-1.65	-1.21	-1.33	-2.55	-3.19[b]	-2.21	-1.5	-1.89	-1.94	-1.72	-1.69	-1.65	-1.68
		1st Diff	-7.91[a]	-7.37[a]	-8.07[a]	-8.26[a]	-8.29[a]	-8.38[a]	-8.39[a]	-8.22[a]	-8.23[a]	-8.32[a]	-8.32[a]	-8.27[a]	-7.96[a]
	PP**	Level	-1.74	-1.17	-2.24	-2.91	-3.32[c]	-2.29	-1.49	-2.01	-2.46	-1.77	-1.94	-1.63	-2.39
		1st Diff	-7.83[a]	-7.54[a]	-8.04[a]	-8.24[a]	-8.18[a]	-8.33[a]	-8.32[a]	-8.10[a]	-8.12[a]	-8.22[a]	-8.25[a]	-8.15[a]	-7.86[a]
Madagascar	DF-GLS*	Level	-0.28	-1.63[c]	-0.95	-0.90	-0.96	-0.40	0.12	-0.73	-1.18	-0.99	-0.77	-1.04	-0.90
		1st Diff	-2.68[a]	-2.09[b]	-5.91[a]	-5.98[a]	-6.23[a]	-6.50[a]	-7.51[a]	-8.38[a]	-8.31[a]	-8.34[a]	-8.33[a]	-8.31[a]	-8.32[a]
	PP*	Level	0.76	-1.21	-1.13	-1.04	-1.09	-0.91	-3.58	-2.57	-1.17	-1.16	-0.90	-1.20	-1.29
		1st Diff	-5.59[a]	-5.80[a]	-6.05[a]	-6.12[a]	-6.21[a]	-6.48[a]	-7.53[a]	-8.38[a]	-8.28[a]	-8.31[a]	-8.36[a]	-8.34[a]	-8.36[a]
	DF-GLS**	Level	-1.41	-1.91	-0.77	-1.14	-1.21	-1.01	-1.02	-1.68	-1.45	-1.04	-0.90	-1.20	-1.09
		1st Diff	-3.07[c]	-2.16[b]	-6.09[a]	-6.14[a]	-6.35[a]	-6.52[a]	-4.25[a]	-8.45[a]	-8.45[a]	-8.44[a]	-8.49[a]	-8.31[a]	-8.35[a]
	PP**	Level	-0.92	-1.06	-0.57	-1.16	-1.98	-1.30	-2.71	-2.44	-1.80	-0.77	-1.03	-1.66	-1.23
		1st Diff	-5.91[a]	-5.84[a]	-6.08[a]	-6.16[a]	-6.33[a]	-6.44[a]	-7.78[a]	-8.38[a]	-8.78[a]	-8.34[a]	-8.45[a]	-8.29[a]	-8.34[a]
Malawi	DF-GLS*	Level	1.89[c]	-0.67	-0.77	-0.52	-0.87	-1.17	-1.52	-1.31	-1.31	-1.43	-1.18	-1.86	0.64
		1st Diff	-8.82[a]	-6.89[a]	-6.93[a]	-6.87[a]	-6.73[a]	-5.98[a]	-8.91[a]	-9.62[a]	-1.64[c]	-9.67[a]	-9.67[a]	-14.4[a]	-7.75[a]
	PP*	Level	1.01	-1.29	-1.56	-1.53	-1.57	-1.29	-1.80	-1.88	-3.02[b]	-1.42	-1.27	-1.68	-0.86

Table B1: Unit Root Tests (Bank Rates)

Country	Test	Series	1990-1995	1991-1996	1992-1997	1993-1998	1994-1999	1995-2000	1996-2001	1997-2002	1998-2003	1999-2004	2000-2005	2001-2006	2002-2007
		1st Diff	-9.05[a]	-7.08[a]	-7.11[a]	-7.04[a]	-6.93[a]	-6.15[a]	-8.83[a]	-9.53[a]	-9.38[a]	-9.62[a]	-9.62[a]	-13.3[a]	-7.86[a]
	DF-GLS**	Level	-1.00	-0.65	-0.50	-1.20	-1.33	-1.26	-1.80	-2.01	-1.78	-2.50	-2.84[c]	-3.40[b]	-2.17
		1st Diff	-9.54[a]	-6.99[a]	-7.18[a]	-6.77[a]	-6.75[a]	-5.94[a]	-8.95[a]	-9.69[a]	-8.14[a]	-9.77[a]	-9.71[a]	-14.7[a]	-7.87[a]
	PP**	Level	-1.07	-0.85	-0.78	-1.53	-1.58	-1.33	-2.58	-1.93	-2.64	-2.69	-3.31	-3.59[b]	-2.27
		1st Diff	-9.44[a]	-7.16[a]	-7.32[a]	-6.99[a]	-6.89[a]	-6.15[a]	-8.83[a]	-9.58[a]	-9.54[a]	-9.70[a]	-9.58[a]	-13.9[a]	-7.81[a]
Mozambique	DF-GLS*	Level	-1.28	-0.63	0.13	0.06	-0.24	-0.28	-0.36	-0.51	x	x	x	x	x
		1st Diff	-4.67[a]	-4.80[a]	-5.70[a]	-6.41[a]	-7.03[a]	-6.36[a]	-2.75[a]	-5.46[a]	x	x	x	x	x
	PP*	Level	-1.67	-0.82	0.13	-0.16	-0.38	-1.71	-2.87[c]	-4.08	x	x	x	x	x
		1st Diff	-4.56[a]	-4.77[a]	-5.70[a]	-6.45[a]	-7.13[a]	-6.69[a]	-5.66[a]	-9.15[a]	x	x	x	x	x
	DF-GLS**	Level	-1.08	-0.55	-0.93	-1.18	-1.16	-0.79	-1.70	-2.48	x	x	x	x	x
		1st Diff	-5.35[a]	-6.02[a]	-6.46[a]	-6.72[a]	-7.17[a]	-6.65[a]	-5.01[a]	-5.68[a]	x	x	x	x	x
	PP**	Level	-0.37	0.19	-1.67	-2.36	-2.26	-0.60	-1.49	-2.55	x	x	x	x	x
		1st Diff	-5.75[a]	-6.55[a]	-6.43[a]	-6.68[a]	-7.14[a]	-6.92[a]	-6.15[a]	-9.87[a]	x	x	x	x	x
Namibia	DF-GLS*	Level	-0.81	-0.73	-2.98b	-2.42	-1.86c	-1.58	-0.87	-1.22	-1.27	0.62	-1.37	-1.30	-1.55
		1st Diff	-6.35[a]	-7.05[a]	-8.03[a]	-3.98[a]	-3.33[a]	-1.92[c]	-3.37[a]	-3.42[a]	-2.83[a]	-6.07[a]	-6.46[a]	-3.68[a]	-3.75[a]
	PP*	Level	-2.25	-2.24	-2.93b	-1.57	-1.27	-0.84	-0.59	-1.43	-1.07	-2.84c	-0.95	-1.44	-1.20
		1st Diff	-6.33[a]	-7.05[a]	-8.03[a]	-7.39[a]	-6.38[a]	-6.50[a]	-6.61[a]	-6.71[a]	-6.29[a]	-6.29[a]	-6.85[a]	-6.86[a]	-6.58[a]
	DF-GLS**	Level	-0.52	-0.72	-3.44[c]	-3.63[b]	-2.09	-2.08	-2.52	-2.4	-2.78	-2.17	-2.68	-2.51	-1.51
		1st Diff	-7.23[a]	-7.68[a]	-8.11[a]	-3.88[a]	-3.55[b]	-2.92[c]	-3.44[b]	-3.46[b]	-2.87[c]	-6.08[a]	-6.53[a]	-3.74[a]	-3.86[a]
	PP**	Level	-0.62	-1.75	-3.43[c]	-2.95	-0.81	-1.98	-2.08	-1.60	-1.88	-2.92	-1.84	-1.51	-0.87
		1st Diff	-8.89[a]	-7.98[a]	-8.11[a]	-7.30[a]	-6.77[a]	-6.59[a]	-6.55[a]	-6.72[a]	-6.28[a]	-6.35[a]	-6.83[a]	-6.88[a]	-6.60[a]
South Africa	DF-GLS*	Level	-0.50	-0.73	-0.82	-1.42	-1.51	-1.57	-1.16	-1.32	-1.24	-0.40	-1.57	-1.77[c]	-1.48
		1st Diff	-8.38[a]	-8.31[a]	-8.31[a]	-5.50[a]	-4.85[a]	-3.40[a]	-4.91[a]	-5.07[a]	-3.19[a]	-2.91[b]	-2.48[b]	-3.65[a]	-3.43[a]
	PP*	Level	-1.37	-1.44	-1.36	-0.71	-1.69	-1.47	-0.79	-1.47	-1.17	-2.65[c]	-0.88	-1.44	-1.16
		1st Diff	-8.40[a]	-8.29[a]	-8.30[a]	-5.40[a]	-4.84[a]	-4.90[a]	-4.92[a]	-5.09[a]	-5.16[a]	-7.09[a]	-7.54[a]	-7.53[a]	-7.26[a]
	DF-GLS**	Level	-0.43	-0.25	-1.10	-2.96[c]	-1.78	-1.68	-1.96	-2.08	-2.73	-2.38	-2.77	-2.72	-1.36
		1st Diff	-8.64[a]	-9.16[a]	-8.66[a]	-4.76[a]	-5.01[a]	-4.51[a]	-5.02[a]	-5.09[a]	-3.25[b]	-2.82	-2.52[a]	-2.40	-3.66[b]
	PP**	Level	0.07	-0.57	-2.84	-3.03	-0.82	-1.81	-2.02	-1.77	-1.99	-2.84	-1.85	-1.52	-0.71
		1st Diff	-8.71[a]	-9.54[a]	-8.73[a]	-5.32[a]	-5.02[a]	-4.91[a]	-5.00[a]	-5.08[a]	-5.15[a]	-7.11[a]	-7.54[a]	-7.54[a]	-7.31[a]
Swaziland	DF-GLS*	Level	-0.19	0.39	-0.33	-0.29	-0.81	-0.89	0.24	-0.65	-1.00	-0.57	-1.71[c]	-1.90[c]	-1.48
		1st Diff	-8.39[a]	-8.43[a]	-8.37[a]	-8.78[a]	-6.84[a]	-6.84[a]	-6.66[a]	-6.80[a]	-3.99[a]	-2.82[a]	-2.44[b]	-2.29[b]	-3.43[a]
	PP*	Level	-0.21	0.64	-0.40	-0.27	-1.63	-1.12	-0.31	-1.44	-1.14	-2.43	-0.89	-1.32	-1.16

Table B1: Unit Root Tests (Bank Rates)

Country	Test	Series	1990-1995	1991-1996	1992-1997	1993-1998	1994-1999	1995-2000	1996-2001	1997-2002	1998-2003	1999-2004	2000-2005	2001-2006	2002-2007
		1st Diff	-8.38[a]	-8.44[a]	-8.34[a]	-8.80[a]	-6.87[a]	-6.86[a]	-6.83[a]	-7.15[a]	-6.95[a]	-6.73[a]	-7.38[a]	-7.39[a]	-7.26[a]
	DF-GLS**	Level	-0.75	-0.52	-1.21	-1.89	-0.22	-1.06	-1.14	-2.15	-2.56	-2.15	-2.49	-2.52	-1.36
		1st Diff	-8.63[a]	-9.06[a]	-8.48[a]	-7.15[a]	-7.23[a]	-7.24[a]	-6.87[a]	-6.89[a]	-3.98[b]	-2.81[c]	-2.48	-2.33	-3.66[b]
	PP**	Level	-0.37	-0.48	-1.85	-2.32	-0.19	-1.97	-2.05	-1.13	-1.71	-2.42	-1.65	-1.51	-0.71
		1st Diff	-8.54[a]	-9.10[a]	-8.37[a]	-8.74[a]	-7.33[a]	-7.37[a]	-6.95[a]	-7.21[a]	-6.93[a]	-6.87[a]	-7.40[a]	-7.37[a]	-7.31[a]
Tanzania	DF-GLS*	Level	-0.88	-1.37	-1.44	-1.51	-1.54	-0.33	-0.29	-1.11	-1.16	-1.23	-0.71	-0.12	-1.41
		1st Diff	-5.45[a]	-5.28[a]	-6.84[a]	-7.10[a]	-5.69[a]	-7.62[a]	-4.05[a]	-2.06[b]	-4.76[a]	-2.13[b]	-2.74[a]	-3.57[a]	-2.91[a]
	PP*	Level	-0.92	-1.78	-1.75	-1.85	-1.94	-3.51[b]	-3.61	-1.62	-1.73	-1.64	-1.99	-0.51	-1.66
		1st Diff	-5.87[a]	-4.82[a]	-6.68[a]	-6.96[a]	-7.70[a]	-7.64[a]	-6.59[a]	-6.91[a]	-7.43[a]	-6.86[a]	-6.07[a]	-4.81[a]	-8.44[a]
	DF-GLS**	Level	-2.36	-1.99	-1.47	-1.62	-1.92	-1.70	-1.93	-2.27	-2.24	-1.23	-0.43	-2.21	-4.40[a]
		1st Diff	-5.49[a]	-4.98[a]	-6.88[a]	-7.14[a]	-4.94[a]	-7.78[a]	-5.64[a]	-5.43[a]	-6.37[a]	-4.63[a]	-7.34[a]	-3.70[a]	-3.12[c]
	PP**	Level	-2.34	-2.16	-1.55	-1.93	-3.26	-3.39[c]	-4.00[b]	-2.24	-2.02	-1.44	-3.44[c]	-2.86	-3.41[c]
		1st Diff	-5.77[a]	-4.79[a]	-6.73[a]	-6.99[a]	-7.58[a]	-7.91[a]	-6.52[a]	-6.89[a]	-7.38[a]	-6.78[a]	-7.18[a]	-4.79[a]	-8.41[a]
Zambia	DF-GLS*	Level	-1.84[c]	-2.01[b]	-1.93[c]	-0.74	-1.04	-0.74	-0.88	-0.07	-1.07	-0.73	-0.63	-0.96	-0.23
		1st Diff	-3.90[a]	-4.45[a]	-4.72[a]	-5.70[a]	-4.83[a]	-3.65[a]	-3.68[a]	-2.98[a]	-3.46[a]	-6.94[a]	-7.14[a]	-2.55[b]	-3.92[a]
	PP*	Level	-1.62	-1.82	-1.64	-1.25	-1.85	-0.92	-0.59	-1.95	-0.73	-1.18	-1.26	-0.88	-2.54
		1st Diff	-4.06[a]	-4.68[a]	-5.09[a]	-5.62[a]	-5.52[a]	-4.84[a]	-5.65[a]	-4.98[a]	-3.68[a]	-6.97[a]	-7.61[a]	-7.92[a]	-7.63[a]
	DF-GLS**	Level	-2.01	-2.18	-2.27	-1.83	-2.25	-1.12	-0.82	-0.82	-0.59	-1.86	-1.65	-2.60	-1.37
		1st Diff	-4.09[a]	-4.67[a]	-5.13[a]	-3.76[a]	-5.31[a]	-4.62[a]	-4.66[a]	-4.48[a]	-3.75[b]	-6.89[a]	-7.41[a]	-3.86[a]	-4.17[a]
	PP**	Level	-1.87	-2.10	-2.31	-2.78	-2.16	-1.73	-0.34	-2.80	-0.27	-1.86	-2.11	-2.85	-2.49
		1st Diff	-4.04[b]	-4.65[a]	-5.09[a]	-5.52[a]	-5.51[a]	-4.87[a]	-5.81[a]	-5.06[a]	-3.62[b]	-6.89[a]	-7.56[a]	-7.85[a]	-7.82[a]

Notes: The rolling periods run from January to December of the years indicated. "x" indicates that the interest rate series was constant for the period. s" indicates that there was an insufficient number of observations for the test to be carried out. "*" and "**" indicates where the unit root tests were carried out with an intercept and a trend and intercept respectively. Significance levels regarding the rejection of the null hypothesis (H_0) are indicated with a, b, and c for 1%, 5% and, 10%, respectively. This note applies to both Table B1 and Table B2.

Source: Estimates by author.

Table B2: Unit Root Tests (Lending Rates)

Country	Test	Series	1990-1995	1991-1996	1992-1997	1993-1998	1994-1999	1995-2000	1996-2001	1997-2002	1998-2003	1999-2004	2000-2005	2001-2006	2002-2007
Botswana	DF-GLS*	Level	-0.32	-0.63	-1.21	-2.40	-0.57	0.16	-0.18	1.00	-0.21	-0.46	-0.96	-1.30	-1.40
		1st Diff	-7.91[a]	-1.66[c]	-8.95[a]	-9.16[a]	-8.90[a]	-7.63[a]	-7.46[a]	-6.74[a]	-6.74[a]	-7.19[a]	-6.43[a]	-6.85[a]	-4.42[a]
	PP*	Level	-1.90	-2.79[c]	-3.91[a]	-2.40	-1.47	-0.35	-0.40	0.09	-2.20	-2.54	-2.04	-1.66	-2.00
		1st Diff	-8.02[a]	-10.1[a]	-8.91[a]	-9.32[a]	-8.83[a]	-7.66[a]	-7.47[a]	-6.81[a]	-7.25[a]	-7.19[a]	-6.35[a]	-6.83[a]	-6.81[a]
	DF-GLS**	Level	-1.40	-1.63	-1.77	-2.83[c]	-1.48	-0.92	-1.16	-1.67	-0.83	-1.11	-2.12	-1.4	-1.50
		1st Diff	-8.04[a]	-4.37[a]	-9.27[a]	-7.03[a]	-8.68[a]	-7.80[a]	-7.63[a]	-6.94[a]	-7.20[a]	-4.50[a]	-6.46[a]	-6.91[a]	-4.44[a]
	PP**	Level	-1.37	-2.34	-4.00[b]	-2.83	-1.53	-0.89	-1.82	-2.40	-0.91	-1.83	-1.94	-1.72	-1.95
		1st Diff	-8.34[a]	-10.1[a]	-9.28[a]	-9.31[a]	-8.78[a]	-7.70[a]	-7.54[a]	-6.85[a]	-7.70[a]	-7.25[a]	-6.35[a]	-6.78[a]	-6.79[a]
Lesotho	DF-GLS*	Level	-1.34	-1.37	-1.47	-1.35	-1.20	-1.48	-1.75[c]	-1.82[c]	-0.95	0.60	0.11	-1.28	-1.06
		1st Diff	-9.47[a]	-13.9[a]	-6.45[a]	-10.1$_a$	-7.28[a]	-4.59[a]	-7.38[a]	-7.30[a]	-4.46[a]	-8.22[a]	-6.46[a]	-2.42[b]	-3.46[a]
	PP*	Level	-2.46	-2.66[c]	-3.68	-2.06	-1.94	-2.44	-2.12	-1.99	-1.10	-1.78	-0.37	-1.22	-1.23
		1st Diff	-20.2[a]	-16.5[a]	-16.3[a]	-14.1[a]	-7.23[a]	-7.49[a]	-7.29[a]	-7.21[a]	-6.95[a]	-8.37[a]	-6.72[a]	-6.23[a]	-6.54[a]
	DF-GLS**	Level	-2.74	-1.71	-1.95	-4.14	-1.97	-1.85	-1.92	-2.03	-1.69	-1.56	-2.04	-1.92	-0.82
		1st Diff	-9.49[a]	-14.1[a]	-6.75[a]	-11.8[a]	-7.36[a]	-6.44[a]	-7.43[a]	-7.30[a]	-4.25[a]	-8.36[a]	-6.62[a]	-2.54	-3.71[a]
	PP**	Level	-4.95[a]	-2.68	-3.83[b]	-4.47[a]	-2.02	-2.24	-2.23	-2.20	-2.35	-2.34	-1.81	-1.15	-0.25
		1st Diff	-21.1[a]	-20.9[a]	-18.3[a]	-14.9[a]	-7.27[a]	-7.46[a]	-7.29[a]	-7.15[a]	-7.09[a]	-8.36[a]	-6.74[a]	-6.28[a]	-6.81[a]
Madagascar	DF-GLS*	Level	0.94	-0.48	-0.75	-0.90	-0.98	-0.82	0.29	-0.12	0.11	-0.82	-0.91	-0.36	-0.33
		1st Diff	-9.28[a]	-9.51[a]	-9.32[a]	-9.16[a]	-9.16[a]	-9.10[a]	-8.72[a]	-8.50[a]	-8.45[a]	-8.34[a]	-8.31[a]	-8.37[a]	-8.39[a]
	PP*	Level	1.79	-0.82	-1.28	-1.29	-1.39	-0.97	-2.51	-2.04	-0.16	-1.35	-1.35	0.44	-0.13
		1st Diff	-9.34[a]	-9.47[a]	-9.23[a]	-9.06[a]	-9.06[a]	-9.03[a]	-8.90[a]	-8.59[a]	-8.69[a]	-8.32[a]	-8.25[a]	-8.52[a]	-8.50[a]
	DF-GLS**	Level	-0.99	-1.49	-0.92	-0.79	-1.21	-1.50	-1.21	-1.95	-2.03	-1.63	-0.44	-1.18	-1.63
		1st Diff	-10.2[a]	-9.55[a]	-9.45[a]	-9.48[a]	-9.38[a]	-9.10[a]	-9.07[a]	-8.63[a]	-8.59[a]	-8.41[a]	-8.81[a]	-8.72[a]	-8.60[a]
	PP**	Level	-0.69	-1.71	-0.66	-0.88	-2.28	-3.62[b]	-1.82	-2.33	-2.43	-1.42	0.10	-0.58	-1.52
		1st Diff	-12.59[a]	-9.40[a]	-9.34[a]	-9.50[a]	-9.32[a]	-9.03[a]	-9.28[a]	-8.82[a]	-8.78[a]	-8.40[a]	-9.03[a]	-11.39[a]	-9.87[a]
Malawi	DF-GLS*	Level	0.17	-0.89	-1.02	-0.96	-0.80	-0.68	-0.98	-0.75	-0.86	-0.20	-0.25	0.29	0.47
		1st Diff	-8.44[a]	-7.83[a]	-7.83[a]	-7.48[a]	-7.57[a]	-7.39[a]	-7.45[a]	-2.30[b]	-1.81[c]	-8.43[a]	-8.36[a]	-8.70[a]	-7.51[a]
	PP*	Level	0.01	-1.45	-1.64	-1.62	-1.46	-1.61	-1.24	-1.35	-3.28[b]	-0.46	-0.68	-0.94	-0.90

Table B2: Unit Root Tests (Lending Rates)

Country	Test	Series	1990-1995	1991-1996	1992-1997	1993-1998	1994-1999	1995-2000	1996-2001	1997-2002	1998-2003	1999-2004	2000-2005	2001-2006	2002-2007
		1st Diff	-8.44[a]	-7.84[a]	-7.85[a]	-7.48[a]	-7.61[a]	-7.45[a]	-7.45[a]	-8.28[a]	-7.56[a]	-8.42[a]	-8.36[a]	-8.81[a]	-7.54[a]
	DF-GLS**	Level	-1.63	-1.59	-1.00	-1.39	-1.34	-1.38	-1.27	-1.07	-0.96	-1.72	-2.06	-2.56	-2.04
		1st Diff	-8.71[a]	-7.87[a]	-7.98[a]	-7.50[a]	-7.58[a]	-7.17[a]	-7.50[a]	-3.45[b]	-3.71[a]	-8.62[a]	-8.45[a]	-8.81[a]	-7.54[a]
	PP**	Level	-2.06	-1.83	-1.13	-1.66	-1.58	-1.68	-2.13	-1.00	-2.5	-1.82	-2.47	-2.55	-2.13
		1st Diff	-8.63[a]	-7.84[a]	-7.96[a]	-7.43[a]	-7.56[a]	-7.39[a]	-7.47[a]	-8.47[a]	-8.01[a]	-8.52[a]	-8.34[a]	-8.79[a]	-7.48[a]
Mozambique	DF-GLS*	Level	s	s	s	-1.78[c]	-1.41	-1.13	-1.16	-1.06	-1.43	-0.95	-0.90	-1.08	-0.53
		1st Diff	s	s	s	-3.94[a]	-5.54[a]	-6.59[a]	-7.28[a]	-7.86[a]	-2.30[b]	-6.88[a]	-7.03[a]	-7.44[a]	-7.78[a]
	PP*	Level	s	s	s	-1.83	-2.60	-3.22[b]	-3.26[b]	-2.47	-1.49	-1.26	-1.13	-1.21	-1.11
		1st Diff	s	s	s	-3.78[b]	-5.47[a]	-6.64[a]	-7.23[a]	-7.79[a]	-8.43[a]	-6.88[a]	-7.03[a]	-7.35[a]	-7.80[a]
	DF-GLS**	Level	s	s	s	-2.34	-2.77	-2.52	-1.54	-1.18	-1.55	-0.78	-0.82	-1.46	-2.02
		1st Diff	s	s	s	-3.97[a]	-5.80[a]	-6.90[a]	-7.79[a]	-8.39[a]	-6.04[a]	-6.98[a]	-7.23[a]	-7.49[a]	-7.81[a]
	PP**	Level	s	s	s	-2.10	-2.74	-3.07	-2.37	-2.48	-1.70	-0.48	-1.16	-2.54	-2.16
		1st Diff	s	s	s	-3.66[c]	-5.64[a]	-7.19[a]	-8.47[a]	-8.98[a]	-8.40[a]	-6.94[a]	-7.14[a]	-7.38[a]	-7.74[a]
Namibia	DF-GLS*	Level	-0.55	-0.43	-1.46	-1.20	-1.38	-1.00	-1.12	-0.79	-0.68	0.57	-0.01	-1.20	-0.91
		1st Diff	-9.72[a]	-2.73[a]	-11.4[a]	-11.5[a]	-11.5[a]	-9.58[a]	-11.4[a]	-10.7[a]	-10.5[a]	-11.1[a]	-1.95[b]	-2.76[a]	-11.6[a]
	PP*	Level	-2.34	-2.57	-2.58	-1.61	-2.41	-1.44	-0.80	-1.21	-1.23	-2.54	-1.11	-1.77	-1.37
		1st Diff	-10.8[a]	-12.5[a]	-13.2[a]	-11.6[a]	-11.2[a]	-11.3[a]	-11.5[a]	-10.5[a]	-10.6[a]	-11.4[a]	-11.6[a]	-11.2[a]	-11.0[a]
	DF-GLS**	Level	-0.78	-1.13	-1.75	-2.24	-2.40	-1.18	-2.22	-2.15	-2.13	-1.43	-1.72	-2.46	-0.78
		1st Diff	-10.5[a]	-2.85[c]	-12.0[a]	-11.6[a]	-11.1[a]	-11.4[a]	-11.7[a]	-10.8[a]	-10.8[a]	-11.9[a]	-11.1[a]	-3.33[b]	-11.1[a]
	PP**	Level	-1.06	-1.76	-2.71	-4.10[a]	-2.36	-2.15	-2.47	-2.25	-2.16	-3.12	-2.41	-1.87	-1.25
		1st Diff	-13.5[a]	-13.9[a]	-14.2[a]	-12.1[a]	-11.5[a]	-11.5[a]	-11.6[a]	-10.4[a]	-10.5[a]	-11.5[a]	-11.6[a]	-11.3[a]	-11.0[a]
South Africa	DF-GLS*	Level	-0.57	-0.78	-0.87	-1.27	-1.52	-1.45	-1.14	-1.28	-1.14	-0.43	-1.73[c]	-1.93[c]	-1.48
		1st Diff	-7.90[a]	-7.54[a]	-7.54[a]	-4.17[a]	-5.41[a]	-3.60[a]	-5.29[a]	-5.39[a]	-3.79[a]	-2.91[b]	-2.41[b]	-2.26[c]	-3.43[a]
	PP*	Level	-1.31	-1.31	-1.32	-0.81	-1.80	-1.37	-0.87	-1.48	-1.23	-2.67[c]	-0.89	-1.32	-1.16
		1st Diff	-7.91[a]	-7.49[a]	-7.49[a]	-5.64[a]	-5.45[a]	-5.48[a]	-5.21[a]	-5.42[a]	-5.43[a]	-7.06[a]	-7.24[a]	-7.26[a]	-7.26[a]
	DF-GLS**	Level	-0.40	-0.46	-1.13	-2.99[c]	-1.82	-1.57	-2.01	-2.46	-2.29	-2.42	-2.52	-2.55	-1.36
		1st Diff	-8.13[a]	-8.02[a]	-7.75[a]	-5.41[a]	-5.55[a]	-5.01[a]	-5.37[a]	-5.41[a]	-3.82[a]	-3.60[b]	-2.45	-2.30	-3.66[b]

Table B2: Unit Root Tests (Lending Rates)

Country	Test	Series	1990-1995	1991-1996	1992-1997	1993-1998	1994-1999	1995-2000	1996-2001	1997-2002	1998-2003	1999-2004	2000-2005	2001-2006	2002-2007
	PP**	Level	0.04	-0.61	-2.50	-2.63	-1.15	-1.85	-2.13	-1.61	-1.86	-2.66	-1.66	-1.51	-0.71
		1st Diff	-8.17[a]	-8.19[a]	-7.74[a]	-5.55[a]	-5.57[a]	-5.53[a]	-5.26[a]	-5.42[a]	-5.41[a]	-7.16[a]	-7.26[a]	-7.24[a]	-7.31[a]
Swaziland	DF-GLS*	Level	0.16	0.69	-0.32	0.38	-0.80	-0.90	0.24	-0.65	-0.99	-0.55	-1.76[c]	-1.97[b]	-1.47
		1st Diff	-7.49[a]	-7.30[a]	-7.31[a]	-8.16[a]	-6.59[a]	-6.59[a]	-6.66[a]	-6.80[a]	-3.99[a]	-2.88[a]	-2.47[b]	-2.30[b]	-3.44[a]
	PP*	Level	-0.28	0.65	-0.39	-0.24	-1.62	-1.12	-0.31	-1.44	-1.21	-2.63[c]	-0.95	-1.36	-1.12
		1st Diff	-7.49[a]	-7.87[a]	-7.83[a]	-8.21[a]	-6.63[a]	-6.62[a]	-6.83[a]	-7.15[a]	-7.26[a]	-7.16[a]	-8.07[a]	-8.04[a]	-8.00[a]
	DF-GLS**	Level	-0.73	-0.48	-1.15	-1.80	-0.71	-1.07	-1.14	-2.15	-2.47	-2.05	-2.44	-2.48	-1.32
		1st Diff	-7.67[a]	-7.72[a]	-7.91[a]	-8.32[a]	-6.98[a]	-6.99[a]	-6.87[a]	-6.89[a]	-4.03[a]	-2.88[c]	-2.51	-2.34	-3.67[b]
	PP**	Level	-0.50	-0.32	-1.92	-2.23	-0.18	-1.95	-2.05	-1.13	-1.72	-2.53	-1.63	-1.51	-0.69
		1st Diff	-7.57[a]	-8.36[a]	-7.86[a]	-8.21[a]	-7.08[a]	-7.13[a]	-6.95[a]	-7.21[a]	-7.23[a]	-7.33[a]	-8.09[a]	-8.03[a]	-8.05[a]
Tanzania	DF-GLS*	Level	-0.28	-1.37	-0.86	-0.68	0.07	-0.81	0.47	0.82	0.65	0.33	-0.55	-0.65	-1.74[c]
		1st Diff	-6.81[a]	-3.30[a]	-7.95[a]	-8.20[a]	-8.30[a]	-5.26[a]	-8.85[a]	-8.57[a]	-8.56[a]	-8.55[a]	-8.73[a]	-7.64[a]	-2.72[a]
	PP*	Level	-0.35	-1.55	-0.84	-0.64	-0.56	-1.23	-4.51	-2.62[c]	-0.43	-0.45	-1.23	-3.58	-3.03[b]
		1st Diff	-7.09[a]	-3.77[a]	-7.91[a]	-8.16[a]	-8.26[a]	-8.30[a]	-8.98[a]	-8.59[a]	-8.62[a]	-8.63[a]	-8.71[a]	-8.75[a]	-11.1[a]
	DF-GLS**	Level	-2.67	-2.45	-0.93	-1.18	-1.65	-1.91	-1.22	-1.67	-2.06	-2.20	-1.67	-1.07	-2.33
		1st Diff	-6.96[a]	-3.11[c]	-8.19[a]	-8.40[a]	-8.29[a]	-5.32[a]	-9.09[a]	-2.89[c]	-8.63[a]	-7.95[a]	-8.75[a]	-8.31[a]	-9.09[a]
	PP**	Level	-2.87	-2.29	-0.96	-1.70	-2.01	-1.28	-3.76[b]	-3.67[b]	-2.03	-2.47	-1.55	-2.03	-3.18[c]
		1st Diff	-7.32[a]	-3.57[b]	-8.13[a]	-8.32[a]	-8.22[a]	-8.31[a]	-9.70[a]	-8.49[a]	-8.56[a]	-8.57[a]	-8.71[a]	-12.1[a]	-11.4[a]
Zambia	DF-GLS*	Level	-1.30	-1.43	-1.48	-1.91	-1.45	-2.09[b]	-1.30	-0.72	-0.99	-0.76	-0.24	0.29	1.28
		1st Diff	-5.38[a]	-5.47[a]	-5.42[a]	-5.88[a]	-1.81[c]	-2.31[b]	-5.17[a]	-2.69[a]	-7.77[a]	-7.51[a]	-6.68[a]	-9.02[a]	-9.79[a]
	PP*	Level	-1.60	-1.67	-1.55	-1.26	-2.99[b]	-1.46	-1.51	-2.70[c]	-1.91	-0.59	-0.41	0.15	-1.63
		1st Diff	-3.40[b]	-3.36[b]	-3.31[b]	-5.95[a]	-3.65[a]	-6.61[a]	-6.31[a]	-6.58[a]	-7.90[a]	-7.99[a]	-7.11[a]	-9.73[a]	-9.76[a]
	DF-GLS**	Level	-1.42	-1.51	-1.65	-1.90	-2.27	-2.37	-1.30	-1.24	-1.26	-1.08	-1.26	-1.85	-1.99
		1st Diff	-5.44[a]	-5.50[a]	-5.52[a]	-5.94[a]	-2.15[c]	-2.50[c]	-5.81[a]	-6.01[a]	-7.94[a]	-8.31[a]	-7.25[a]	-8.92[a]	-10.0[a]
	PP**	Level	-1.40	-1.69	-2.16	-2.10	-2.40	-2.17	-1.32	-3.24[c]	-1.28	-1.39	-1.79	-5.12[a]	-2.26
		1st Diff	-3.31[b]	-3.27[b]	-3.27[c]	-6.38[a]	-4.28[a]	-6.68[a]	-6.37[a]	-6.70[a]	-8.09[a]	-8.22[a]	-7.14[a]	-9.58[a]	-9.96[a]

APPENDIX C:
COINTEGRATION ANALYSIS SUMMARY

Table C1: Cointegration Analysis

	Rolling Sample				Johansen Test							ECM(s)		
					Trace		Max							
Country	From	To	Obs	K	r<0	r<1	r<0	r<1	EG	Prob.	CRDW	Coeff	t-stat	Coint?
Botswana	Jan-90	Dec-95	72	3	32.1[0.00]	12.4[0.05]	19.6[0.05]	12.4[0.05]	-2.95	0.00	0.45	-0.27	-3.68	Yes
	Jan-91	Dec-96	72	4	18.4[0.02]	1.04[0.3]	17.3[0.02]	1.06[0.3]	-1.72	0.08	0.37	-0.22	-2.21	Yes
	Jan-92	Dec-97	72	0	25.2[0.00]	3.35[0.52]	21.9[0.01]	3.35[0.52]	-3.67	0.00	0.43	-0.32	-4.02	Yes
	Jan-93	Dec-98	72	0	29.7[0.02]	6.95[0.35]	22.7[0.02]	6.95[0.35]	-2.42	0.02	0.65	-0.10	-0.89	No
	Jan-94	Dec-99	72	0	22.7[0.03]	1.88[0.98]	25.9[0.00]	1.88[0.98]	-1.55	0.11	0.33	-0.17	-2.80	Yes
	Jan-95	Dec-00	72	1	18.5[0.02]	0.13[0.72]	18.4[0.01]	0.13[0.72]	-3.28	0.00	0.47	-0.16	-3.11	Yes
	Jan-96	Dec-01	72	1	34.5[0.00]	0.15[0.69]	34.3[0.00]	0.15[0.69]	-7.86	0.00	1.87	-0.40	-5.58	Yes
	Jan-97	Dec-02	72	1	32.8[0.00]	0.02[0.89]	32.8[0.00]	0.02[0.89]	-8.01	0.00	1.91	-0.42	-5.65	Yes
	Jan-98	Dec-03	72	1	37.8[0.00]	5.88[0.48]	31.9[0.00]	5.88[0.48]	-8.12	0.00	1.91	-0.47	-5.92	Yes
	Jan-99	Dec-04	72	1	33.9[0.00]	2.92[0.08]	30.9[0.00]	2.92[0.08]	-8.47	0.00	1.73	-0.36	-4.23	Yes
	Jan-00	Dec-05	72	3	133[0.00]	4.24[0.7]	129[0.00]	4.24[0.7]	-7.50	0.00	1.76	-0.41	-4.64	Yes
	Jan-01	Dec-06	72	2	27.7[0.03]	4.61[0.65]	23.0[0.01]	4.61[0.65]	-7.20	0.00	1.70	-0.87	-7.25	Yes
	Jan-02	Dec-07	72	2	34.1[0.00]	4.42[0.68]	29.7[0.00]	4.42[0.68]	-7.51	0.00	1.78	-0.85	-7.21	Yes
Lesotho	Jan-90	Dec-95	72	1	16.4[0.04]	2.38[0.12]	14.0[0.05]	2.38[0.12]	-4.91	0.00	1.03	-0.34	-2.91	Yes
	Jan-91	Dec-96	72	1	38.5[0.00]	1.40[0.24]	37.1[0.00]	1.4[0.24]	-6.94	0.00	1.48	-0.72	-4.24	Yes
	Jan-92	Dec-97	72	1	39.4[0.00]	8.67[0.20]	30.7[0.00]	8.67[0.20]	-7.22	0.00	1.70	-0.75	-4.42	Yes
	Jan-93	Dec-98	72	1	30.8[0.00]	1.47[0.22]	29.3[0.00]	1.47[0.22]	-7.60	0.00	1.81	-0.80	-5.12	Yes
	Jan-94	Dec-99	72						-2.16	0.03	0.43	-0.12	-1.35	Yes
	Jan-95	Dec-00	72						-2.32	0.02	0.28	-0.12	-1.89	Yes
	Jan-96	Dec-01	72						-2.26	0.02	0.27	-0.13	-2.10	Yes
	Jan-97	Dec-02	72						-2.10	0.03	0.24	-0.12	-1.93	Yes
	Jan-98	Dec-03	72						-0.84	0.35	0.19	-0.04	-0.71	No
	Jan-99	Dec-04	72						-2.04	0.04	0.16	-0.04	-0.97	No
	Jan-00	Dec-05	72						-1.02	0.28	0.09	0.01	0.26	No
	Jan-01	Dec-06	72	0	19.9[0.00]	2.46[0.12]	17.4[0.01]	2.46[0.12]	-1.27	0.19	0.12	0.01	0.51	No
	Jan-02	Dec-07	72	1	22.5[0.02]	4.89[0.3]	17.6[0.03]	4.89[0.3]	-1.49	0.13	0.08	0.01	0.21	No
Madagascar	Jan-90	Dec-95	72	4	15.5[0.05]	1.14[0.29]	14.4[0.05]	1.14[0.29]	-3.18	0.00	0.63	-0.26	-2.66	Yes
	Jan-91	Dec-96	72	0	17.4[0.03]	1.37[0.24]	16.0[0.03]	1.37[0.24]	-2.08	0.04	0.40	-0.23	-3.33	Yes
	Jan-92	Dec-97	72	1	26.3[0.04]	2.51[0.93]	23.8[0.01]	2.51[0.93]	-1.09	0.25	0.21	-0.15	-3.00	Yes
	Jan-93	Dec-98	72	2	17.4[0.03]	2.49[0.11]	14.9[0.04]	2.49[0.11]	-2.53	0.01	0.28	-0.22	-3.69	Yes
	Jan-94	Dec-99	72	1	29.3[0.00]	3.29[0.53]	26.0[0.00]	3.29[0.53]	-2.36	0.02	0.37	-0.30	-4.51	Yes
	Jan-95	Dec-00	72	1	21.8[0.03]	5.66[0.22]	16.2[0.05]	5.66[0.22]	-3.09	0.00	0.29	-0.23	-4.12	Yes
	Jan-96	Dec-01	72	0	29.0[0.00]	7.32[0.11]	21.7[0.01]	7.32[0.11]	-2.01	0.04	0.22	-0.12	-2.84	Yes
	Jan-97	Dec-02	72						-1.54	0.11	0.10	-0.08	-2.29	Yes
	Jan-98	Dec-03	72						-2.04	0.04	0.15	-0.04	-1.03	No
	Jan-99	Dec-04	72						-1.89	0.06	0.18	-0.12	-2.96	Yes
	Jan-00	Dec-05	72						-2.38	0.02	0.19	-0.15	-3.16	Yes
	Jan-01	Dec-06	72						-0.46	0.51	0.20	-0.05	-0.76	No
	Jan-02	Dec-07	72						-0.44	0.52	0.13	-0.02	-0.42	No
Malawi	Jan-90	Dec-95	72						-3.32	0.00	0.51	-0.29	-3.58	Yes
	Jan-91	Dec-96	72						-3.22	0.00	0.53	-0.29	-3.57	Yes
	Jan-92	Dec-97	72						-3.24	0.00	0.52	-0.29	-3.54	Yes
	Jan-93	Dec-98	72						-3.10	0.00	0.48	-0.27	-3.28	Yes
	Jan-94	Dec-99	72						-2.96	0.00	0.45	-0.24	-3.10	Yes
	Jan-95	Dec-00	72	4	29.8[0.02]	6.40[0.41]	23.4[0.01]	6.40[0.41]	-4.35	0.00	0.39	-0.37	-5.08	Yes
	Jan-96	Dec-01	72	4	20.4[0.00]	1.78[0.18]	18.6[0.01]	1.78[0.18]	-4.95	0.00	1.02	-0.26	-3.12	Yes
	Jan-97	Dec-02	72	1	20.4[0.00]	2.94[0.09]	17.5[0.02]	2.94[0.09]	-5.17	0.00	1.11	-0.25	-3.22	Yes
	Jan-98	Dec-03	72	1	29.9[0.00]	4.98[0.30]	25.0[0.00]	4.98[0.30]	-5.72	0.00	1.14	-0.43	-4.84	Yes
	Jan-99	Dec-04	72	1	25.9[0.00]	0.32[0.57]	25.5[0.00]	0.32[0.57]	-6.00	0.00	1.35	-0.39	-3.93	Yes
	Jan-00	Dec-05	72	1	27.8[0.00]	0.59[0.44]	27.2[0.00]	0.59[0.44]	-6.20	0.00	1.41	-0.40	-4.29	Yes
	Jan-01	Dec-06	72	3	44.6[0.00]	0.63[0.43]	44.0[0.00]	0.63[0.43]	-6.18	0.00	1.35	-0.59	-7.40	Yes
	Jan-02	Dec-07	72	0	15.7[0.05]	0.75[0.39]	15.4[0.04]	0.75[0.39]	-2.41	0.02	0.75	-0.40	-4.06	Yes

Table C1: Cointegration Analysis

	Rolling Sample				Johansen Test							ECM(s)		
					Trace		Max							
Country	From	To	Obs	K	r<0	r<1	r<0	r<1	EG	Prob.	CRDW	Coeff	t-stat	Coint?
Mozambique	Jan-90	Dec-95			Insufficient number of observations to estimate VAR									
	Jan-91	Dec-96			Insufficient number of observations to estimate VAR									
	Jan-92	Dec-97			Insufficient number of observations to estimate VAR									
	Jan-93	Dec-98	72	2	24.9[0.01]	6.68[0.14]	18.3[0.03]	6.68[0.14]	-2.97	0.01	1.52	-0.91	-2.93	Yes
	Jan-94	Dec-99	72	1	45.1[0.00]	3.85[0.43]	41.3[0.00]	3.85[0.43]	-2.89	0.01	0.96	-0.46	-2.91	Yes
	Jan-95	Dec-00	72	4	59.8[0.00]	8.37[0.22]	51.5[0.00]	8.37[0.22]	-3.17	0.00	0.82	-0.38	-3.31	Yes
	Jan-96	Dec-01	72	4	58.8[0.00]	3.81[0.05]	50.0[0.00]	3.81[0.05]	-2.91	0.00	0.63	-0.30	-3.06	Yes
	Jan-97	Dec-02	72	4	59.5[0.00]	0.15[0.69]	59.3[0.00]	0.15[0.69]	-1.78	0.07	0.32	-0.13	-1.83	Yes
	Jan-98	Dec-03			Near Singular matrix (log of non positive number)									
	Jan-99	Dec-04			Near Singular matrix (cannot estimate VAR)									
	Jan-00	Dec-05			Near Singular matrix (cannot estimate VAR)									
	Jan-01	Dec-06			Near Singular matrix (cannot estimate VAR)									
	Jan-02	Dec-07			Near Singular matrix (cannot estimate VAR)									
Namibia	Jan-90	Dec-95	72	0	38.6[0.00]	5.44[0.24]	33.2[0.00]	5.44[0.24]	-3.13	0.00	1.26	-0.65	-5.80	Yes
	Jan-91	Dec-96	72	1	22.3[0.03]	5.51[0.23]	16.7[0.04]	5.51[0.23]	-6.27	0.00	1.55	-0.74	-5.92	Yes
	Jan-92	Dec-97	72	1	24.0[0.01]	6.67[0.15]	17.3[0.03]	6.67[0.15]	-5.69	0.00	1.23	-0.63	-5.65	Yes
	Jan-93	Dec-98	72	1	19.6[0.01]	3.18[0.07]	16.4[0.02]	3.18[0.07]	-4.87	0.00	1.05	-0.56	-5.25	Yes
	Jan-94	Dec-99	72	4	27.1[0.03]	5.05[0.59]	22.1[0.02]	5.05[0.59]	-2.42	0.02	0.77	-0.44	-4.49	Yes
	Jan-95	Dec-00	72	1	20.7[0.01]	1.34[0.25]	19.4[0.01]	1.34[0.25]	-3.23	0.00	0.90	-0.54	-5.26	Yes
	Jan-96	Dec-01	72	3	22.2[0.01]	1.07[0.30]	21.2[0.01]	1.07[0.30]	-5.48	0.00	1.15	-0.64	-5.93	Yes
	Jan-97	Dec-02	72						-2.29	0.02	0.69	-0.46	-5.90	Yes
	Jan-98	Dec-03	72	3	30.1[0.01]	9.8[0.14]	20.3[0.04]	9.80[0.14]	-2.45	0.01	0.71	-0.49	-6.26	Yes
	Jan-99	Dec-04	72	3	34.2[0.00]	11.1[0.09]	23.2[0.01]	11.1[0.09]	-2.53	0.01	0.75	-0.45	-5.93	Yes
	Jan-00	Dec-05	72						-2.62	0.01	0.74	-0.44	-5.93	Yes
	Jan-01	Dec-06	72	3	28.1[0.03]	8.3[0.23]	19.8[0.04]	8.30[0.23]	-2.92	0.00	0.83	-0.54	-7.16	Yes
	Jan-02	Dec-07	72	1	27.3[0.00]	3.43[0.06]	23.9[0.00]	3.43[0.06]	-2.45	0.01	0.88	-0.61	-7.17	Yes
South Africa	Jan-90	Dec-95	72	1	23.8[0.00]	1.97[0.16]	21.8[0.00]	1.97[0.16]	-7.58	0.00	1.80	-0.89	-10.20	Yes
	Jan-91	Dec-96	72	1	23.3[0.00]	1.87[0.17]	21.4[0.00]	1.87[0.17]	-6.77	0.00	1.55	-0.80	-8.05	Yes
	Jan-92	Dec-97	72	1	24.4[0.00]	1.73[0.19]	22.7[0.00]	1.73[0.19]	-6.87	0.00	1.60	-0.81	-7.90	Yes
	Jan-93	Dec-98	72	1	25.0[0.00]	1.77[0.18]	23.2[0.00]	1.77[0.18]	-5.32	0.00	1.16	-0.85	-9.27	Yes
	Jan-94	Dec-99	72	2	19.0[0.01]	2.41[0.12]	16.6[0.02]	2.41[0.12]	-5.60	0.00	1.23	-0.87	-9.22	Yes
	Jan-95	Dec-00	72	1	30.0[0.01]	4.98[0.60]	25.0[0.01]	4.98[0.60]	-4.96	0.00	1.06	-0.73	-8.12	Yes
	Jan-96	Dec-01	72	0	50.1[0.00]	0.31[0.58]	49.8[0.00]	0.31[0.58]	-4.63	0.00	0.94	-0.62	-7.01	Yes
	Jan-97	Dec-02	72						-4.55	0.00	0.92	-0.57	-6.26	Yes
	Jan-98	Dec-03	72	4	20.4[0.05]	3.09[0.56]	17.3[0.03]	3.09[0.56]	-3.09	0.00	0.85	-0.54	-5.90	Yes
	Jan-99	Dec-04	72						-1.76	0.07	0.42	-0.21	-3.00	Yes
	Jan-00	Dec-05	72						-1.60	0.10	0.11	-0.06	-1.55	Yes
	Jan-01	Dec-06	72	3	22.2[0.03]	3.70[0.46]	18.5[0.02]	3.70[0.46]	-3.72	0.00	0.17	-0.14	-2.86	Yes
	Jan-02	Dec-07			Near Singular Matrix									
Swaziland	Jan-90	Dec-95	72						-2.86	0.00	0.33	-0.19	-3.07	Yes
	Jan-91	Dec-96	72	1	19.1[0.01]	0.39[0.53]	18.7[0.01]	0.39[0.53]	-5.57	0.00	0.85	-0.53	-5.41	Yes
	Jan-92	Dec-97	72	1	29.3[0.00]	0.19[0.66]	29.1[0.00]	0.19[0.66]	-7.11	0.00	1.55	-0.84	-7.49	Yes
	Jan-93	Dec-98	72	1	92.5[0.00]	0.27[0.60]	92.3[0.00]	0.27[0.60]	-7.23	0.00	1.71	-0.83	-16.09	Yes
	Jan-94	Dec-99	72	1	33.4[0.00]	2.55[0.11]	30.8[0.00]	2.55[0.11]	-8.56	0.00	2.04	-0.99	-8.31	Yes
	Jan-95	Dec-00	72	0	58.2[0.00]	0.50[0.48]	57.7[0.00]	0.50[0.48]	-8.55	0.00	2.04	-1.00	-8.36	Yes
	Jan-96	Dec-01			Near Singular matrix									
	Jan-97	Dec-02			Near Singular matrix									
	Jan-98	Dec-03			Near Singular matrix									
	Jan-99	Dec-04	72	1	19.4[0.01]	0.50[0.48]	18.9[0.01]	0.50[0.48]	-2.16	0.03	0.16	-0.08	-1.65	Yes
	Jan-00	Dec-05	72						-1.63	0.10	0.26	-0.08	-1.49	No
	Jan-01	Dec-06	72						-1.48	0.13	0.28	-0.09	-1.49	Yes
	Jan-02	Dec-07	72						-1.71	0.08	0.30	-0.14	-2.18	Yes
Tanzania	Jan-90	Dec-95	72						-2.36	0.02	0.52	-0.05	-0.46	No
	Jan-91	Dec-96	72	4	17.2[0.03]	2.58[0.11]	14.7[0.04]	2.58[0.11]	-2.63	0.01	0.79	-0.31	-2.13	Yes
	Jan-92	Dec-97	72						-2.31	0.02	0.37	-0.08	-1.19	No
	Jan-93	Dec-98	72						-2.01	0.04	0.26	-0.04	-0.92	No
	Jan-94	Dec-99	72	3	16.3[0.04]	0.74[0.39]	15.6[0.03]	0.74[0.39]	-2.86	0.00	0.27	-0.07	-1.84	Yes

Table C1: Cointegration Analysis

	Rolling Sample				Johansen Test							ECM(s)		
					Trace		Max							
Country	From	To	Obs	K	r<0	r<1	r<0	r<1	EG	Prob.	CRDW	Coeff	t-stat	Coint?
	Jan-95	Dec-00	72	0	23.6[0.00]	2.71[0.10]	20.9[0.00]	2.71[0.10]	-3.13	0.00	0.28	-0.12	-2.89	Yes
	Jan-96	Dec-01	72	0	34.9[0.00]	8.21[0.08]	26.7[0.00]	8.21[0.08]	-2.60	0.01	0.17	-0.11	-4.09	Yes
	Jan-97	Dec-02	72						-2.53	0.01	0.09	-0.07	-2.35	Yes
	Jan-98	Dec-03	72						-1.20	0.21	0.09	-0.03	-0.92	No
	Jan-99	Dec-04	72						-0.25	0.59	0.05	-0.01	-0.58	No
	Jan-00	Dec-05	72	0	19.9[0.01]	3.05[0.08]	16.9[0.02]	3.05[0.08]	-1.32	0.17	0.05	-0.03	-0.92	No
	Jan-01	Dec-06	72	2	29.5[0.02]	9.67[0.14]	19.8[0.04]	9.67[0.14]	-2.84	0.01	0.13	-0.12	-3.00	Yes
	Jan-02	Dec-07	72	4	29.7[002]	8.47[0.22]	21.3[0.03]	21.3[0.03]	-3.15	0.00	0.37	-0.19	-2.53	Yes
Zambia	Jan-90	Dec-95	72	2	20.0[0.01]	20.2[0.16]	18.0[0.01]	20.2[0.16]	-3.60	0.00	0.86	-0.31	-2.84	Yes
	Jan-91	Dec-96	72	2	23.3[0.00]	2.46[0.12]	20.8[0.00]	2.46[0.12]	-3.96	0.00	0.84	-0.28	-3.06	Yes
	Jan-92	Dec-97	72						-3.16	0.00	0.50	-0.20	-2.90	Yes
	Jan-93	Dec-98	72	4	21.1[0.04]	3.45[0.50]	17.6[0.03]	3.45[0.50]	-3.18	0.00	0.53	-0.23	-3.83	Yes
	Jan-94	Dec-99	72	2	32.8[0.00]	5.91[0.20]	26.9[0.00]	5.91[0.20]	-2.66	0.01	0.34	-0.12	-2.85	Yes
	Jan-95	Dec-00	72	1	28.6[0.00]	3.41[0.07]	25.2[0.00]	3.41[0.07]	-1.16	0.22	0.19	-0.15	-2.77	Yes
	Jan-96	Dec-01	72	0	18.7[0.02]	3.05[0.08]	15.7[0.03]	3.05[0.08]	-1.21	0.20	0.21	-0.14	-2.26	Yes
	Jan-97	Dec-02	72	4	22.1[0.03]	3.90[0.43]	18.3[0.03]	3.90[0.43]	-1.22	0.20	0.18	-0.13	-1.94	Yes
	Jan-98	Dec-03	72						-1.90	0.06	0.50	-0.21	-2.30	Yes
	Jan-99	Dec-04	72						-2.73	0.01	0.53	-0.26	-3.32	Yes
	Jan-00	Dec-05	72						-2.63	0.01	0.37	-0.18	-3.21	Yes
	Jan-01	Dec-06	72	2	24.0[0.01]	6.85[0.13]	17.1[0.03]	6.85[0.13]	-2.49	0.01	0.33	-0.13	-2.92	Yes
	Jan-02	Dec-07	72	0	32.1[0.01]	7.34[0.31]	24.7[0.01]	7.34[0.31]	-1.92	0.05	0.26	-0.07	-2.61	Yes

Notes: Parenthesis [ ] are used to denote probability values. EG - Engle-Granger approach. CRDW – cointegrating regression Durbin-Watson.

Source: Estimates by author.

APPENDIX D:
LONG-RUN ROLLING REGRESSION MODEL SUMMARY

Table D1: Long -Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Adj. R^2	DW
Country	From	To		Coeff	t-stat	Coeff	t-stat		
Botswana	Jan-90	Dec-95	72	0.87	2.11	0.96	29.6	0.92	0.45
	Jan-91	Dec-96	72	-0.01	-0.01	1.04	11.3	0.65	0.37
	Jan-92	Dec-97	72	8.21	10.2	0.45	7.56	0.44	0.43
	Jan-93	Dec-98	72	8.18	13.6	0.46	10.0	0.58	0.65
	Jan-94	Dec-99	72	8.26	8.83	0.46	6.36	0.36	0.33
	Jan-95	Dec-00	72	5.24	6.11	0.70	10.8	0.62	0.47
	Jan-96	Dec-01	72	2.13	4.51	0.95	26.6	0.91	1.87
	Jan-97	Dec-02	72	1.96	5.05	0.97	33.6	0.94	1.91
	Jan-98	Dec-03	72	1.91	4.79	0.97	33.9	0.94	1.91
	Jan-99	Dec-04	72	3.36	6.26	0.87	23.0	0.88	1.73
	Jan-00	Dec-05	72	4.90	8.23	0.76	18.5	0.83	1.76
	Jan-01	Dec-06	72	1.59	26.72	0.99	243.0	1.00	1.70
	Jan-02	Dec-07	72	1.60	22.17	0.99	200.9	1.00	1.78
Lesotho	Jan-90	Dec-95	72	-1.10	-0.61	1.18	10.4	0.60	1.03
	Jan-91	Dec-96	72	-0.36	-0.25	1.12	12.3	0.68	1.48
	Jan-92	Dec-97	72	0.68	0.45	1.04	10.8	0.62	1.70
	Jan-93	Dec-98	72	-0.12	-0.11	1.10	16.6	0.79	1.81
	Jan-94	Dec-99	72	2.03	2.34	0.95	18.0	0.82	0.43
	Jan-95	Dec-00	72	6.77	5.01	0.66	8.41	0.50	0.28
	Jan-96	Dec-01	72	8.44	7.13	0.57	8.22	0.48	0.27
	Jan-97	Dec-02	72	9.16	8.87	0.53	8.65	0.51	0.24
	Jan-98	Dec-03	72	8.03	6.58	0.58	7.98	0.47	0.19
	Jan-99	Dec-04	72	6.39	5.07	0.63	8.02	0.47	0.16
	Jan-00	Dec-05	72	4.57	3.03	0.71	7.09	0.41	0.09
	Jan-01	Dec-06	72	-0.10	-0.05	1.04	7.33	0.43	0.12
	Jan-02	Dec-07	72	2.77	1.64	0.83	6.65	0.38	0.08
Madagascar	Jan-90	Dec-95	72	19.9	60.5	0.49	27.2	0.92	0.63
	Jan-91	Dec-96	72	19.5	46.2	0.53	25.2	0.90	0.40
	Jan-92	Dec-97	72	21.4	35.9	0.47	15.8	0.78	0.21
	Jan-93	Dec-98	72	22.8	45.9	0.42	16.7	0.80	0.28
	Jan-94	Dec-99	72	23.5	53.8	0.39	18.0	0.82	0.37
	Jan-95	Dec-00	72	23.2	50.6	0.40	17.3	0.81	0.29
	Jan-96	Dec-01	72	21.7	44.8	0.49	15.8	0.78	0.22
	Jan-97	Dec-02	72	23.0	25.5	0.35	4.50	0.21	0.10
	Jan-98	Dec-03	72	22.8	54.4	0.31	7.97	0.47	0.15
	Jan-99	Dec-04	72	22.8	55.7	0.27	7.23	0.42	0.18
	Jan-00	Dec-05	72	23.3	78.1	0.18	7.31	0.42	0.19
	Jan-01	Dec-06	72	22.9	49.3	0.23	5.84	0.32	0.20
	Jan-02	Dec-07	72	24.6	9.02	0.30	1.32	0.01	0.13

Table D1: Long -Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Adj. R^2	DW
Country	From	To		Coeff	t-stat	Coeff	t-stat		
Malawi	Jan-90	Dec-95	72	9.52	9.85	0.82	22.1	0.87	0.51
	Jan-91	Dec-96	72	8.86	8.87	0.84	26.2	0.91	0.53
	Jan-92	Dec-97	72	8.24	6.74	0.85	22.5	0.88	0.52
	Jan-93	Dec-98	72	8.81	6.21	0.85	20.5	0.85	0.48
	Jan-94	Dec-99	72	5.05	2.98	0.97	21.7	0.87	0.45
	Jan-95	Dec-00	72	3.01	1.66	1.03	23.3	0.88	0.39
	Jan-96	Dec-01	72	8.15	5.18	0.91	24.7	0.90	1.02
	Jan-97	Dec-02	72	7.43	4.51	0.94	24.5	0.89	1.11
	Jan-98	Dec-03	72	15.3	7.95	0.79	18.4	0.83	1.14
	Jan-99	Dec-04	72	17.7	12.1	0.73	22.3	0.87	1.35
	Jan-00	Dec-05	72	15.0	13.3	0.78	28.9	0.92	1.41
	Jan-01	Dec-06	72	14.3	15.4	0.79	32.5	0.94	1.35
	Jan-02	Dec-07	72	10.6	42.7	0.91	116.8	0.99	0.75
Mozambique	Jan-90	Dec-95		Insufficient number of data observations to estimate model					
	Jan-91	Dec-96		Insufficient number of data observations to estimate model					
	Jan-92	Dec-97		Insufficient number of data observations to estimate model					
	Jan-93	Dec-98	72	15.2	5.66	0.86	4.09	0.50	1.52
	Jan-94	Dec-99	72	9.93	4.53	1.17	6.24	0.58	0.96
	Jan-95	Dec-00	72	7.80	4.14	1.30	7.73	0.60	0.82
	Jan-96	Dec-01	72	9.09	5.05	1.22	7.42	0.51	0.63
	Jan-97	Dec-02	72	11.9	5.40	1.05	5.17	0.29	0.32
	Jan-98	Dec-03		Near Singular Matrix					
	Jan-99	Dec-04		Near Singular Matrix					
	Jan-00	Dec-05		Near Singular Matrix					
	Jan-01	Dec-06		Near Singular Matrix					
	Jan-02	Dec-07		Near Singular Matrix					
Namibia	Jan-90	Dec-95	72	5.18	6.09	0.82	16.0	0.83	1.26
	Jan-91	Dec-96	72	5.45	5.65	0.80	13.9	0.75	1.55
	Jan-92	Dec-97	72	5.28	4.40	0.81	11.4	0.64	1.23
	Jan-93	Dec-98	72	5.14	4.78	0.82	12.9	0.70	1.05
	Jan-94	Dec-99	72	8.38	8.40	0.64	10.7	0.62	0.77
	Jan-95	Dec-00	72	8.13	12.4	0.66	16.5	0.79	0.90
	Jan-96	Dec-01	72	7.31	15.1	0.72	22.7	0.88	1.15
	Jan-97	Dec-02	72	5.57	10.9	0.84	23.3	0.88	0.69
	Jan-98	Dec-03	72	5.90	11.4	0.81	20.7	0.86	0.71
	Jan-99	Dec-04	72	4.50	7.99	0.93	18.5	0.83	0.75
	Jan-00	Dec-05	72	5.01	10.3	0.85	17.7	0.81	0.74
	Jan-01	Dec-06	72	5.11	12.1	0.82	18.5	0.83	0.83
	Jan-02	Dec-07	72	5.35	14.9	0.78	20.2	0.85	0.88
South Africa	Jan-90	Dec-95	72	3.97	16.6	0.95	60.6	0.98	1.80
	Jan-91	Dec-96	72	3.40	10.2	1.00	44.3	0.97	1.55
	Jan-92	Dec-97	72	3.14	9.90	1.02	47.2	0.97	1.60
	Jan-93	Dec-98	72	3.56	9.94	0.98	42.2	0.96	1.16

Table D1: Long -Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Adj. R^2	DW
Country	From	To		Coeff	t-stat	Coeff	t-stat		
	Jan-94	Dec-99	72	3.68	9.87	0.98	41.1	0.96	1.23
	Jan-95	Dec-00	72	2.77	7.00	1.03	40.5	0.96	1.06
	Jan-96	Dec-01	72	2.56	7.69	1.04	47.1	0.97	0.94
	Jan-97	Dec-02	72	2.93	9.89	1.01	49.7	0.97	0.92
	Jan-98	Dec-03	72	3.22	11.2	1.00	47.4	0.97	0.85
	Jan-99	Dec-04	72	3.47	14.8	0.98	48.8	0.97	0.42
	Jan-00	Dec-05	72	3.99	19.9	0.93	48.7	0.97	0.11
	Jan-01	Dec-06	72	3.79	26.0	0.96	64.6	0.98	0.17
	Jan-02	Dec-07		Near Singular Matrix					
Swaziland	Jan-90	Dec-95	72	2.72	8.36	1.02	39.0	0.96	0.33
	Jan-91	Dec-96	72	3.15	22.1	0.99	91.1	0.99	0.85
	Jan-92	Dec-97	72	3.14	38.4	0.99	166.5	1.00	1.55
	Jan-93	Dec-98	72	3.10	43.5	0.99	201.4	1.00	1.71
	Jan-94	Dec-99	72	2.98	89.0	1.00	445.3	1.00	2.04
	Jan-95	Dec-00	72	2.98	91.7	1.00	457.6	1.00	2.04
	Jan-96	Dec-01		Near Singular Matrix					
	Jan-97	Dec-02		Near Singular Matrix					
	Jan-98	Dec-03		Near Singular Matrix					
	Jan-99	Dec-04	72	3.78	44.9	0.94	128.0	1.00	0.16
	Jan-00	Dec-05	72	4.18	61.0	0.90	134.3	1.00	0.26
	Jan-01	Dec-06	72	4.19	69.1	0.90	144.2	1.00	0.28
	Jan-02	Dec-07	72	4.18	75.2	0.91	157.3	1.00	0.30
Tanzania	Jan-90	Dec-95	72	28.6	27.8	0.27	8.78	0.64	0.52
	Jan-91	Dec-96	72	27.7	25.3	0.30	8.81	0.58	0.79
	Jan-92	Dec-97	72	25.7	26.9	0.33	10.2	0.61	0.37
	Jan-93	Dec-98	72	22.6	18.5	0.39	9.30	0.55	0.26
	Jan-94	Dec-99	72	18.8	14.2	0.48	10.6	0.61	0.27
	Jan-95	Dec-00	72	16.1	14.4	0.53	12.4	0.68	0.28
	Jan-96	Dec-01	72	13.8	9.16	0.65	7.44	0.43	0.17
	Jan-97	Dec-02	72	16.0	13.8	0.40	4.94	0.25	0.09
	Jan-98	Dec-03	72	13.5	12.7	0.46	6.05	0.33	0.09
	Jan-99	Dec-04	72	14.3	9.72	0.31	2.72	0.08	0.05
	Jan-00	Dec-05	72	17.1	11.8	-0.01	-0.13	-0.01	0.05
	Jan-01	Dec-06	72	19.9	19.8	-0.32	-4.07	0.18	0.13
	Jan-02	Dec-07	72	15.0	31.7	0.02	0.47	-0.01	0.37
Zambia	Jan-90	Dec-95	72	8.29	3.73	1.05	31.2	0.95	0.86
	Jan-91	Dec-96	72	7.24	3.68	1.06	33.7	0.95	0.84
	Jan-92	Dec-97	72	13.2	7.16	0.98	31.1	0.93	0.50
	Jan-93	Dec-98	72	14.1	7.82	0.98	31.8	0.94	0.53
	Jan-94	Dec-99	72	19.0	8.65	0.83	16.5	0.84	0.34
	Jan-95	Dec-00	72	24.2	12.7	0.61	10.9	0.69	0.19
	Jan-96	Dec-01	72	24.5	12.6	0.62	11.2	0.70	0.21
	Jan-97	Dec-02	72	25.9	11.7	0.58	8.05	0.55	0.18

Table D1: Long -Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Adj. R^2	DW
Country	From	To		Coeff	t-stat	Coeff	t-stat		
	Jan-98	Dec-03	72	23.1	13.3	0.63	11.1	0.70	0.50
	Jan-99	Dec-04	72	24.9	25.2	0.58	16.7	0.82	0.53
	Jan-00	Dec-05	72	21.7	22.4	0.67	18.4	0.83	0.37
	Jan-01	Dec-06	72	18.9	21.5	0.77	21.3	0.86	0.33
	Jan-02	Dec-07	72	14.1	12.3	0.98	16.5	0.79	0.26

Note: In cases where results for the entire rolling window were not reported this indicates that there was either an insufficient number of data observations to estimate the model or the series were representative of a near singular matrix.

Source: Estimates by author.

APPENDIX E:
SHORT-RUN ROLLING REGRESSION MODEL SUMMARY

Table E1: Short- Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Lag Dep		Adj. R^2	DW	ECM(s)		ML
Country	From	To		Coeff	t-stat	Coeff	t-stat	Coeff	t-stat			Coeff	t-stat	Coeff
Botswana	Jan-90	Dec-95	72	0.03	0.57	0.63	7.46	-0.01	-0.10	0.52	2.03	-0.27	-3.68	1.38
	Jan-91	Dec-96	72	0.04	1.08	0.54	4.51	-0.22	-2.21	0.28	1.76	-0.22	-2.21	2.05
	Jan-92	Dec-97	72	0.02	0.90	0.42	4.78	-0.15	-1.66	0.45	2.04	-0.32	-4.02	1.78
	Jan-93	Dec-98	72	0.00	-0.08	0.35	3.39	-0.10	-0.89	0.26	2.12			
	Jan-94	Dec-99	72	0.02	1.09	0.08	0.83	-0.06	-0.52	0.09	1.94	-0.17	-2.80	5.35
	Jan-95	Dec-00	72	0.02	1.33	0.14	2.53	0.08	0.69	0.13	1.91	-0.16	-3.11	5.36
	Jan-96	Dec-01	72	0.01	0.84	0.24	4.67	0.06	0.60	0.33	2.00	-0.40	-5.58	1.89
	Jan-97	Dec-02	72	0.02	1.56	0.26	4.94	0.12	1.23	0.35	2.00	-0.42	-5.65	1.76
	Jan-98	Dec-03	72	0.02	1.47	0.31	5.74	0.06	0.63	0.39	2.01	-0.47	-5.92	1.47
	Jan-99	Dec-04	72	0.01	0.80	0.28	5.83	0.15	1.64	0.36	1.95	-0.36	-4.23	2.01
	Jan-00	Dec-05	72	0.01	0.49	0.28	6.00	0.21	2.26	0.38	1.82	-0.41	-4.64	1.78
	Jan-01	Dec-06	72	0.00	-0.10	0.99	80.94	0.02	1.85	0.99	1.98	-0.87	-7.25	0.01
	Jan-02	Dec-07	72	0.00	0.04	0.97	73.60	0.03	2.01	0.99	2.01	-0.85	-7.21	0.04
Lesotho	Jan-90	Dec-95	72	-0.04	-0.25	0.59	1.99	-0.32	-2.86	0.33	2.11	-0.34	-2.91	1.20
	Jan-91	Dec-96	72	-0.07	-0.52	0.95	3.22	-0.12	-0.95	0.38	1.97	-0.72	-4.24	0.06
	Jan-92	Dec-97	72	-0.02	-0.16	0.94	3.07	-0.11	-0.86	0.40	1.97	-0.75	-4.42	0.08
	Jan-93	Dec-98	72	0.04	0.31	0.99	6.41	-0.10	-0.99	0.51	2.00	-0.80	-5.12	0.01
	Jan-94	Dec-99	72	-0.01	-0.09	0.75	8.08	-0.05	-0.54	0.48	2.03	-0.12	-1.35	2.09
	Jan-95	Dec-00	72	0.00	-0.05	0.57	6.69	-0.02	-0.20	0.39	1.92	-0.12	-1.89	3.61
	Jan-96	Dec-01	72	0.02	0.23	0.56	6.58	0.00	0.00	0.39	2.03	-0.13	-2.10	3.25
	Jan-97	Dec-02	72	-0.01	-0.09	0.52	6.77	-0.01	-0.07	0.40	2.03	-0.12	-1.93	4.10
	Jan-98	Dec-03	72	-0.06	-0.70	0.51	6.26	0.04	0.34	0.36	2.00			
	Jan-99	Dec-04	72	-0.13	-1.96	0.12	1.24	-0.02	-0.15	-0.01	1.55			
	Jan-00	Dec-05	72	-0.06	-1.31	0.08	1.28	0.18	1.46	0.04	2.01			
	Jan-01	Dec-06	72	-0.03	-0.65	0.11	1.40	0.26	2.06	0.08	2.00			
	Jan-02	Dec-07	72	-0.01	-0.14	0.16	1.80	0.22	1.72	0.07	2.06			
Madagascar	Jan-90	Dec-95	72	0.12	1.13	0.31	3.64	-0.20	-1.68	0.27	1.93	-0.26	-2.66	2.65
	Jan-91	Dec-96	72	0.10	1.04	0.27	3.83	-0.28	-2.68	0.33	1.88	-0.23	-3.33	3.23
	Jan-92	Dec-97	72	0.09	0.93	0.24	3.42	-0.27	-2.47	0.28	1.95	-0.15	-3.00	5.02
	Jan-93	Dec-98	72	0.04	0.44	0.23	3.14	-0.23	-2.23	0.32	1.95	-0.22	-3.69	3.51
	Jan-94	Dec-99	72	0.04	0.45	0.16	2.37	-0.20	-1.93	0.35	1.97	-0.30	-4.51	2.76
	Jan-95	Dec-00	72	-0.02	-0.28	0.15	2.32	-0.18	-1.74	0.28	1.88	-0.23	-4.12	3.69
	Jan-96	Dec-01	72	-0.15	-2.10	0.14	2.49	-0.16	-1.40	0.15	2.01	-0.12	-2.84	7.26
	Jan-97	Dec-02	72	-0.07	-1.48	0.09	1.67	-0.04	-0.33	0.08	2.01	-0.08	-2.29	12.2
	Jan-98	Dec-03	72	-0.04	-1.28	0.06	1.79	0.02	0.16	0.01	2.00			
	Jan-99	Dec-04	72	-0.02	-0.75	0.03	1.08	-0.01	-0.13	0.10	2.01	-0.12	-2.96	8.38
	Jan-00	Dec-05	72	-0.01	-0.21	0.04	0.97	0.00	-0.04	0.11	2.02	-0.15	-3.16	6.25
	Jan-01	Dec-06	72	0.05	0.84	0.04	0.62	0.00	0.04	-0.03	2.02			
	Jan-02	Dec-07	72	0.28	0.95	0.02	0.06	0.00	0.02	-0.04	2.00			

Table E1: Short- Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Lag Dep		Adj. R^2	DW	ECM(s)		ML
Country	From	To		Coeff	t-stat	Coeff	t-stat	Coeff	t-stat			Coeff	t-stat	Coeff
Malawi	Jan-90	Dec-95	72	0.09	0.28	0.49	2.98	0.08	0.70	0.23	1.95	-0.29	-3.58	1.76
	Jan-91	Dec-96	72	0.07	0.24	0.58	4.89	0.07	0.72	0.37	1.93	-0.29	-3.57	1.43
	Jan-92	Dec-97	72	0.01	0.03	0.59	4.89	0.08	0.77	0.36	1.94	-0.29	-3.54	1.44
	Jan-93	Dec-98	72	0.00	-0.01	0.74	6.96	0.10	1.12	0.47	1.94	-0.27	-3.28	0.99
	Jan-94	Dec-99	72	0.04	0.12	0.78	7.11	0.08	0.85	0.47	1.96	-0.24	-3.10	0.92
	Jan-95	Dec-00	72	0.27	1.14	1.07	11.2	0.05	0.78	0.69	2.06	-0.37	-5.08	0.18
	Jan-96	Dec-01	72	0.04	0.14	0.38	5.69	-0.01	-0.09	0.31	2.03	-0.26	-3.12	2.37
	Jan-97	Dec-02	72	0.20	0.83	0.33	5.05	-0.06	-0.62	0.26	2.03	-0.25	-3.22	2.72
	Jan-98	Dec-03	72	0.17	0.70	0.37	5.99	-0.07	-0.72	0.38	1.94	-0.43	-4.84	1.47
	Jan-99	Dec-04	72	-0.21	-0.93	0.35	5.95	-0.10	-0.97	0.34	1.97	-0.39	-3.93	1.67
	Jan-00	Dec-05	72	-0.22	-1.03	0.36	6.30	-0.13	-1.35	0.37	1.98	-0.40	-4.29	1.61
	Jan-01	Dec-06	72	-0.04	-0.26	0.50	9.19	-0.12	-1.47	0.57	1.73	-0.59	-7.40	0.84
	Jan-02	Dec-07	72	0.02	0.29	0.84	25.06	0.04	1.04	0.90	2.27	-0.40	-4.06	0.40
Mozambique	Jan-90	Dec-95		Insufficient number of data observations to estimate model										
	Jan-91	Dec-96		Insufficient number of data observations to estimate model										
	Jan-92	Dec-97		Insufficient number of data observations to estimate model										
	Jan-93	Dec-98	72	-0.68	-0.88	-0.18	-0.37	0.34	1.19	0.30	1.63	-0.91	-2.93	1.30
	Jan-94	Dec-99	72	-0.46	-1.03	-0.09	-0.23	0.12	0.62	0.18	1.71	-0.46	-2.91	2.35
	Jan-95	Dec-00	72	-0.33	-1.09	-0.05	-0.15	0.08	0.51	0.18	1.74	-0.38	-3.31	2.73
	Jan-96	Dec-01	72	-0.18	-0.73	-0.04	-0.14	0.10	0.72	0.11	1.80	-0.30	-3.06	3.48
	Jan-97	Dec-02	72	-0.08	-0.36	-0.04	-0.14	0.08	0.60	0.01	1.91	-0.13	-1.83	8.10
	Jan-98	Dec-03		Near Singular Matrix										
	Jan-99	Dec-04		Near Singular Matrix										
	Jan-00	Dec-05		Near Singular Matrix										
	Jan-01	Dec-06		Near Singular Matrix										
	Jan-02	Dec-07		Near Singular Matrix										
Namibia	Jan-90	Dec-95	72	-0.07	-0.97	-0.06	-0.38	-0.12	-1.15	0.44	1.81	-0.65	-5.80	1.63
	Jan-91	Dec-96	72	-0.07	-0.81	-0.19	-0.90	-0.17	-1.41	0.48	1.88	-0.74	-5.92	1.62
	Jan-92	Dec-97	72	-0.03	-0.38	-0.11	-0.56	-0.13	-1.25	0.39	1.91	-0.63	-5.65	1.77
	Jan-93	Dec-98	72	0.02	0.20	0.26	1.73	-0.15	-1.46	0.38	1.90	-0.56	-5.25	1.32
	Jan-94	Dec-99	72	0.01	0.16	0.19	1.20	-0.23	-2.31	0.36	1.92	-0.44	-4.49	1.83
	Jan-95	Dec-00	72	-0.01	-0.09	0.20	1.25	-0.19	-1.96	0.41	1.97	-0.54	-5.26	1.49
	Jan-96	Dec-01	72	-0.05	-0.61	0.14	0.89	-0.15	-1.49	0.43	1.99	-0.64	-5.93	1.35
	Jan-97	Dec-02	72	-0.07	-0.96	0.17	1.36	-0.25	-2.67	0.42	2.01	-0.46	-5.90	1.82
	Jan-98	Dec-03	72	-0.12	-1.49	0.13	1.04	-0.26	-2.88	0.45	1.98	-0.49	-6.26	1.79
	Jan-99	Dec-04	72	-0.19	-2.51	-0.01	-0.05	-0.27	-2.83	0.41	1.97	-0.45	-5.93	2.26
	Jan-00	Dec-05	72	-0.09	-1.56	-0.11	-0.72	-0.26	-2.78	0.41	1.95	-0.44	-5.93	2.52
	Jan-01	Dec-06	72	-0.06	-1.14	-0.13	-0.92	-0.24	-2.68	0.48	1.99	-0.54	-7.16	2.09
	Jan-02	Dec-07	72	0.02	0.48	-0.07	-0.46	-0.24	-2.67	0.51	1.89	-0.61	-7.17	1.75
South Africa	Jan-90	Dec-95	72	-0.02	-0.64	0.40	5.67	0.10	1.44	0.65	1.79	-0.89	-10.20	0.67
	Jan-91	Dec-96	72	0.01	0.15	0.57	6.73	0.22	2.76	0.59	1.87	-0.80	-8.05	0.55
	Jan-92	Dec-97	72	0.00	0.06	0.65	8.15	0.20	2.74	0.63	1.89	-0.81	-7.90	0.43

Table E1: Short- Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Lag Dep		Adj. R^2	DW	ECM(s)		ML
Country	From	To		Coeff	t-stat	Coeff	t-stat	Coeff	t-stat			Coeff	t-stat	Coeff
	Jan-93	Dec-98	72	0.04	1.03	0.42	5.58	0.15	2.48	0.77	1.94	-0.85	-9.27	0.68
	Jan-94	Dec-99	72	0.00	0.09	0.46	6.32	0.15	2.55	0.78	2.00	-0.87	-9.22	0.62
	Jan-95	Dec-00	72	-0.02	-0.43	0.48	6.05	0.14	2.22	0.74	1.93	-0.73	-8.12	0.71
	Jan-96	Dec-01	72	-0.03	-0.69	0.55	7.01	0.13	1.85	0.71	2.03	-0.62	-7.01	0.73
	Jan-97	Dec-02	72	-0.01	-0.30	0.61	8.17	0.11	1.63	0.71	2.16	-0.57	-6.26	0.68
	Jan-98	Dec-03	72	-0.03	-0.61	0.64	8.80	0.10	1.46	0.73	2.19	-0.54	-5.90	0.67
	Jan-99	Dec-04	72	-0.03	-0.96	0.85	13.8	-0.03	-0.56	0.75	2.65	-0.21	-3.00	0.73
	Jan-00	Dec-05	72	0.01	0.36	0.87	27.6	0.05	1.34	0.92	2.06	-0.06	-1.55	2.12
	Jan-01	Dec-06	72	0.01	0.97	0.90	30.9	0.05	1.44	0.94	2.11	-0.14	-2.86	0.74
	Jan-02	Dec-07		Near Singular Matrix										
Swaziland	Jan-90	Dec-95	72	0.01	0.67	0.86	19.7	0.09	1.84	0.86	2.46	-0.19	-3.07	0.76
	Jan-91	Dec-96	72	0.01	0.95	0.86	22.9	0.03	0.79	0.89	2.11	-0.53	-5.41	0.26
	Jan-92	Dec-97	72	0.00	0.05	0.87	29.1	0.01	0.30	0.93	2.00	-0.84	-7.49	0.15
	Jan-93	Dec-98	72	0.01	-1.45	0.96	85.9	0.01	1.05	0.99	2.07	-0.83	-16.1	0.05
	Jan-94	Dec-99	72	0.00	0.02	0.97	110.1	0.01	0.64	0.99	2.01	-0.99	-8.31	0.03
	Jan-95	Dec-00	72	0.00	-0.12	0.97	110.5	0.01	0.55	0.99	1.13	-1.00	-8.36	0.03
	Jan-96	Dec-01		Near Singular Matrix										
	Jan-97	Dec-02		Near Singular Matrix										
	Jan-98	Dec-03		Near Singular Matrix										
	Jan-99	Dec-04	72	0.00	-0.09	0.97	65.4	-0.02	-1.58	0.99	2.05	-0.08	-1.65	0.32
	Jan-00	Dec-05	72	0.00	0.46	0.96	57.5	-0.04	-2.18	0.98	2.16	-0.08	-1.49	0.48
	Jan-01	Dec-06	72	0.01	0.76	0.96	61.2	-0.03	-2.06	0.98	2.15	-0.09	-1.49	0.42
	Jan-02	Dec-07	72	0.01	1.17	0.96	61.1	-0.03	-2.06	0.98	2.13	-0.14	-2.18	0.26
Tanzania	Jan-90	Dec-95	72	0.37	1.22	0.04	0.80	-0.13	-0.67	-0.05	2.02			
	Jan-91	Dec-96	72	0.18	0.40	0.37	5.56	-0.36	-1.48	0.36	1.48	-0.31	-2.13	2.05
	Jan-92	Dec-97	72	-0.10	-0.44	0.08	1.80	-0.04	-0.31	0.02	2.00			
	Jan-93	Dec-98	72	-0.13	-0.61	0.08	1.88	-0.06	-0.48	0.01	2.00			
	Jan-94	Dec-99	72	-0.28	-1.53	0.09	2.47	-0.09	-0.71	0.07	1.98	-0.07	-1.84	13.5
	Jan-95	Dec-00	72	-0.13	-0.73	0.14	3.19	-0.12	-1.05	0.15	1.93	-0.12	-2.89	7.29
	Jan-96	Dec-01	72	-0.35	-3.19	0.09	1.83	-0.18	-1.67	0.21	1.56	-0.11	-4.09	7.95
	Jan-97	Dec-02	72	-0.19	-2.43	0.07	1.36	-0.02	-0.19	0.05	1.92	-0.07	-2.35	13.4
	Jan-98	Dec-03	72	-0.14	-1.81	0.12	2.09	0.00	0.02	0.03	1.92			
	Jan-99	Dec-04	72	-0.14	-1.75	0.08	1.07	-0.08	-0.63	-0.01	1.88			
	Jan-00	Dec-05	72	-0.08	-0.96	0.05	0.47	-0.03	-0.25	-0.02	2.00			
	Jan-01	Dec-06	72	-0.10	-1.27	-0.05	-0.70	-0.06	-0.51	0.09	1.97	-0.12	-3.00	8.44
	Jan-02	Dec-07	72	-0.03	-0.37	0.01	0.13	-0.10	-0.37	0.08	2.03	-0.19	-2.53	5.27
Zambia	Jan-90	Dec-95	72	0.05	0.07	0.66	7.33	0.23	2.40	0.72	1.63	-0.31	-2.84	1.12
	Jan-91	Dec-96	72	0.07	0.12	0.63	7.87	0.24	2.81	0.71	1.63	-0.28	-3.06	1.31
	Jan-92	Dec-97	72	0.06	0.13	0.58	8.10	0.27	3.34	0.70	1.64	-0.20	-2.90	2.09
	Jan-93	Dec-98	72	-0.64	-1.49	0.44	6.82	0.27	3.73	0.68	1.27	-0.23	-3.83	2.42
	Jan-94	Dec-99	72	-0.51	-1.91	0.26	5.79	0.44	5.13	0.71	1.92	-0.12	-2.85	6.23
	Jan-95	Dec-00	72	-0.22	-1.02	0.22	2.86	0.05	0.43	0.31	1.54	-0.15	-2.77	5.16

Table E1: Short- Run Model Analysis

	Rolling Sample		Obs	Intercept		Slope		Lag Dep		Adj. R^2	DW	ECM(s)		ML
Country	From	To		Coeff	t-stat	Coeff	t-stat	Coeff	t-stat			Coeff	t-stat	Coeff
	Jan-96	Dec-01	72	-0.23	-0.96	0.27	3.08	0.10	0.85	0.29	1.60	-0.14	-2.26	5.3
	Jan-97	Dec-02	72	-0.35	-1.47	0.36	3.26	0.02	0.16	0.29	1.60	-0.13	-1.94	5.12
	Jan-98	Dec-03	72	-0.08	-0.37	0.24	2.80	-0.03	-0.28	0.18	1.57	-0.21	-2.30	3.54
	Jan-99	Dec-04	72	-0.17	-0.89	0.23	3.18	-0.02	-0.14	0.25	1.66	-0.26	-3.32	2.93
	Jan-00	Dec-05	72	-0.11	-0.68	0.22	3.40	0.05	0.46	0.23	2.04	-0.18	-3.21	4.32
	Jan-01	Dec-06	72	-0.27	-1.83	0.17	2.75	0.00	-0.04	0.15	2.30	-0.13	-2.92	6.46
	Jan-02	Dec-07	72	-0.50	-3.83	0.09	1.43	-0.23	-1.93	0.10	1.94	-0.07	-2.61	12.2

Notes: Symm Adj. – speed of adjustment coefficient calculated as equation (4) in Chapter 3. In cases where the ECM(s) and the Symmetric Adjustment Coefficient are not reported this signifies rolling windows where an error correction model (ECM) could not be estimated because there was no evidence of a cointegrating relationship between the central bank rate (CBR) and the lending rate (LR). In cases where results for the entire rolling window were not reported this indicates that there was either an insufficient number of data observations to estimate the model or the series were representative of a near singular matrix.

Source: Estimates by author.

LIST OF REFERENCES

AFXENTIOU, P., 2000. Convergence, the Maastricht Criteria, and Their Benefits. *The Brown Journal of World Affairs.* 7(1): 245-254.

AGBEYEGBE, T., 2003. *On the Feasibility of a Monetary Union in the SADC.* [Online]. Available:http://econ.hunter.cuny.edu/research/papers/HunterEconWP306.pdf [Accessed: 25 February 2008].

ALLEN, D., and NDIKUMANA, L., 2000. Financial Intermediation and Economic Growth in Southern Africa. *Journal of African Economies.* 9(2): 132-160.

APPLEYARD, D., and FIELD, A., 2001. International Economics (4th ed.). McGraw-Hill Publishers, New York.

ARGUELLO, R., 2000. Economic Integration: An Overview of Basic Theory and Other Related Issues. [Online]. Available: http://www.uario.edu.co/FASE1/economia/documentos/pdf/bi03.pdf [Accessed: 7 May2008].

AZIAKPONO, M., 2006. Financial Integration amongst the SACU Countries: Evidence from Interest Rate Pass-Through Analysis. *Studies in Economics and Econometrics.* 30(2): 1-23.

AZIAKPONO, M., KLEIMEIER, S., and SANDER, H., 2007. Banking Market Integration in the SADC Countries: Evidence from Interest Rate Analyses. [Online]. Available: http://www.edocs.ub.unimaas.nl/loader/file.asp?id=1248 [Accessed: 10 May 2008].

AZIAKPONO, M., 2008. 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., 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.

BALASSA, B., 1987. Economic Integration: Entry in the New Palgrave: A Dictionary of Economics. Stock Press, New York.

BAXTER, M., and KING, R., 1995. Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series. National Bureau of Economic Research WP/05/22.

BAYOUMI, T., and Eichengreen, B., 1992. Shocking Aspects of European Monetary Unification. [Online]. Available: http://papers.ssrn.com/so13/papers.cfm?abstarctid=228003 [Accessed: 7 May 2009].

BAYOUMI, T., and OSTRY, J., 1998. Macroeconomic Shocks and Trade Flows within sub-Saharan Africa: Implications for Optimal Currency Arrangements. *Journal of African Economies.* 3: 412-444.

BECK, T., DEMIRGUC-KUNT, A., and LEVINE, R., 2000. A New Database on Financial Development and Structure. *World Bank Economic Review.* 14:597-605.

BLANCHARD, O., and QUAH, D., 1989. The Dynamic Effects of Aggregate Demand and Supply Disturbances. *American Economic Review.*79: 655 -673.

BUIGUT, S., 2006. Monetary Initiatives in Eastern and Southern Africa (ESA): Sorting the Overlapping Membership. *International Finance.* 9(3): 295-315.

BUIGUT, S., and VALEV, N., 2006. Eastern and Southern African Monetary Integration: A Structural Vector Autoregession Analysis. *Review of Development Economics.* 10(4): 586-603.

CARDOSO, C., and FERREIRA, L., 2000. The Effects of European Economic Integration on Tourism: Challenges and Opportunities for Portuguese Tourism Development. *International Journal of Contemporary Hospitality Management.* 12(7): 401-409.

COTTARELLI, C., and KOURELIS, A., 1994. Financial Structure, Bank Lending Rates, and the Transmission of Monetary Policy. *IMF Staff Papers.* 41(4): 587-623.

DICKEY, D., and FULLER, W., 1981. Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrika.* 49: 1057-1072.

DORNBUSCH, R., FAVERO, C., and GIAVAZZI, F., 1998. Immediate Challenges for the European Central Bank. *Economic Policy.* 26: 15 – 64.

FINK, G., and SALVATORE, D., 1999. Benefits and Costs of European Economic and Monetary Union. *The Brown Journal of World Affairs.* 6(2): 187-194.

GAOLATHE, B., 2004. *Official Opening Speech.* CCBG meeting in Gaborone, Botswana. 30 April.

GLICK, R., 1991. *European Monetary Union: Costs and Benefits.* [Online]. Available: http://www.frbsf.org/publications/economics/letter/1991/e191-16.pdf [Accessed: 28 February 2008].

GRANDES, M., 2003. Macroeconomic Convergence in Southern Africa: the Rand Zone Experience. *OECD Development Centre Working Paper.* WP/03/231.

GUILLAUME, D., and STASAVAGE, D., 2000. Improving Policy Credibility: Is there a Case for African Monetary Unions? *World Development.* 28(8): 1391-1407.

HAWKINS, J., and MASSON, P., 2003. *Economic Aspects of Regional Currency Areas and the Use of Foreign Currencies.* [Online]. Available: http://www.bis.org/publ/bppdf/bispap17c.pdf [Accessed: 7 May 2007].

HALL, S., ROBERTSON, D., and WICKENS, M., 1992. Measuring Convergence of the EC Economies. *The Manchester School of Economic and Social Studies.* 60: 99-111.

HODRICK, R., and PRESCOTT, E., 1980. Post-war Business Cycles: an empirical investigation. Mimeo: Carnegie-Mellon University Press, Pittsburgh.

JEFFERIS, K.R., 2007. The Process of Monetary Integration in the SADC Region. *Journal of Southern African Studies.* 33(1): 83-105.

KABUNDI, A., and LOOTS, E., 2005. *Dancing with Neighbours: Co-Movement between South Africa and SADC.* [Online]. Available: http://www.essa.org.za/download/2005Conference/Kabundi.pdf [Accessed: 30 April 2007].

KARRAS, G., 2006. Is Africa an Optimum Currency Area? A Comparison of Macroeconomic Costs and Benefits. *Journal of African Economies.* 16(2): 234-258.

KAUFMANN, H., 1996. *European Economic and Monetary Union Prospects and Pitfalls: Is EMU Premature?* [Online]. Available: http://www/ecsanet.org/confrences/ecsaworld3/kaufmann.htm [Accessed: 18 February 2008].

KHAMFULA, Y., and TESFAYOHANNES, M., 2004. South Africa and Southern African Monetary Union: A Critical Review of Sources of Costs and Benefits. *South African Journal of Economics.* 72(1): 37-49.

KHAMFULA, Y., and HUIZINGA, H., 2004. The Southern African Development Community: Suitable for a Monetary Union? *Journal of Development Economics.* 73: 669-714.

KREMERS, J., ERICSSON, N., and DOLADO, J., 1992. The Power of Cointegration Tests. *Oxford Bulletin of Economics and Statistics.* 54(3): 325-348.

KWAIATKOWSKI, D., PHILLIPS, P., SCHMIDT, P., and SHIN, Y., 1992. Testing the Null Hypothesis of Stationarity against the Alternative of a Unit Root. *Joournal of Econometrics.*5(4): 159-178.

MARUPING, M., 2005. *Challenges for Regional Integration in Sub-Saharan Africa: Macroeconomic Convergence and Monetary Coordination.* [Online]. Available: http://www.fondad.org/publications/africaworld/Fondad-AfricaWorld-Chapter11.pdf [Accessed: 7 May 2007].

MASSON, P., and PATTILLO, C., 2004. A Single Currency for Africa? *Finance and Development.* 41(4): 9-15.

MASSON, P., and PATTILLO, C., 2005. The Monetary Geography of Africa. Brookings Institution Press, Washington.

MATSASENG, K., and VIEGI, N., 2003. *African Economic Integration: Is a Common Currency a Necessary Condition?* [Online]. Available: http://www.Ukzn.ac.za/economics/viegi/research/ESSA2003.pdf [Accessed: 18 February 2008].

McCARTHY, C., 2002. *Macroeconomic Convergence in SADC – A Policy Perspective for the Central Banks of the Integration Arrangement.* [Online]. Available:http://www.reservebank.co.za/SADC/SADC.nsf/LDV/0FBD063AC03D7A3A42257IE00027E456/$File/MECFinal.pdf [Accessed: 28 March 2007].

McCARTHY, C., 2005. *Comparing the Regional Integration Experience in Southern Africa and the European Union in Relation to a Common Currency.* [Online]. Available: http://www.tralac.org/scripts/content.php?id=3474 [Accessed: 18 February 2008].

PHILLIPS, P., and PERRON, P., 1988. Testing for a Unit Root in Time Series Regression. *Biometrike.*75: 335-346.

POLASEK, W., and AMPLATZ, C., 2003. The Maastricht Criteria and the Euro: Has the Convergence Continued? [Online]. Available: http://www.his.ac.at/publications/eco/es-133.pdf [Accessed: 30 April 2008].

ROSSOUW, J., 2006a. An Analysis of Macroeconomic Convergence in SADC. *South African Journal of Economics.* 74(3): 382-390.

ROSSOUW, J., 2006b. *South Africa's Role in Macroeconomic Convergence in SADC.* [Online]. Available: http://www.icbs.co.za/internet/Publications.nsf/LADV/95D2246FD9E8493E4225729D0048A71E/$File/Rossouw.pdf [Accessed: 18 February 2008].

SAID, S., and DICKEY, W., 1984. Testing for Unit Roots in Autoregressive Moving Average Models of Unknown Order. *Biometrika.* 71: 599-607.

SANDER, H., and KLEIMEIR, S., 2004. Convergence in Eurozone 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 KLEIMEIR, S., 2006. Interest Rate Pass-Through in the Common Monetary Area of the SACU Countries. *South African Journal of Economics.* 74(2): 215-229.

SAVILLE, A., BADER, M., and SPINDLER, Z., 2005. Alternative Monetary Systems and the Quest for Stability: Can a Free Banking System Deliver in South Africa. *South African Journal of Economics.* 73(4): 674-693.

SORENSEN, C., and WERNER, T., 2006. Bank Interest Rate Pass-Through in the Euro Area: A Cross Country Comparison. [Online]. Available: http://www.ecb.int/pub/pdf/scpwps/ecbwp580.pdf [Accessed: 10 August 2008].

SPARKS, D., 2002. The Future of Monetary Integration in Southern Africa: Will SADC join the Rand Monetary Area? Citadel, Southern Carolina. Unpublished Conference Paper.

SPRINGER, B., 1996. *The March Toward Monetary Integration: Europe and the Maastricht Treaty*. In Goddard, R., Passe-Smith, J., and Conklin, J (Eds.), *International Political Economy*. Lynne Rienner Publishers: London.

TAVLAS, G., 2007. The Benefits and Costs of Monetary Union in Southern Africa: A Critical Survey of the Literature. [Online]. Available:http://www.reservebank.co.za/internet/publication.nsf/WECV/EF6F2006 [Accessed: 7 May 2008].

TETHALOVA, J, 2004. EMU Enlargement in Context of the OCA Theory. [Online]. Available: http://www.ies.fsv.cuni.cz/storage/work/470_jana_tethalove.pdf [Accessed: 7 May 2008].

TOOLSEMA, L., STURM, J., and de HAAN, J., 2002. Convergence of Pass-Through from Money Market to Lending Rates in EMU Countries: New Evidence. [Online]. Available: http://irs.ub.rug.nl/ppn/241147190 [Accessed: 8 August 2008].

YEHOU, E., 2005. On the Pattern of Currency Blocs in Africa. *IMF Working Paper*. WP/05/45.