

**THE FEASIBILITY OF MONETARY INTEGRATION WITHIN THE SADC
REGION**

**A Thesis Submitted in Fulfilment of the Requirements for the Degree of PHD
(COMMERCE)**

Of Rhodes University

Department of Economics & Economic History

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August, 2012

ABSTRACT

The Southern African Development Community (SADC) aims to have a regional central bank by 2016 and a common currency by 2018. The member states are at the early stages of the process of regional economic integration, having launched a free trade area in 2008. Monetary integration is an advanced stage of regional economic integration that requires progressive changes in the participating countries. The purpose of this study is to determine the feasibility of monetary integration within the SADC countries and hence, provide policy recommendations to guide the integration process. To accomplish this, the study analyses the extent to which the member states meet the criteria for an optimum currency area (OCA) as well as the degree to which their economies are converging.

The study finds that the main macroeconomic objectives of SADC countries differ due to a difference in the relative importance of monetary policy instruments in member states, which influences each country's commitment towards achieving the macroeconomic convergence targets and harmonising policies. A more appropriate approach to macroeconomic convergence would be to allow for variable speed, geometry and depth in each country as premature adherence to convergence targets could prevent a harmonisation of the economies in the future and possibly destabilise the union.

In addition, the study investigates the importance and similarities of the monetary aggregate channel, the interest rate channel, the exchange rate channel and the credit channel in the transmission of monetary policy using VAR analysis. This is important when considering monetary integration because differences in transmission mechanisms can result in asymmetric behaviour between member states, which in turn will prevent harmonisation of their economies.

The results of the analysis suggest that SADC member states display asymmetries in their responses to monetary policy shocks as well as the relative importance of transmission mechanisms. In addition, the results suggest that national monetary policy is generally inefficient in determining economic performance in the member states. Furthermore, the study finds that the failure to meet the OCA criteria implies that the SADC member states will respond asymmetrically to shocks within a monetary union. With no effective alternative adjustment mechanisms in place, the effects of the shocks will endure in union members and possibly widen existing cyclical variation. Hence, monetary integration would not result in harmonisation of the economies of member states. It is therefore, concluded that the SADC countries were not suitable for monetary integration at present.

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LIST OF ACCRONYMS

AEC	African Economic Community
AMF	African Monetary Fund
AMU	Arab Maghreb Union
ASEAN	Association of Southeast Asian Nations
AU	African Union
BoP	Balances of Payments
CEMAC	Economic and Monetary Union of Central Africa
CET	Common External Tariff
CCBG	Committee of Central Bank Governors
CFA	Communauté Financière d’afrique
CMA	Common Monetary Area
CMFI	Committee of Ministers for Finance and Investment
COMESA	Common Market for Eastern and Southern Africa
CU	Customs Union
CV	Coefficient of Variation
DCE	Direct Credit Expansion
DRC	Democratic Republic of Congo
EAC	East African Community
EC	European Community
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EMU	Economic and Monetary Union
EMS	European Monetary System
EPU	European Payments Union
ERM	Exchange Rate Mechanism
ESA	Eastern and Southern Africa
EU	European Union
FLAR	Latin American Reserve Fund
FPE	Factor Price Equalization
FTA	Free Trade Area
GARCH	Generalised Auto-Regressive Conditional Heteroscedasticity

GDP	Gross Domestic Product
GLS	Generalised Least Squares
G-PPP	Generalised Purchasing Power Parity
HO	Heckscher-Ohlin
IGAD	Intergovernmental Authority on Development
IFS	International Financial Statistics
IMF	International Monetary Fund
LAFTA	Latin American Free Trade Area
LNS	Lesotho, Namibia and Swaziland
MEC	Macroeconomic Convergence
MERCUSOR	Mercado Común del Sur
MOU	Memorandum of Understanding
NAFTA	North American Free Trade Area
OCA	Optimum Currency Area
OECD	Organisation for Economic Co-Operation and Development
OECS	Organisation of Eastern Caribbean States
PCA	Principal Component Analysis
REC	Regional Economic Community
RER	Real Exchange Rate
RIA	Regional Integration Arrangement
RISDP	Regional Indicative Strategic Development Plan
SACU	Southern African Customs Union
SADC	Southern African Development Community
SARB	South African Reserve Bank
SDR	Special Drawing Rights
SQAM	Standards, Quality, Accreditation and Metrology
SVAR	Structural Vector Auto-Regressive
UEMOA	West African Economic and Monetary Union
US	United States
VAR	Vector Auto Regression
WAEMU	West African Economic and Monetary Union
WAMZ	West African Monetary Zone
ZAR	South African Rand

ACKNOWLEDGEMENTS

I would like to thank my family, my mom, Ms. Josephine Ngubeni especially, for the moral and financial support throughout the course of my study, without them I would not have made it. Special thanks go to my husband, Dr Mbulelo Dube for all the love and support he has given me. I cannot imagine where I would be without him.

I would also like to thank the Andrew Mellon Foundation for the financial support and granting me the opportunity to further my studies. In addition, I would like to thank my friend, Sola Amusa for all the help with resources as well as moral support. I would also like to thank my supervisor, Dr Mutambara, as well as Prof Aziakpono and Prof Alagidede for the guidance they provided. Last, but not least, I would like to thank the Almighty for seeing me through the hard times.

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

African countries initiated regional economic integration in two waves; the first wave was from the mid-1970s to the early 1980s, which involved the re-establishment of some existing regional bodies and the creation of new ones. According to Dinka and Kennes (2007:6), the first wave of economic integration was inspired by the deliberate post-independence pursuit of integration by African policy makers and to some extent; it was in response to the success of the European Community (EC) and its first enlargement in the 1970s when the United Kingdom, Denmark and Ireland joined the EC.

The Lagos Plan of Action (1980) for the Economic Development of Africa was the main driving force behind the first wave of regional integration. It envisaged three regional groupings aimed at the creation of separate but convergent and over-arching integration arrangements in three sub-Saharan sub-regions. These were the Economic Community of West African States (ECOWAS), the Common Market for Eastern and Southern Africa (COMESA) and the treaty of the Economic Community of Central African States (ECCAS)¹. Together with the Arab Maghreb Union (AMU) in North Africa, these regional groupings were envisioned to result in an all-African common market by the year 2025.

The second wave of regional integration occurred during the first half of the 1990s and focused mainly on revitalising and expanding the mandates of existing regional bodies rather than on creating completely new groupings. This wave of economic integration, motivated by the ratification of the Abuja Treaty of 1991, was in a way prompted by developments in the global arena. Around that time, the North American countries created the North American Free Trade Agreement (NAFTA) and the European countries consolidated the European Union (EU) with the launch of a single market and the signing of the Maastricht Treaty of 1992 (Dinka and Kennes, 2007:6).

¹ It was approved in 1983 but remains to be fully ratified.

The second wave of regional integration saw the emergence of smaller regional economic communities (RECs) as subsets of the original groupings. To begin with, there is the West African Economic and Monetary Union (WAEMU), which is a subset of ECOWAS and the Economic and Monetary Union of Central Africa (CEMAC) within the proposed ECCAS region. Similarly, the Southern African Customs Union (SACU) with its associated monetary union (the Common Monetary Area), the Southern African Development Community (SADC) and the East African Community (EAC) lie within the geographic area of COMESA. Some countries in this region are also in partnership with countries located on the Horn of Africa in the Intergovernmental Authority on Development (IGAD) (Dinka and Kennes, 2007:6).

The Abuja Treaty envisaged that these RECs would be the building blocks of the African Economic Community (AEC), with the hope that once they have successfully integrated, the AEC would be realised much smoother. According to the Economic Commission for Africa (2004:28), African leaders envisioned the transformation of African countries into the AEC to take place in six phases over 34 years. The first phase, 1994-99, focused on strengthening regional economic communities, that were to evolve into free trade areas and customs unions that would eventually consolidate and culminate in a common market covering the continent.

The second phase, 1999–2007, was to focus on the freezing of tariffs, non-tariff barriers, customs duties, and internal taxes at their May 1994 levels while also gradually harmonising policies and implementing multi-national programmes in all economic sectors. The priority sectors were to be agriculture, industry, transport, communications and energy. The African leaders envisioned the third phase, 2007–2017, to be the period of consolidating the free trade zones and customs unions through progressive elimination of tariffs, non-tariff barriers, and other restrictions to trade, and adopting common external tariffs for the continent as a whole.

The fourth phase, 2017–2019, would be the period for finalising coordination and harmonisation of policies and programmes in trade and other sectors as a precursor to full realisation of the African Common Market and the African Economic Community, with all the regional economic communities. In addition, the leaders hope this phase results in the free movement of people, with rights of residence and establishment among the regional economic communities.

The fifth phase, 2019–2023, is the period for consolidating the continent wide African Common Market, and the sixth phase, 2023–2028, is the period in which the vision of the African Economic Community, with complete economic, political, social, and cultural integration and with common structures, facilities, and functions would be realised. This includes the realisation of a single African central bank, with a single African currency, a pan-African parliament, and a pan-African economic and monetary union (Economic Commission for Africa, 2004:31). Each African REC therefore has set its own specific objectives and targets that would guide its integration process. The subsection below provides a review of the background to the SADC countries' experience with regional economic integration.

1.1.1 Regional Economic Integration Efforts of SADC Countries

The SADC²'s regional economic integration process is set to follow progressive stages, beginning with the implementation of a free trade area (FTA) in August 2008. Angola, the Democratic Republic of Congo (DRC) and Seychelles however opted out of the integration arrangement. The SADC Trade Protocol, ratified in 2000, provides the legal basis for the attainment of the SADC FTA. The latter aims to stimulate intra-SADC trade, development and thereby eradicate poverty (Hansohm and Shilimela, 2006:6). The trade protocol called for the liberalisation of up to 85% of intra-SADC trade by 2008 at the onset of the regional FTA. The remaining 15% of trade, comprising sensitive products, is to be tariff free by 2012 (SADC, 2006:7).

The Regional Indicative Strategic Development Plan (RISDP) was set up to achieve these objectives. The strategy of the RISDP involves the gradual elimination of tariffs, the elimination of non-tariff barriers, the adoption of common rules of origin, the harmonisation of customs rules and procedures, the harmonisation of sanitary and phyto-sanitary measures, the liberalisation of trade in services and the attainment of internationally acceptable Standards, Quality, Accreditation and Metrology (SQAM) (Hansohm and Shilimela, 2006:6).

² Presently SADC comprises of fifteen countries, namely: Angola, Botswana, the Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

The second stage of the SADC integration process involves the implementation of a customs union, which was originally set for 2010, but the countries delayed its implementation to 2012. The SADC countries envision the third stage to be the implementation of a common market in 2015 and the fourth stage, monetary integration. The implementation of a monetary union is to be in two stages, with the establishment of a SADC central bank by 2016 and a regional currency by 2018 (SADC, 2006:7).

A sub-set of SADC countries, which consists of Angola, the DRC, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe, are also members of another FTA known as the Common Market for Eastern and Southern Africa (COMESA) founded in 1994. COMESA has 21 member states, which also include Burundi, Comoros, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Seychelles, Sudan and Uganda.

COMESA launched its Free Trade Area in October 2000. From the SADC countries that are also members of COMESA, only Madagascar, Malawi, Mauritius, Zambia and Zimbabwe joined the FTA. These countries have since become members of the SADC FTA as well, consequently finding themselves in a conflicting position as members of two different FTAs. In June 2009, COMESA launched a customs union and aims to establish a monetary union by 2015 and a COMESA community by 2025.

Another sub-set of SADC countries comprising Botswana, Lesotho, Namibia, South Africa and Swaziland form the Southern African Customs Union (SACU), which dates back to the late 1800s. All SACU countries, with the exception of Botswana also belong to the Common Monetary Area (CMA) established in 1986 as a successor to the Rand Monetary Area (RMA), established in 1976. Botswana was initially a member of the RMA before opting to withdraw from the arrangement in 1976 to pursue an independent exchange rate system. However, the Botswana pula remains linked informally to the South African Rand (ZAR) through a basket of currencies in which, since 1990, the latter weighs around 60 to 70%. Hence, literature sometimes regards Botswana as a *de facto* member of the CMA (Grandes, 2003; Aziakpono, 2008).

The CMA is a monetary integration arrangement where capital flows freely between the member countries which maintain common exchange controls. Article 2 of the CMA (Multilateral) Agreement gives Lesotho, Namibia and Swaziland (the LNS countries) the

right to issue national currencies, and their bilateral agreements with South Africa define the areas where their currencies are legal tender. The national currencies are legal tender only in their respective countries, while the ZAR is legal tender throughout the CMA. For this reason, South Africa compensates the LNS countries for forgone seignorage based on a pre-determined formula (Wang *et al*, 2007:8).

Article 3 of the CMA Agreement stipulates that no restrictions can be imposed on the transfer of funds, whether for current or capital transactions, to or from any member country³. The national currencies of the LNS countries are pegged at par to the ZAR and are perfect substitutes with the latter. In addition, there are no transaction costs in conversion (Oosthuizen, 2006; Wang *et al*, 2007).

The South African Reserve Bank (SARB) is the only central bank that engages actively in discretionary monetary policy, while policies in the LNS countries are managed in line with the SARB policy. Consultations are made through meetings with governors of the central banks of the LNS countries and heads of research departments twice a year, before the Monetary Policy Committee (MPC) of the SARB meets. However, there is no obligation on the SARB's part to include its CMA partners in the monetary policy decision process (Aziakpono, 2008:191).

Monetary policy in the LNS countries is designed primarily to ensure that the exchange rate peg within the CMA is maintained through sufficient foreign reserves, and that interest rates are kept at levels that prevent any distortions to the fixed exchange rates. Commitment to this arrangement effectively puts monetary policy decisions for the smaller countries in the hands of the SARB as it gives them little or no scope for further discretionary policy (Nielsen *et al*, 2005; Oosthuizen, 2006; Aziakpono, 2008).

1.2 CONTEXT OF THE RESEARCH

According to Mundell (2000:281), the support for the use of a common currency to fulfil the functions of money as a unit of account, unit of contract for current and deferred payments, medium of exchange and store of value, dates back to the classical economists who argued

³ With the exception of investment or liquidity requirements prescribed for financial institutions.

for a single world currency as first best solution to globalisation. However, the desire to maintain a degree of sovereignty by independent countries makes it near impossible to have a single world currency. Thus, the second best solution is a system of well-managed state currencies that have a permanently fixed exchange rate, hence the desire for monetary integration.

Yuen (1999:5) describes monetary integration as occurring within an area bearing a permanently fixed relationship between the exchange rates of the national currencies of its member countries. Either the countries use a common currency or, if there are several currencies, these currencies are convertible one into the other at immutably fixed exchange rates, thereby effectively creating a single currency. Regional economic communities (RECs) worldwide are realising the need for monetary integration as they pursue deeper regional economic integration. The latter process results in the integration of financial markets, which according to the Impossible Trinity Principle, implies that individual countries cannot pursue independent monetary policies and maintain flexible exchange rates when there is free trade. The move to adopt a common currency therefore, arises from the constrained optimisation decisions of countries (Wyplosz, 1997; Frankel, 1999; and van der Haegen and Viñals, 2003).

However, the use of a common currency in a group of countries is not a simple, straightforward transition. The countries are required to form an optimum currency area (OCA), which is defined as the optimal geographical domain within which a group of countries share a single currency, or maintains several national currencies whose exchange rates are irrevocably pegged and are fully-convertible into one another. The single currency/national currencies fluctuate(s) jointly *vis-à-vis* other currencies (Tavlas, 2008:12).

Mongelli (2002:7) elaborates on the definition of an OCA, explaining that the *domain* of an OCA is determined by the sovereign countries choosing to adopt a single currency or to fix their exchange rates irrevocably. This in essence refers to the RECs seeking monetary integration. Mckinnon (1963:717) describes “*optimum*” as referring to a single currency area within which monetary-fiscal policies and flexible external exchange rates can be used to give the best resolution of three (sometimes conflicting) objectives: the maintenance of full employment; the maintenance of balanced international payments; and the maintenance of a stable internal average price level.

The OCA theory considers economic factors that determine the benefits and costs of adopting a common currency. The benefits from monetary integration include the lower transactions costs between the trading partners and the elimination of exchange rate variability. The costs, on the other hand, arise from the inability to pursue independent monetary policies and to use the exchange rate as an instrument for macroeconomic adjustment (Lundahl and Peterson, 1991; Frankel, 1999; Bayoumi and Ostry, 1995; Mundell, 2000). Both benefits and costs of monetary integration depend on the structural features of the economies concerned including the free mobility of labour and other factors of production, economic openness, diversification in production and consumption (Bayoumi and Ostry, 1995:1). *Optimality* requires that these structural conditions exist in the group of countries (Mongelli, 2002:7).

The OCA theory further prescribes that the countries attain convergence in macroeconomic stability indicators, such as their inflation rates, exchange rates, interest rates and the level of their budget deficits prior to integration (Jenkins and Thomas, 1997; McCarthy, 2002). The opening up of trade and capital accounts may result in increased exposure and vulnerabilities of the economies of the integrating countries to external shocks (Alberola *et al*, 2003:26). *Sharing* the above OCA properties reduces the usefulness of nominal exchange rate adjustments within the currency area by fostering internal and external balance thus, reducing the impact of some types of shocks or facilitating the adjustment thereafter. Thus, the OCA theory provides a foundation for evaluating whether or not a group of countries are suitable for monetary integration (Mongelli, 2002:7).

For developing countries with substantial regional inequalities, monetary integration requires that the countries also achieve nominal- and real economic convergence. When assessing the degree to which potential members of a monetary union are converging; one also needs to consider the degree to which their income levels converge (Jenkins and Thomas, 1997; McCarthy, 2002; and Alberola *et al*, 2003).

The most commonly used argument for monetary integration is that it provides a credible nominal anchor for monetary policy of member countries. Most national central banks in developing countries lack independence in general and some countries with their own currencies have experienced periods where the monetary authorities were forced to monetise fiscal deficits to prevent a financial crisis (Masson and Pattilo, 2003:33). Several authors argue that monetary integration, which would set policy rules at the regional level within the

framework of the union, is the only way to rebuild poor reputations in many African countries (Guillaume and Stasavage, 1999; Masson and Pattilo, 2003; and Balogun, 2007).

Hence, an alternative method of assessing the desirability of monetary integration in developing countries is to determine the effectiveness of independent monetary and exchange rate policies in achieving macroeconomic stabilisation. The approach is based on the assumption that countries would weigh the advantages of maintaining autonomy over their monetary policy against the costs of surrendering it to a regional authority. If independent monetary policies have not been effective in determining macroeconomic performance indicators, the implication is that they would be better off surrendering autonomy to a regional authority (Balogun, 2007:4).

1.3 STATEMENT OF THE PROBLEM

The goal of the African Union (AU) is to have an African Economic Community (AEC) by the year 2028 with a single central bank and a common currency for the African continent. To achieve this goal, the AU tasked the African RECs to accelerate their regional economic integration efforts and attain the status of an economic and monetary union (EMU) much earlier than the target for the establishment of the AEC. The AU envisions that the achievements of the RECs will be building blocks for the AEC (Economic Commission for Africa, 2004:31).

The SADC is one of the RECs given the mandate of reaching the status of an economic and monetary union (EMU). It is the goal of the SADC countries to have a regional central bank by 2016 and a common currency by 2018 (SADC, 2006:7). The SADC countries are emulating the integration process followed by the European Union (EU), which culminated in the implementation of a full EMU with a common currency. The EU countries adhered to the conventional methods of determining the suitability of its member countries for monetary integration, which insist on the *ex ante* achievement of the OCA criteria and macroeconomic policy convergence.

However, it has been argued that the OCA criteria may be inappropriate for evaluating the feasibility of monetary integration in a group of developing countries because the underlying basic assumptions of the theory apply to market economies that are competitive, organised, developed and respond quickly to policy stimuli. In contrast, developing countries have less

developed regimented markets; application of the same model tends to produce indeterminate and undesirable results⁴ (Balogun, 2008:2). Alternative methods of determining the desirability of monetary integration in developing countries therefore, need to be taken into account.

The theory of the endogeneity of the OCA criteria provides an impetus for considering alternative methods of determining the desirability of monetary integration in developing countries. The theory asserts that irrespective of the stage of development and economic structures, monetary integration can boost intra-regional trade and could act as an instrument for macroeconomic convergence. This would result in a high correlation between the income levels and business cycles of member countries and in turn, a similarity of shocks. Thus, even if countries do not meet the OCA criteria *ex ante*, they would do so *ex post* (Frankel and Rose, 1996; Arryo, 2003; Balogun, 2008).

1.4 GOALS OF THE RESEARCH

The goal of the research was to determine the feasibility of monetary integration within the SADC countries. To achieve this, the study:

- i. Assessed the degree to which the SADC countries meet the OCA criteria;
- ii. Assessed the progress of the SADC countries towards meeting the macroeconomic convergence criteria; and
- iii. Assessed the impact of selected monetary and exchange rate policy instruments on domestic economic performance in each country.

1.5 HYPOTHESES

The null hypotheses of the study were:

- i. The SADC countries do not constitute an optimum currency area;
- ii. The SADC countries do not meet the set macroeconomic convergence targets; and
- iii. Independent monetary and exchange rate policies in the SADC countries have been relatively ineffective in influencing domestic activities.

⁴ See Jenkins and Thomas (1997), Agbeyegbe (2003), Carrere (2004), Khamfula and Huizinga (2004), Buiguit and Valev (2006).

1.6 SIGNIFICANCE OF THE RESEARCH

Research conducted on the feasibility of monetary integration in the SADC countries tends to focus on the behavior of shocks in the countries or the extent to which the countries converge in macroeconomic stability indicators. However, considering the diverse nature of the SADC economies, these studies either find that shocks are asymmetric or that a subset of the countries converges⁵. The consensus of the studies is that the SADC countries are not ready for monetary integration.

Nonetheless, the SADC countries are required to implement monetary integration. Thus, further research is called upon to guide the integration process. The present study contributes to the research by considering the effectiveness of independent monetary and exchange rate policy pursuits on macroeconomic stabilisation in the SADC member countries. The study argues for the need for monetary integration in the non-CMA SADC countries to gain credibility in their monetary policies.

1.7 ORGANISATION OF THE STUDY

Chapter 2 is a review of the theoretical framework of regional economic integration. The chapter provides an overview of the process of regional economic integration and an explanation as to how monetary integration fits into the whole process. Chapter 3 reviews the theoretical frameworks of monetary integration. The chapter comprises a discussion on the theory of optimum currency areas, the impossible trinity principle as well as the need for economic convergence in a group of countries wishing to adopt a common currency.

Chapter 4 provides an evaluation of the extent to which SADC countries are suitable for monetary integration. This was achieved by reviewing empirical studies on monetary integration within the SADC countries in addition to assessing the extent to which the member states meet the OCA criteria. Chapter 5 looks at the experience of the EU countries with economic integration and extracts some valuable lessons for the SADC countries from the assessment. Chapter 6 provides a description of the theoretical framework behind the methods and techniques used in the analyses. Chapter 7 discusses the results from the estimations, while Chapter 8 concludes the research.

⁵ Mainly, the members of the Common Monetary Area (CMA) and a few other countries.

CHAPTER TWO

THEORETICAL FRAMEWORK OF REGIONAL ECONOMIC INTEGRATION

2.1 INTRODUCTION

Regional economic integration has been a topic of discussion for decades in the global arena. Many regional economic communities worldwide are pursuing regional economic integration at different levels. The SADC countries are at the early stages of undergoing the process of regional integration with the aim of establishing a full economic and monetary union with a common currency by 2018. The present chapter discusses the theory of regional economic integration, with the aim of highlighting how monetary integration fits into the whole integration process.

Section 2.2 reviews the theory of regional economic integration and discusses the rationale for integration in African countries. The section also reviews the different levels of regional economic integration. In addition, the section reviews the different types of monetary integration arrangements. Section 2.3 discusses the potential costs and benefits of regional economic integration to developing countries. This is followed by a discussion on the factors that hinder economic integration in developing countries in Section 2.4. Lastly, Section 2.5 concludes the chapter.

2.2 THE THEORY OF REGIONAL ECONOMIC INTEGRATION

Tekere and Rusare (2001:1) define regional economic integration as “the unification of neighbouring states working within a framework to promote free movement of goods, services and factors of production, and to coordinate and harmonise their policies”. It involves a process of gradually eliminating economic barriers between independent states that would eventually function as one entity (Molle, 2001:4).

Asante (1997:19) identifies two forms of regional economic integration, i.e. the dynamic and static forms. The static form of regional economic integration is defined as a state of affairs characterised by the absence of various forms of discrimination between the countries in the region; components of individual countries function together as entities of a single, larger economy. The United States of America can be characterised as existing in the static form of

economic integration. The states evolved from independent sovereign regional economies each with its own constitution and currency to an integrated national economy with a single currency (Kim, 1998:661).

The dynamic state of regional economic integration is described as a process whereby all types of discrimination between economic units from the different countries within the region is abolished over time, with the formerly separate states gradually merging into a larger whole (Asante, 1997:19). The European Union (EU) has the longest history of economic integration, with its integration process spanning over 40 years culminating in the implementation of an economic and monetary union with a common currency, the Euro. Latin America is another region that has taken equally as long as the EU to integrate, though the impetus has been weaker and the obstacles and setbacks faced by the region arguably greater (van der Haegen and Viñals, 2003:4).

Development in African countries has in the past, been hampered by the small nature of their domestic markets; this has prompted them to venture into regional integration to foster a more efficient allocation of resources (Mutambara, 2001:1). Furthermore, the World Trade Organisation's rules for the world trade system have heightened global competition and raised stakes for Africa in particular. Jefferis (2007:2) notes that the motivation behind regional integration in African countries is more political than economic. The countries recognise that the continent is excessively fragmented on an economic level and that the small size of the economies is a barrier to growth, hence, the need for the creation of larger markets.

However, Proff (1997:484) notes that regional integration amounts to a second best option given that trade liberalisation is still restricted to members of a regional integration arrangement (RIA) rather than a situation where there is unilateral trade liberalisation. Nonetheless, countries opt to pursue regional integration as opposed to unilateral trade liberalisation for balance of payments and political reasons, among other things (Winters, 1991:183).

The approaches to regional integration reviewed below have been termed the “textbook” stages of regional economic integration outlined by the market integration process. Asante (1997:22) however, notes that the stages of economic integration can exist in their own right

and should not be taken as a systematic process resulting in full economic integration. Each integration arrangement can have sectoral integration in particular areas of the economy.

2.2.1 Market Integration

Market integration calls for the progressive elimination of tariff and non-tariff barriers to trade among cooperating members, harmonisation of their external trade and eventually, their fiscal and monetary policy (Lundahl and Peterson, 1991; Davies, 1994; Asante, 1997). Market integration has been categorised into distinct phases/stages summarised in Table 2.1 below; these stages are reviewed in the subsections that follow.

Table 2.1: Characteristics of the Levels of Economic Integration

Characteristic/ Integration Form	Lower Tariffs between Member states	No internal tariffs between member states	Common external tariffs	Free flow of Labour and capital	Harmonisation of economic policies	Unification of political institutions
Preferential Trade Area	*					
Free Trade Area		*				
Customs Union		*	*			
Common Market		*	*	*		
Economic Union		*	*	*	*	
Political Union		*	*	*	*	*

Source: Haarlov (1997)

2.2.1.1 Preferential Trade Agreements

Preferential trade agreements entail the preferential reduction of tariffs and/ or preferential treatment on import restrictions between groups of countries, while maintaining normal trade restrictions towards third countries. Preferential treatment tends to be granted on specific goods and not to all products (Arguello, 2000:4).

2.2.1.2 Free Trade Area

A free trade area (FTA) entails the reduction and eventual removal of intra-regional tariff and non-tariff barriers on goods and services. In addition, there is free mobility of goods and services among member states but individual nations can still set different customs tariffs with respect to third countries (SADC, 2006:4). However, there is a possibility for trade deflection in an FTA, whereby goods enter through a country with the lowest external tariff for re-export to other member countries. Hence, FTAs require rules of origin to guard against trade deflection (Molle, 2001; Hansohm and Shilimela, 2006).

These rules of origin stipulate that internationally traded goods should be labelled with 'certificates of origin' indicating in which country the goods were produced. In this way, customs officers at borders between member countries with different outer tariffs would be able to determine whether tariffs would still be due (on goods originating from a third country) or whether the goods originate from another member country and thus can be imported duty-free (Molle, 2001: 16).

The SADC states launched a FTA in August 2008. The countries agreed to follow the principle of asymmetry in the implementation of the regional FTA, whereby more developed members liberalise faster than underdeveloped members. South Africa, the most advanced state in the region, agreed to a faster removal of tariffs, while other member states offered tariff reductions to South Africa at a slower rate than what they offered among themselves. SACU countries agreed to implement the removal of tariffs faster than the rest of SADC members, followed by Mauritius and Zimbabwe, and then by Malawi, Mozambique, Tanzania and Zambia (the least developed countries) (Hansohm and Shilimela, 2006:7).

In light of the fact that some SADC countries are party to both the SADC and COMESA FTAs, Kritzingers-van Niekerk and Moreira (2002:2) state that there is a heightened risk of trade deflection within the region. Goods preferentially imported from a member of one of these regimes (e.g. Kenya, a member of COMESA), by a member of both regimes (e.g. Malawi) could be subsequently preferentially re-exported to a member of only the other regime (e.g. South Africa, a member of SADC). This makes it extremely difficult, though not entirely impossible for the FTAs to co-exist. However, as already noted above, it would be impossible for any member state to belong to more than one regime when the RIAs advance beyond FTA status.

2.2.1.3 Customs Union

A customs union (CU), like a FTA involves the removal of trade barriers between member countries and in addition, the countries must also conduct and pursue common external commercial relations, for instance imposing common external tariffs (CETs) on non-members (Asante, 1997; Molle, 2001). The imposition of a CET eliminates the need for certificates of origin at internal borders. Once goods are imported through any member of the CU, they may circulate freely within the region (Molle, 2001:16). SACU and COMESA are examples of customs unions that some of the SADC countries are members of.

2.2.1.4 Common Market

A complete common market consists of (i) an internal market, which entails the free intra-regional mobility of products (goods and services) and factors of production (labour and capital); and (ii) common external regulations for both products and production factors. A complete common market is assumed to require not only the permanent removal of trade barriers, but also the removal of all governmental restrictions on the movement of factors of production within the region (Asante, 1997; Molle, 2001).

It is possible for countries to have an incomplete common market, which may arise when barriers to trade still exist with respect to some categories of goods and services. Under such an arrangement, free movement of significant segments of labour and capital between the countries would occur while various options with respect to third parties are possible. The partner countries may choose to maintain different national regulations (as in the case of an FTA) or a common regulation (comparable to a CU). Alternatively, it is possible to implement combinations of common policies and national policies in relation to third parties (Molle, 2001:17). The *Mercado Común del Sur* (MERCOSUR), which comprises Argentina, Brazil, Paraguay and Uruguay, is an example of a common market.

2.2.1.5 Full Economic Union

A full economic union is essentially a common market that asks for a high degree of coordination or even unification of the most important areas of economic policy. The policies comprise those that are associated with the common market (such as market regulation, competition and industrial structure), those associated with the monetary union (such as macroeconomic and monetary policies) and lastly, those that refer to the more social aspects (such as redistribution policies, social and environmental policies) (Molle, 2001:18). The EU is an example of a full economic and monetary union (EMU).

Haseeb and Makdisi (1980:12) note that full economic integration entails increased intra-regional trade (which requires payments for the goods exchanged), increased capital movements within the region (which calls for the exchangeability of different currencies) and free labour mobility (which calls for chances to receive and remit earnings by citizen of different states). All these processes require an international payments system that would allow payments and foreign exchange transactions without restrictions or controls hindering the integration process, hence the need for monetary integration.

2.2.1.6 Monetary Integration

Monetary integration can be either complete or incomplete, ranging from policy coordination to full unification. Incomplete/ partial monetary integration occurs when member countries maintain some form of monetary arrangements that are rule-based and, they coordinate their domestic policies in order to improve on their macroeconomic stabilisation efforts. Complete/ full monetary integration, on the other hand, occurs when member countries give up the use of their national currencies for a common currency and have a central monetary authority that controls monetary policy within the region (Yuen, 1999:5).

The subsections below outline the different types of monetary integration arrangements; each arrangement serves different purposes for the participating countries. Chang (2000a:3) classifies these arrangements into three distinct categories: regional payments agreements, agreements for balance of payments financing, and monetary unions. A fourth type of monetary integration arrangement that has gained heightened interest in literature is dollarisation, which is also discussed below.

2.2.1.6.1 Regional Payments Agreements

Williamson (1980:13) describes regional payments agreements⁶ as a type of arrangement whereby a number of countries with inconvertible currencies set up a multi-lateral clearing arrangement to handle payments for their reciprocal trade. The arrangement ensures that payments due or made between member countries would be handled in the same way irrespective of who the trading partner is, thus eliminating the incentive to discriminate in trade.

Gonzalez del Valle (1980:207) cites the main objectives of such arrangements as being: the facilitation of the settlement of overall reciprocal foreign exchange positions among the participating countries on a multi-lateral basis; the reduction of the cost of monetary transfers eligible for clearing; and the minimisation of the use of official foreign exchange reserves for the settlement of intra-regional balances.

⁶ Also known as payments unions.

Regional payments systems require a clearing-house where all intra-area transactions are reported by the central banks of member countries. The central banks could act as the clearing-house or appoint a similar agent to handle the transactions. It is the responsibility of the central banks to acquire any claims that may be due to their respective countries and present them to the clearing-house, which in turn makes periodic calculations of the net balances due or owed by each country and arranges for settlement to be made in reserves and/or credit (Williamson, 1980:18).

Chang (2000a:4) identifies two ways in which such an agreement could economise on currency flows and the associated transaction costs. Firstly, if the periodic settlement of the accounts were done on a *net* basis whereby transactions of equal value cancel each other, then the amount of each settlement would only reflect the *difference* between accumulated sales and purchases during the settlement period. This would be cheaper than a decentralised system where all transactions are paid individually and therefore, *all* sales and purchases involve an international currency flow.

Alternatively, the central bank of a deficit country could transfer a reserve currency *at the end* of the settlement period to pay for the bilateral trade between member countries. This is preferred to a decentralised system where each central bank would need to maintain enough international reserves to finance bilateral payments continuously during the period. These two features imply that each central bank can safely reduce its holdings of reserve assets (Chang, 2000a:4).

According to Gonzalez del Valle (1980:207), by minimising the use of official foreign exchange reserves, regional payments systems support trade liberalisation in an area that suffers from a chronic shortage of liquid international reserves. This is achieved through the direct central bank interchanges of reciprocal holdings of foreign exchange claims. Williamson (1980:18) argues that foreign exchange shortages would normally encourage bilateralism given that no country would be willing to use up their limited reserves to finance a deficit with one of its weak-currency neighbours rather than finance imports from hard-currency countries.

Bilateralism could however, be considered as the polar opposite of regional economic integration as it discourages intra-regional co-operation and may seriously jeopardise the

overall volume of trade. Thus, by ensuring that additional exports have the same value regardless of their intended recipient within the area, multilateral clearing eliminates the incentive for bilateralism. Similarly, it ensures that additional imports have the same cost regardless of their source within the area (Williamson, 1980:18).

An added advantage of regional payments systems in cases where a member country cannot settle its account is that the union could provide credit to cover part of the net imbalances in its trade with other members. In some cases, the creditor central banks could provide interim financing which earns interest at mutually agreed rates and which must be repaid at short fixed intervals (Williamson, 1980:18).

According to Gonzalez del Valle (1980:208), interim financing in a clearing house is intended to avoid the waste involved in too frequent settlements of bilateral or multilateral accounts. It is thus considered to be a temporary investment of foreign exchange by the creditor central banks, which can be fully converted into usable international currencies, earn interest at reasonable commercial rates and is not subject to automatic refinancing.

According to Chang (2000a:15), if the reason for regional monetary integration is coping with financial instability and crises, then regional payments systems may be of little value to the countries. In as much as regional funds for balance of payments support may help prevent/ cushion the impact of financial crises, the importance of international contagion (itself derived from the financial integration) and the size of the international liquidity that would be necessary are formidable obstacles⁷.

Latin America has three clearing and payments arrangements, the Central American Clearing House, the payments system of the Latin American Free Trade Association (LAFTA) and the Caribbean Community Multilateral Clearing Facility; established in 1961, 1965 and 1977, respectively. All these arrangements were designed to facilitate private and official monetary transfers among participants on a multilateral basis. The approach adopted by members of the different Latin American clearing houses was to restrict credit to amounts and payment periods compatible with the overall volume of transactions between the parties involved, on

⁷ For example, regional payments systems played no essential role in helping deal with the sequence of crises that hit the Latin American countries.

condition that the financing was not used as regular export credit or as global balance-of-payments support (Gonzalez del Valle, 1980:207). The SADC countries do not have a clearing-house although COMESA does have one.

Chang (2000a:8) however notes that the importance of regional payments systems and of regional funds for balance of payments support is decreasing with time for individual countries as they are finding less need for official international reserves as they switch to more flexible exchange rate regimes. Furthermore, due to the increased integration of international financial markets and the development of financial technologies, it has become easier for international payments to be channelled via private institutions.

2.2.1.6.2 Agreements for Balance of Payments Financing

According to Chang (2000a:8), there are cases where a group of countries set up an institution that facilitates a common pool of international reserves mainly for balance of payments support, but which can also serve as a form of investment. Williamson (1980:13) describes this as reserve pooling, whereby member countries acquire liquid claims on an agent through depositing some part of their reserves with the agent⁸ while the agent holds liquid claims on third parties. The agent can either invest the funds in marketable securities or extend credit to member countries to support trade and, in some circumstances, to assist member central banks that may require loans to finance balance-of-payments deficits (Chang, 2000a:9).

According to Williamson (1980:13), the credit may be short term or medium term; automatic or subject to some sort of discretionary control; provided that the payments imbalances of members are reasonably desynchronised. In this way, the arrangement ensures that the liquidity of members' deposits are not jeopardised and that the agent does not violate the customary principles of fractional reserve banking. Chang (2000a:9) likens such regional institutions to the arrangement under the International Monetary Fund (IMF), giving the Latin American Reserve Fund (FLAR) as a leading example of such an arrangement.

⁸ Which continue to form part of their overall reserves.

Williamson (1980:20) emphasises that member countries should implement a set of rules that limit the right to draw on the reserves to prevent individual countries from adopting policies likely to generate deficits. Without binding limits, a reserve pool would enable deficit countries to draw on the real resources of surplus countries, particularly when the loans carry a concessional interest rate. There are a number of possible ways to mitigate such risks; member countries can set fairly-mechanical rules similar to those used in the European Payments Union (EPU) or the low-conditionality facilities of the IMF. Alternatively, the countries could have the institution manage the reserve pool, which in turn would lay down explicit policy conditions similar to the high-conditionality drawings from the IMF. Lastly, the countries could maintain a strong consensus on policy obligations similar to that of the European Monetary System (EMS).

According to Chang (2000a:10), reserve pools, through the provision of balance-of-payments support, may help achieve financial stability in the face of financial and exchange rate crises. The availability of a sufficiently large “war chest” of international reserves may prevent speculative attacks on the currency or the financial system of individual countries by increasing the amount of reserves that each country may have access to⁹. This however, is only viable on condition that all members do not simultaneously require access to more than their respective shares of resources. Lastly, reserve pooling could also aid in the reduction of financial instability by allowing participating countries better access to foreign creditors than if the countries had acted individually.

In practice however, Chang (2000a:10) points out that developing countries may find it difficult to expand the effective size of their pool, particularly in contrast with institutions such as the IMF, that include developed countries as members. This is because developing countries do not have the capacity to provide convertible currencies on demand, in contrast with the advanced countries that can grant enough international currency to shore up IMF’s operations when required. Thus, the implicit promise that one of the members of a reserve pool in developing countries will have access to enough international liquidity to transfer to the pool in case of need is not feasible.

⁹ According to Chang (2000a:11), sufficiently large refers to a chest roughly the size of M2 money supply in order to enable the countries to cover the potential short-term net liabilities of the financial system.

The African Union (AU) established an African Monetary Fund (AMF) in September 2009, which together with the African Central Bank and African Investment Bank, are expected to promote deeper monetary integration in the continent. The AMF's objectives include:

- i. The correction of imbalances in the balance of payments (BoP) of the RECs of the AU with the rest of the world;
- ii. The contribution to the removal of restrictions on current payments between the member states;
- iii. The settlement of current payments between member states in order to promote intra African trade; and
- iv. The coordination of the position of member states on international monetary issues (African Union, 2008:5).

The AMF aims to provide short- and medium-term loans to member states (or to the RECs) for the financing of their overall BoP deficits with countries outside Africa, resulting from trade in goods and services, transfers and capital movements. The AMF also aims to issue guarantees in order to strengthen the borrowing capabilities of member states or the RECs from other financial sources to finance the overall deficits in their BoPs (African Union, 2008:5).

2.2.1.6.3 Monetary Unions

Monetary unions can be either partial or complete, with the extreme involving the use of a common currency within the region. Williamson (1980:24) notes that partial monetary integration arrangements can possibly play a strategic role in the gradual evolution to full monetary integration. The sub-sections below review the different types of monetary unions.

2.2.1.6.3.1 Exchange Rate Co-ordination (Currency Convertibility)

Williamson (1980:13) describes exchange rate co-ordination as a type of partial regional monetary integration where participating countries agree to pursue common policies that limit the extent to which the exchange rates between their national currencies can diverge. Under this arrangement, member countries retain their individual currencies, which would be convertible either at market-determined rates (limited currency convertibility) or at pre-determined rates (full currency convertibility). Exchange rate co-ordination is adopted to facilitate trade by minimising the disadvantages brought about by the use of multiple currencies within a trade area.

Within a limited currency convertibility arrangement, there are no exchange restrictions with respect to the national currencies in the region and no common policy towards third countries; individual countries can still formulate different policies towards non-member countries (Ogunkola, 2005:17). Exchange rate co-ordination in such an arrangement implies central bank intervention to limit deviations from the agreed upon rates between member currencies. Member countries need to agree on the structure of and margins around the central rates. They also need to agree on the intervention mechanism when exchange rates deviate from the margins, and the division of responsibility of intervention between the country whose currency is at the ceiling and the one whose currency is on the floor, prior to the implementation of such an arrangement (Williamson, 1980:13).

With full currency convertibility, on the other hand, members convert their currencies at fixed exchange rates and the combined value of their currencies, relative to the rest of the world, may be adjusted occasionally or be allowed to float freely (Ogunkola, 2005:17). Co-ordination in such an arrangement requires ensuring that the rates posted by all participating countries remain constant relative to each other and that central rates are defined by member countries in terms of the same unit. Participating countries may also limit the freedom of individual countries to change the central rate. This could be achieved either through setting restrictions on the size of changes that are permissible or setting a requirement that all member countries mutually agree on any changes before they are implemented. Alternatively, the countries may make use of an agreed upon formula to determine the extent to which the central rate may be changed (Williamson, 1980:13).

Exchange rate co-ordination requires a degree of harmonisation of the monetary policy of individual countries through cooperative intervention in their exchange markets¹⁰ and a degree of cooperation in fiscal policy. Member countries would still retain a substantial amount of autonomy over most areas of economic and financial policies (Ogunkola, 2005:18). However, Machlup (1977:22) warns against the risks associated with the retention of policy autonomy by individual countries. Similarly, Al-Jarhi (1980:31) warns that exchange rate unification could present difficulties arising from internal political pressures and from external factors such as the domination of foreign currencies.

¹⁰ i.e. the buying or selling of foreign currency in exchange for domestic currency to keep the exchange rate from fluctuating

According to Machlup (1977:22), if monetary authorities in individual countries retain power to influence domestic money supply and aggregate spending¹¹, or to restrict the free inter-convertibility of currencies¹², then exchange rate co-ordination could be rendered practically worthless. Thus, full currency convertibility works if and only if countries are prepared to give up their autonomy over credit policy.

The arrangement also calls for certain preconditions in the economies of participating countries to be met, such as approximate external balance and readiness to eliminate all exchange and other restrictions on external transactions without undue pressure on the foreign exchange reserves. The European Monetary System (EMS) was an example of such an arrangement.

2.2.1.6.3.2 Monetary Co-ordination

Monetary co-ordination is another type of partial regional monetary integration which Williamson (1980:23) describes as an arrangement where participating countries agree to pursue common monetary policies while retaining the use of their national currencies. Where the countries maintain floating exchange rates, monetary co-ordination would entail focusing on a target of some concept(s) of money supply or a target for domestic credit expansion (DCE). On the other hand, where countries maintain fixed exchange rates, monetary co-ordination implies targeting domestic credit expansion given that the countries cannot influence monetary policy¹³.

The objectives for monetary co-ordination are two-fold, to promote cyclical stabilisation and to support a common exchange rate policy *vis-à-vis* non- members. A common exchange rate policy would enable member countries to avoid intra-area changes in central rates. This requires member countries to have a common rate of DCE and hence, not to sterilise reserve changes in this respect. Cyclical stabilisation is of particular importance in achieving greater regional stability where monetary policy has strong spill over effects on conjunctural conditions in member countries, e.g. in the case of the Organisation for Economic Co-

¹¹ In pursuit of any national goals other than exchange rate stability.

¹² In pursuit of the maintenance of fictitious stability of official exchange rates.

¹³ See the discussion in Section 3.3 of Chapter 3.

operation and Developed (OECD) member countries and IMF member states (Williamson, 1980:23).

However, taking into account that policy acts only with a significant lag, having strong spill over effects does not automatically mean that monetary co-ordination would be appropriate for a group of countries. It is possible that a crude form of co-ordination requiring all countries to expand or contract simultaneously could increase instability (Williamson, 1980:19).

2.2.1.6.3.3 Parallel Currency Union

Parallel currency unions are a form of partial monetary integration whereby a common currency is issued within the region that circulates alongside the national currencies of the participating countries (Williamson, 1980; Frankel, 1999; Ogunkola, 2005). A currency union represents the strongest commitment to a fixed exchange rate as possible and most countries form/ join one with the hope of gaining maximum credibility for their monetary policy by adopting the strongest commitment to inflation targeting (Frankel, 1999:3).

For the arrangement to work there must be an irrevocable commitment to a permanently fixed exchange rate between the union currency and the national currencies as well as full, less costly convertibility. In addition, there should not be any restrictions on the use of the parallel currency in transactions, foreign or domestic (Williamson, 1980:24).

National central banks are maintained but their existing autonomy in monetary and credit management is reduced in favour of the union monetary authority, which is jointly exercised by the member countries (Ogunkola, 2005:18). Furthermore, the arrangement requires the *ex ante* harmonisation of monetary policies of member countries, which in turn requires equally correct growth rate preconditions, the same (real) income elasticities of demand for money, and constant real exchange rates (Williamson, 1980:24).

The currency could play one of two roles:

- i. It could function as a vehicle currency to facilitate international transactions. In such an arrangement the parallel currency would be extended to replace national currencies in their domestic roles only if and when the member countries reached a decision that they could safely dispense with internal exchange rate changes; alternatively

- ii. The currency could be freely accessible from the start to anyone holding any of the national currencies. When over fifty percent of the total regional money supply is converted voluntarily into the parallel currency, then the remaining currencies in circulation would be called in through a compulsory conversion operation.

The second option calls for exchange rate co-ordination where the countries would be required to undergo a series of stages in which the permissible bands for exchange rate changes are narrowed progressively, until the final stage of irrevocably locked exchange rates is reached. The currencies would thus, by default merge into one (Williamson, 1980:24).

There are a number of ways of determining the value of the parallel currency; it may be valued in terms of a basket of the currencies of the participating countries. In such an arrangement, should an individual require the parallel currency, they would need to purchase all the currencies according to the weights assigned to them in the basket¹⁴. The individual would then exchange the basket of currencies for the parallel currency with an agent, who would in turn acquire claims on the respective central banks and liabilities to the commercial banks (Williamson, 1980:23).

Alternatively, an agent could accept the individual currencies, rather than a basket, at the prevailing exchange rates and express its claims on national central banks in the parallel currency, rather than in national currencies. This would therefore prevent the process of conversion from exerting pressure in the exchange markets. Similarly, should individuals wish to convert their bank deposits into the parallel currency, all that would be required is redenomination, without actual transactions occurring (Williamson, 1980:23).

The parallel currency could also be valued in terms of a unit external to the area such as the Special Drawing Rights (SDR), with the possibility of making discretionary changes in the value of the currency (to keep it fairly constant in terms of the member currencies or in pursuit of payments balance for the entire region). Lastly, the currency could have a stable real value, which could be determined through assigning units of each currency in the basket in proportion to the prevailing inflation in the respective countries (Williamson, 1980:23).

¹⁴ This could however exert exchange-market pressure if the demand to convert the national currencies does not correspond to the proportional composition of the parallel currency.

It is possible to reverse the commitment to a currency union¹⁵. Panama and the Organisation of Eastern Caribbean States (OECS) are examples of currency unions; they use the United States dollar as a parallel currency (Frankel, 1999:3). The CMA arrangement in the southern African countries of Lesotho, Namibia, Swaziland and South Africa is another example of a currency union, with the South African Rand (ZAR) as the parallel currency.

2.2.1.6.3.4 Complete Monetary Unions

This is an arrangement that involves the establishment of a regional currency with a common external exchange rate and common monetary and credit policies. Ultimately, a complete monetary union would require the establishment of a regional central bank that would be responsible for issuing the common currency, holding and managing the external assets of the member countries in a common pool, and determining monetary, credit and some aspects of the fiscal policies of the countries (Williamson, 1980; Yuen, 1999; Ogunkola, 2005).

Rather than replacing all currencies within the region with a completely new one, the participating countries could opt to recall all the national currencies save for one, which would become the common currency (Williamson, 1980:23).

The common central bank of a monetary union is required to facilitate monetary stability and the full and unlimited convertibility of the union currency against any external currency to which it would be pegged immutably (Ogunkola, 2005:18). The central bank could also assume other roles that traditionally are assigned to national central banks, such as serving as a lender of last resort for financial entities of member countries and, perhaps, providing clearinghouse services for the region (Chang, 2000a:12).

The Communauté Financière d'Afrique (CFA) franc zone is an example of a complete monetary union in developing countries. The CFA zone comprises fourteen countries divided into two different zones, one West African and the other Central African. Each zone has its own central bank though they use the same currency; the CFA franc, created in 1948. The currency is pegged to the French franc with unlimited convertibility, which is guaranteed by

¹⁵ For example, the union between the Czech and Slovak korunas experienced a smooth reversal while on the other hand; the Former Soviet Union had a considerably rougher separation.

the unlimited overdraft facilities given to the zone members at the French Treasury. This is on condition that at least sixty five percent of their gross foreign exchange reserves are kept in a Treasury deposit; implicitly making the French government lender of last resort in the CFA zone (Chang, 2000a:12).

2.2.1.6.4 Dollarisation

Dollarisation is a type of monetary integration arrangement whereby small countries adopt the currency of a larger, more stable country as a substitute for their national currencies. This kind of arrangement is usually adopted in order to benefit from the fiscal discipline of, as well as to gain monetary policy credibility from the larger country (Calvo, 1999; Masson and Pattilo, 2003; Araujo and Leon, 2003).

Dollarisation can either be full or partial, with the latter occurring when a foreign currency is used in *any* of the three classical roles of money, i.e., as a unit of account, means of payments, or store of value. The most relevant being the first two roles (Calvo, 1999; Araujo and Leon, 2003). Most countries are partially-dollarised either on the asset side (e.g. bank deposits) or on the liability side. Partial dollarisation may also occur in cases where the national currency may still be in use for small transactions or be issued to consumers as small change (Calvo, 1999:1).

2.2.1.7 Political Union

Economic integration requires the establishment of institutions and common policies to align the different objectives and forms of government regulations that may exist owing to different preferences of member countries. Since the region pursues common policies towards non-members in areas such as trade, production factors, economic sectors and monetary stability, it requires a central authority to exercise control over these matters. This implies that member countries should be willing to give up a degree of their sovereignty to regional institutions that would guide and stimulate the integration process, with the end goal of transforming the individual member states into regions of one nation (Haseeb and Makdisi, (1980; Molle, 2001; Van der Haegen and Viñals, 2003).

Similarly, Williamson (1980:15) states that an economic union requires standardised policy regarding capital flows *vis-à-vis* the rest of the world, as a complement to liberalised capital movements within the area. Harmonised external exchange controls are a necessity within an

integration area in order to prevent residents in the countries with tighter controls from evading these controls by moving their funds through the countries with less stringent controls.

2.3 COSTS AND BENEFITS OF REGIONAL ECONOMIC INTEGRATION

The Economic Commission for Africa (2004:11) points out that the potential gains from regional economic integration are mostly realisable in the long term, while, on the other hand, the costs are observable in the short term and are definite. As such, countries are advised not to assess the viability of regional economic integration on a short-term basis but rather, to also consider the potential long-term benefits. The subsections below review the potential benefits of regional economic integration.

2.3.1 Benefits of Regional Economic Integration

The benefits associated with regional economic integration are not a given for every regional group and may be unevenly distributed among the member countries due to differing resource endowments, these are reviewed below.

2.3.1.1 Fosters Economic Growth and Development

The benefits of regional economic integration for developing countries are associated with the role that integration can play in fostering economic growth and development, particularly industrial development (McCarthy, 2003:606). Regional integration is seen as a geographically extended version of import-substituting industrialisation, whereby a single market larger than that of the national economy is created, which allows room for scale economies in production, more competition, and thus greater efficiency (Schiff, 2003:4).

Countries tend to substitute regional production for imports from outside the region. Consumers within the region could benefit from a reduction in import prices if the pre-union tariffs in a particular country are higher than the CETs implemented. The elimination of intra-union tariffs implies that importers would incur less importation costs, which then lead to higher returns to owners of the abundant factor (Lundahl and Peterson, 1991; McLeod, 2003).

In addition, the free movement of factors of production is expected to encourage the optimum allocation of labour and capital. Producers should be able to move their capital from places of low return to places of higher return, where production would be most economical. This,

combined with an enlarged market of factors of production ought to result in new production possibilities that would in turn permit new, more modern or more efficient uses of factors (Lundahl and Peterson, 1991:303). The growth in production and investment in participating countries would in turn foster development within the region (McCarthy, 2003:606). Furthermore, consumers would benefit from the reduced prices in the region, thus improving their welfare (Lundahl and Peterson, 1991:162).

2.3.1.2 Trade Creation Effects

Regional integration is beneficial when it results in trade creation, which occurs when there is a shift in production from high cost producers within the region and from the rest of the world to relatively low cost producers within the region (Corden, 1972; Lundahl and Peterson, 1991, Piazzolo, 2001). Trade creation leads to efficiency in production due to specialisation. Union members benefit from the reduction in the real cost of goods previously produced domestically, which will now be imported cheaper from a partner country¹⁶. Similarly, consumers experience a gain in their consumer surplus due to a reduction in the cost of final goods, which enables them to consume more goods¹⁷ (Corden, 1972:461-471).

Furthermore, a shift in trade from goods originating from outside the RIA that are subject to tariffs to cheaper goods produced within the RIA could have the welfare effect of lowering world prices. In addition, trade creation could potentially improve the terms of trade of participating countries if a RIA has a significant share in the world market (Economic Commission for Africa, 2004:11). Lastly, the increased opportunities to export low-skill intensive goods can have poverty reducing impacts when a country is abundant in a factor, for instance unskilled labour (Lundahl and Peterson, 1991:171).

Trade creation requires that there be a large economic area and a large portion of overall trade between partner countries as opposed to external trade with third countries. According to Lundahl and Peterson (1991:172), the following generalisations apply: (i) the larger the economic size of the integrated area and the more the number of countries comprising the union, and (ii) the greater the share of intra-regional trade in the members' total trade; the greater the scope of trade creation as opposed to trade diversion.

¹⁶ This is known as the production effect.

¹⁷ This is known as the consumption effect.

Furthermore, trade creation requires that there be higher pre-union tariffs (which imply greater production and consumption distortions), as well as lower tariffs after the formation of the union as opposed to higher tariffs (which create a scope for trade diversion). Similarly, there must be competitive economies in the member states for there to be opportunities to take advantage of gains from specialisation. If the economies produce a less diversified range of products, there will be reduced opportunities to substitute products of one member for another; making it possible for a high cost producer to dominate the market (Winters, 1991; Haarlov, 1997; Carim, 1997).

Hirsch (2005:4) however notes that RIAs have not succeeded in improving the terms of trade of their member countries in developing countries. This is because they lack the necessary conditions for trade creation to take place. Although the volume of trade has increased, their relative share in world trade has decreased because most developing countries trade in primary commodities, whose prices have been declining overtime, with the exception of oil.

2.3.1.3 Increased Market Size and Competition

Countries can also benefit from regional economic integration in the long term through the effects of increased competition in their economies resulting from integrated markets. Trade liberalisation implies that domestic producers would have to compete with other producers from the region, which would force them to be more efficient in production. Efficiency in production would result in a reduction in production costs, which ultimately would lead to a fall in consumer prices (Economic Commission for Africa, 2004).

Trade liberalisation also implies increased market size for domestic producers, which would enable them to take advantage of economies of scale, thus increasing the productivity of the available resources and making them more competitive regionally and globally. Similarly, economies of scale have the potential to attract more investment to the region, thus fostering economic growth in the long-run (Jaber, 1970; Corden, 1972; Mutambara, 2001).

2.3.1.4 Other Benefits of Regional Economic Integration

Other (non-economic) benefits of regional integration include enhancing the international bargaining power of individual countries in multilateral agreements. Globalisation has put pressure on countries to increase the size of their negotiating strength through membership in

regional groupings. Countries may also partake in regional integration to reduce the risk of conflict within the region by increasing the interdependence between members and to avoid spill over effects of unrest in neighbouring countries (Schiff and Winters, 2003:6).

Regional integration also creates a larger political community that will ‘lock in’ trade reforms, constrain discretionary actions by government and could, in particular, in the absence of intra-regional lobbying and alliances, restrict the ability of powerful political interest groups to retard economic growth (McCarthy, 2003:606). Regional integration could also facilitate the joint supply of specific regional public goods such as infrastructure and negotiated shared access to natural resources e.g. water (Schiff and Winters, 2003:6). The subsection below reviews the costs associated with regional economic integration.

2.3.2 Costs of Regional Economic Integration

Regional economic integration also comes with costs to some of the participating countries. Consumers who may have to pay higher than world market prices for goods purchased regionally in keeping with a preferential trade agreement incur some of the costs of regional economic integration. Other costs of integration are at national level, some countries may find themselves marginalised when production relocates to the least cost producer within the region. The subsections below review the costs associated with regional economic integration.

2.3.2.1 Trade Diversion and Trade Suppression Effects

Regional integration in developing countries is more likely to lead to trade diversion, which occurs when there is a shift in trade from relatively low cost producers from outside the region to high cost, less efficient producers within the region in response to the removal/reduction in tariffs between members of a RIA. Trade diversion is harmful if only one country produces a commodity prior to integration, or if production originates in that country once the common external tariff (CET) is in place. This form of specialisation implies that production on a global scale would not be at the least-cost hence; there would be a loss in income to the rest of the world (Corden, 1972; Lundahl and Peterson, 1991; McCarthy, 1999; Piazzolo, 2001).

However, the effects on incomes of member states of this form of specialisation are unclear. If intra-regional specialisation results in a reduction in the price of the goods, then trade

diversion will have cost-reduction effects for the regional producer who enjoys profits from increased sales to its trading partners (Corden, 1972: 468). If, on the other hand, they experience increased costs of production then member countries would also encounter a loss in incomes. Thus, trade diversion would have welfare costs to the community of having to pay higher than world market prices for goods (McCarthy, 1999:380).

Piazolo (2001:25) asserts that the larger the differences in production costs between the producers within the region and from the rest of the world, the more harmful trade diversion would be for the importing countries in the region. The governments of the importing countries would lose their tariff revenue, either directly through tariff cuts among members or indirectly through a shift away from imports from non-members that are subject to tariffs. The cost of this loss depends on how easily members can switch to alternative ways of raising funds, but it can be high on countries that rely heavily on tariffs.

In some cases, regional integration may result in trade suppression, which occurs when there is a shift in trade from relatively low cost producers from outside the region to high cost, *newly established* domestic producers in response to the removal/ reduction in tariffs (Corden, 1972: 468).

2.3.2.2 Polarised Development

Developing countries consider trade integration beneficial if the growth in production and investment exceed the welfare costs of trade diversion. However, output growth in the region maybe polarised, with the larger and more industrialised economies benefiting from increasing returns to scale and greater competition while the smaller and less developed countries experience economic decline characterised by industrial closures and growing unemployment (Lundahl and Peterson, 1991; McCarthy, 1999; 2003; McLeod, 2003).

Furthermore, free capital mobility leads to a convergence of interest rates in member countries. As such, funds tend to flow towards those members whose *ex ante* investments are large compared to domestic savings. This results in a concentration of investments in those member countries in which the marginal productivity of capital and productivity growth is highest (Lundahl and Peterson, 1991:303).

Similarly, labour mobility may exacerbate the problem of income disparities among member countries. Encouraging labour to migrate to areas of higher productivity to mitigate unemployment implies that those countries with no capacity to produce at least cost will not develop. Yet most developing countries participate in regional integration with the aim of increasing domestic income levels and employment, and to gain faster economic growth through expanded local production (Lundahl and Peterson, 1991:303).

Regional economic integration within the SADC region is likely to be polarised, with South Africa benefitting at the expense of the smaller countries. Mayer and Thomas (1997:329) note that the structural characteristics of the SADC economies are more competitive than complementary, with economies (with the exception of South Africa) producing a similar range of primary products and competing for export markets. The absolute dominance in size and level of development of the South African economy, its substantial trade surplus with the other SADC countries and their dependence on South African infrastructure strengthen the likelihood of polarised development in the region (McCarthy, 1999; 2002; Khamfula and Tesfayohannes, 2004).

Furthermore, there is a possibility that conflict could arise if the production of some goods relocates to places where there is comparative advantage within the region. These factors provide the main obstacles to successful regional integration and economic development in the SADC region. Lundahl and Peterson (1991:5) advise that there be a regional mechanism implemented to compensate the disadvantaged countries for the loss in tariff revenue, lest the integration arrangement collapse. They suggest that the countries that benefit should compensate the disadvantaged countries through a transfer of financial resources¹⁸. Alternatively, countries could implement measures to encourage industrial production in the less developed countries. This would ensure that regional integration plays a more active role in the economic development of the relatively poorer countries in the region.

¹⁸ For example, the revenue sharing agreement in the Southern African Customs Union (SACU) whereby South Africa compensates the smaller countries for the loss in revenue.

2.3.2.3 Overlapping Membership in Integration Arrangements

Authors such as Kritzinger-van Niekerk and Moreira (2002), Lee (2002), Masson and Pattilo (2003), Khandelwal (2004), and Jakobeit *et al* (2005), among others, have discussed the issue of overlapping membership of African countries in RIAs. According to Khamfula and Tesfayohannes (2004:40), the main potential cost associated with overlapping membership in RIAs is policy conflict. Conflicting regulations of preferential trade arrangements make it difficult for members of more than one regional body to implement preferential tariffs to some of its trade partners. For example, Swaziland being a member of both COMESA and SACU cannot implement preferential tariffs for other COMESA countries nor introduce free trade for imports from them in terms of the COMESA FTA without prior consent from the other SACU members (Kritzinger-van Niekerk and Moreira, 2002; Oosthuizen, 2006).

This requirement has also attributed to the stalemate in the SADC- EC economic partnership agreement (EPA), in which South Africa has an independent preferential trade arrangement with the EU under the Trade Development and Cooperation Agreement (TDCA) (Jakobeit *et al*, 2005:65). Kritzinger-van Niekerk and Moreira (2002:3) further highlight the potential problems that may arise should COMESA and SADC become customs unions in the future. They caution that it may be impossible for any country to belong to more than one RIA, unless each RIA adopts a common external tariff (CET) when they become customs unions (CUs) and the same CU regulations.

The consensus is that, countries will eventually have to choose one RIA to belong to, especially when these groups reach the stage of monetary union. It would be impossible for any country to belong to more than one monetary union. The eastern and southern African countries therefore need to resolve the issue of over-lapping memberships in regional bodies before it impedes their economic integration efforts. The subsection below reviews other factors that hinder the success of regional economic integration in developing countries.

2.4 FACTORS HINDERING MARKET INTEGRATION IN DEVELOPING COUNTRIES

Market integration has not been as successful in developing countries in comparison to the experience of the European countries because it involves countries with a low and similar level of development and resource endowment, which leaves little scope for inter- or intra-industry specialisation. The similarity in production and trade patterns among these countries

also makes it harder to exploit economies of scale. Hence, for these countries, industrial development and diversification rather than the removal of trade barriers, will enhance intra-regional trade (Jaber, 1970; Mayer and Thomas 1997; Mutambara, 2001; Shams, 2003). The SADC countries are no exception, the industrial sector in the region is under-developed and production lacks complementarity¹⁹. There is need to transform the industry in the region to enhance their production capacity.

Schiff (2003:4) cites government intervention in developing markets as another hindrance to regional integration. For integrating countries to exploit economies of scale, specialisation should be determined by market forces. However, in most developing countries governments, and not markets, determine the nature of production. Thus, these countries fail to realise economies of scale because goods are not produced at least cost. Furthermore, the high transportation costs, low level of economic development, lack of knowledge and inadequate managerial skills and foreign exchange controls, among other factors prevalent in developing countries, also limit the potential benefits of trade liberalisation (Jaber, 1970:263).

Cobham and Robson (1992:2) also note that the European countries are more integrated with respect to trade, financial and other factor flows than the African countries, and also have more organised financial markets. On the other hand, African countries and sub-regions are small relative to European ones, in terms of indicators such as the gross domestic product (GDP), trade flows, and money supply. There are also greater disparities between the African countries than there are with the European countries at the macroeconomic level. These differences have led to suggestions that African countries should rather attempt simpler, cheaper, more productive, and more cost-effective models of economic integration.

Lundahl and Peterson (1991:5) suggest that developing countries should rather pursue production and development integration, which involves an initial modification of existing instruments and institutions, and more importantly, the creation of new ones, to enable the market to function efficiently and to promote other policy objectives in the union. According to Lee (2002:4), development integration requires more state intervention than market integration. The member states are required to first and foremost make a political

¹⁹ This has adverse implications for monetary integration, which are discussed in detail in Chapter 4.

commitment to integration, which will lay the foundation for cooperation. The political commitment is expected to help member states work toward implementing policies that will help with problems created by the unequal distribution of benefits from the process of market integration.

Economic integration in developing countries could also be undertaken through the co-ordination of the investment decisions in participating countries in order to create complementary production structures from which trade flows would follow. Regional groupings could choose priority sectors for development such as agriculture, industry, power, transportation, or training, and identify specific, concrete projects in each sector that could be implemented on a community basis, with possible financial support from abroad. If successful, a single investment area could necessitate a customs union in future²⁰ (Dajani, 1980; Davies, 1994; Diouf, 1995).

According to Dajani (1980:28), partial monetary integration would be more relevant than full monetary integration in such a scenario given that its purpose would be the facilitation of the exchange of the limited number of goods produced within the region. Nonetheless, it is the goal of the African Union to deepen regional economic integration within the African countries. It is essential to identify the fundamental factors that guided the EU's integration process as they could provide useful lessons for other regional economic communities (RECs) to apply in their quest for economic integration.

2.5 CONCLUSION

McCarthy (2002), Masson and Pattilo (2003), and Arroyo (2003) among others, note that RECs need to bear in mind that the implementation of a full monetary and economic union is likely to be *a gradual process that requires a significant degree of convergence and integration before that status is realised*. Hence, RIAs are advised not to rush the implementation of a monetary union.

SADC countries are at the early stages of undertaking the process of regional economic integration and as such are a long way from implementing monetary integration. At present

²⁰ This is the reverse of the EU experience.

regional integration results in polarised development in the SADC countries, with South Africa benefitting the most as the largest economy. This is due mainly to South Africa being more industrialised than the rest of the countries and hence, scale economies imply that production is at the least-cost there. This however, implies that South Africa will continue to grow at a faster rate than the rest of the member states. A disparity in income levels indicates that a group of countries may not be suitable for monetary integration, which requires economic convergence in member countries²¹.

The discussion on economic integration highlighted a number of factors that hinder the integration process in developing countries. The implication drawn is that if the SADC countries are to be successful in regional integration, they need to restructure their economies. This will be a lengthy and costly process for some of the countries however, if implemented correctly; it will benefit the whole region in the long run and would make it less costly for the region to have a common currency. Chapter 3 reviews the theoretical framework of monetary integration.

²¹ The need for economic convergence in a group of countries wishing to form a monetary union is elaborated on in Chapter 5.

CHAPTER THREE

THEORETICAL FRAMEWORKS OF MONETARY INTEGRATION

3.1 INTRODUCTION

The focus of the present study is to evaluate the implications of monetary integration for regional economic integration and development within the SADC region. However, before an assessment of the suitability of the SADC countries for monetary integration can be undertaken, it is important to gain an understanding of the theory of monetary integration. Thus, the present chapter provides a review of the theory, beginning with a discussion of the arguments supporting the need for monetary integration in the pursuit of regional economic integration.

The discussion on the costs and benefits associated with monetary integration are centred on the implications of adopting a fixed exchange rate system between the member countries. Thus, Section 3.2 evaluates the pros and cons of adopting either of the two extreme exchange rate regimes, i.e., either a fixed or a flexible exchange rate system. Section 3.3 reviews the theory of the impossible trinity in international trade, which asserts that the simultaneous pursuit of full capital mobility, independence of monetary policy, and a fixed exchange rate system is impossible in an environment of free trade.

Section 3.4 discusses the theory of optimum currency areas, which prescribes structural conditions that when present in the economies of countries wishing to form a monetary union, minimise the costs of giving up the exchange rate as an adjustment tool. Section 3.5 presents an alternative consideration for the need for monetary integration, which argues that small countries whose independent monetary policies have not been effective in determining economic performance may be better off surrendering monetary policy to a regional authority.

Section 3.6 discusses the need for convergence in macroeconomic stability indicators in addition to meeting the preconditions prescribed by the OCA theory. Section 3.7 then reviews the theory of economic convergence and the sources of economic growth stipulated by the theory. The section also provides an explanation on why it is necessary for integrating countries to achieve real economic convergence alongside nominal convergence. Section 3.8

presents a discussion on the need for a fiscal policy framework within a monetary union, while Section 3.9 highlights the need for financial integration within member states. Lastly, Section 3.10 concludes the chapter.

3.2 THE CHOICE OF AN OPTIMUM EXCHANGE RATE SYSTEM

The arguments for monetary integration are centred on the debate on the desirability of fixed *versus* flexible exchange rates, which ultimately depends on the nation involved and the conditions under which it operates. The section begins with a review of the debate over the appropriate exchange rate mechanism, which ultimately influence the arguments for monetary integration. The arguments for flexible exchange rates are discussed in Section 3.2.1 below, while Section 3.2.2 considers arguments for fixed exchange rates. Lastly, Section 3.2.3 makes a comparison between fixed and flexible exchange rates.

3.2.1 The Case for Flexible Exchange Rates

The subsections below review the advantages of a freely floating exchange rate system, which are mainly associated with greater market efficiency and the availability of more effective policy instruments for the achievement of domestic policy objectives. Each argument in favour of flexible exchange rates is presented together with a comparison of the effects of fixed exchange rates.

3.2.1.1 Market Efficiency

Domestic adjustment to correct disequilibrium in a nation's balance of payments (BoP) is more efficient under a flexible exchange rate system than a fixed exchange rate system. In general, a nation's prices and wages are relatively rigid downwards and factors are immobile among the countries. It is argued that when a country is hit by a negative demand or supply shock, the only instrument to avoid higher inflation or unemployment is the change in the flexible exchange rate. This is because, under a freely floating exchange rate system, a deficit or surplus in a nation's BoP is corrected automatically by a depreciation or appreciation of the nation's currency, respectively. The economy will revert to both internal and external

equilibrium, without any government intervention and loss or accumulation of reserves²² (Friedman, 1953; Horváth and Komárek, 2002; Salvatore, 2004).

On the other hand, the excess demand for (supply of) foreign exchange that arises from fixing the exchange rate results in a deficit (surplus) in a nation's BoP, which is correctable only through a change in economic variables other than the exchange rate. However, the country will still experience either inflation or unemployment. This is inefficient, may lead to policy mistakes and requires the use of adjustment policies, e.g. monetary policy that would not be available to achieve purely domestic objectives (Friedman, 1953; Mundell, 1961; Horváth and Komárek, 2002; Salvatore, 2004).

In addition, under a flexible exchange rate system, only the exchange rate needs to change to correct disequilibrium in the BoP, while a fixed exchange rate system requires that all internal prices be perfectly flexible for BoP equilibrium to be attained. It is argued that it is more efficient to rely on changing only one price (i.e., the exchange rate) than changing all internal prices to bring about an adjustment in the BoP. Furthermore, in practice, internal prices are generally sticky downwards and therefore, highly inflexible (Salvatore, 2004: 705).

The smooth and continuous adjustment in the exchange rate to correct BoP disequilibria results in stabilising speculation under a flexible exchange rate system, which in turn dampens fluctuations in the exchange rate. On the other hand, the maintenance of a fixed rate when it is out of equilibrium under a fixed exchange rate system is likely to result in destabilising speculation and may eventually force the nation to make large discrete changes in its exchange rate which could be costly.

Furthermore, flexible exchange rates reflect the degree of competitiveness of a nation in various commodities when the equilibrium rates are translated into domestic prices. Fixed exchange rates, on the other hand, are often not in equilibrium with the rest of the world and thus, distort the pattern of international trade and prevent the most efficient allocation of resources. For example, an undervalued exchange rate may lead a nation to export more of a

²² Where internal prices and wages are not rigid or factors are fully mobile, there is little economic difference between these ways and the change in the exchange rate to adjust the economy. However, it is argued that the latter provides a less painful means of adjustment (Horváth and Komárek, 2002:8).

commodity than would be justified at the equilibrium exchange rate. The commodity may be relatively cheaper than competitive foreign commodities at the undervalued exchange rate, even though it may be relatively more expensive at the equilibrium exchange rate. This results in an inefficient allocation of world resources and reduces the benefits from international specialisation in production and trade (Salvatore, 2004: 705).

3.2.1.2 Policy Advantages

Another argument in favour for a flexible exchange rate system is that monetary policy is not constrained by a predetermined level of the exchange rate. Monetary policy sets interest rates in order to achieve domestic equilibrium (i.e., price stability), while the nominal exchange rate adjusts to balance the external accounts²³. When price stability is achieved and is expected to be maintained, interest rates are then set by the monetary authorities with the objective of smoothing the business cycle (i.e., a counter-cyclical monetary policy can then be an option). Thus, the nation does not need to concern itself with the use of domestic policy to maintain external balance (Baquero *et. al*, 2003: 221).

On the other hand, monetary policy under a fixed exchange rate system is targeted toward the achievement of external balance, leaving only fiscal policy at the disposal of domestic authorities to achieve internal balance and other purely domestic objectives such as full employment with price stability, economic growth and equitable distribution of income. (Salvatore, 2004: 706).

In addition, flexible exchange rates enhance the effectiveness of monetary policy in the pursuit of domestic objectives. For example, an anti-inflationary policy that improves the trade balance will result in an appreciation of the domestic currency. This in turn encourages imports and discourages exports, thus further reducing domestic inflationary pressures.

Different nations have different trade-offs between inflation and unemployment. Flexible exchange rates allow each nation to pursue domestic policies aimed at attaining its own desired inflation-unemployment trade-off. On the other hand, under fixed exchange rates, different inflationary rates in different nations result in differing BoP pressures. The more

²³ Under such a regime, monetary policy is the nominal anchor of the economy.

inflationary nations face BoP deficits, while the less inflationary ones face BoP surpluses. The BoP pressures would restrain or prevent each nation from achieving its optimum inflation-unemployment trade-off.

Furthermore, flexible exchange rates prevent governments from manipulating the official exchange rate in order to benefit a particular sector in the economy at the expense of another or to achieve an economic objective that could be attained by less costly means. For example, developing countries tend to maintain an over-valued exchange rate in order to encourage imports, especially of capital equipment needed for development. This, however, discourages exports of agricultural and traditional commodities and results in an excess demand for foreign exchange, which in turn prompts government to exercise exchange and trade controls. However, controls introduce many distortions and inefficiencies into the economy. *Ceteris paribus*, it is more efficient to allow the exchange rate to determine its equilibrium and provide a subsidy to the industrial sector (Salvatore, 2004: 706).

3.2.2 The Case for Fixed Exchange Rates

The subsections below discuss the advantages of a fixed exchange rate system, which include reduced uncertainty in international trade and finance, greater price discipline and stabilising speculation. The arguments for fixed exchange rates are presented together with replies from advocates for flexible exchange rates, as well as empirical evidence in support of the arguments.

3.2.2.1 Reduced Uncertainty

Fixed exchange rates eliminate fluctuations in the exchange rate, which discourage specialisation in production and the flow of international trade and investments. Advocates for fixed exchange rates argue that, the excessive fluctuations in the exchange rate associated with a flexible system may be costly in terms of higher frictional unemployment if they result in frequent attempts at reallocating domestic resources among the various sectors of the economy.

Furthermore, the tendency of the exchange rate to overshoot its equilibrium value in the short run has in most instances, resulted in continuous fluctuations in the rate. This occurs in situations where economies face further disturbances before the exchange rate reaches its equilibrium rate. The constant volatility in the exchange rates of most nations is evidence of

overshooting, subsequent correcting, but always fluctuating value of the rate (Salvatore, 2004: 534).

However, advocates for flexible exchange rates argue that the uncertainty and instability surrounding the large discrete changes in par values that periodically become necessary under a fixed exchange rate system are more damaging and disruptive to the smooth flow of international trade and investments than the uncertainty inherent in flexible exchange rates. In addition, the uncertainty associated with flexible exchange rates generally can be hedged against, while on the other hand, that associated with fixed rates cannot. However, this does not apply to the case of a *truly* fixed exchange rate, such as the gold standard (Salvatore, 2004: 707).

3.2.2.2 Stabilising Speculation

Destabilising speculation occurs when speculators purchase a foreign currency when the exchange rate is rising, in the expectation that the rate will rise even more, and sell the foreign currency when the exchange rate is falling, in the expectation that the rate will fall even more. The process amplifies fluctuations in exchange rates resulting from the business cycles, and in turn, the uncertainty and risks involved in international transactions. This reduces the international flow of trade and investments. The opposite occurs under stabilising speculation.

Advocates for fixed exchange rates argue that speculation is likely to be more *destabilising* under a flexible than a fixed exchange rate system. However, advocates for flexible exchange rates argue that the reverse is true, stating that destabilising speculation is less likely to occur when exchange rates adjust continuously than when they are prevented from doing so until a large discrete adjustment is necessary. Speculators would then sell a currency that they expect to be devalued and buy one that they expect to be revalued. Their expectations are usually self-fulfilling. However, this process does not occur under a *truly* fixed exchange rate system where exchange rates are always kept fixed and BoP adjustments are achieved by other means. In this case, speculation is likely to be stabilising. The same process occurs under truly flexible exchange rates (Salvatore, 2004: 707).

3.2.2.3 Price Discipline

The anchor argument for a fixed exchange rate system states that fixed exchange rates instill price discipline on a nation at a much faster rate than would occur under a flexible exchange rate system. Fixing the exchange rate imposes an automatic mechanism that regulates the amount of money and hence, sets interest rates accordingly. This in turn implies the abandonment of an independent monetary policy but it also fosters credibility in economic policies as the concerned nation would import the monetary policy of the anchor country, along with its credibility (Baquero *et. al*, 2003: 221).

Furthermore, it is argued that the role of the exchange rate as the nominal anchor of the economy is easier for the public to understand than the more abstract concept of a monetary policy anchor. Hence, theoretically price stability is achieved faster under this arrangement than under a flexible exchange rate system (Baquero *et. al*, 2003: 221).

In addition, a fixed exchange rate arrangement instils price discipline in situations where a government is prone to running continuously large and ever growing fiscal deficits. A government typically has three possible ways through which it can finance its fiscal deficit: it can borrow funds either domestically (i.e. issue bonds to the public) or from abroad (e.g. from the international monetary fund), it can deplete its foreign exchange reserves, or it can print money (i.e. borrow from the central bank).

A government that has borrowed a lot in the past would have accumulated a heavy debt, and will have difficulties borrowing further, either domestically or internationally, because of doubts about its capacity to service its debt. Similarly, reserve losses cannot continue indefinitely as the government will eventually exhaust its stock of foreign exchange reserves. Thus, the government will have only the option of printing money, which is known as seigniorage.

The policy of printing money to finance the deficit is pursued by many governments that are unable to enact adequate tax programs or administer them effectively to raise the required revenue. In addition, taxation, especially in developing countries, is associated with high collection costs and distorting effects. As such, governments resort to financing the deficit through monetary expansion (Aghveli and Khan, 1977).

However, seigniorage has a self-perpetuating effect on inflation. This is because the government's nominal revenues are generally fixed in the short run hence, their real value falls in the face of rapid inflation, while its spending commitments are mostly in real terms. This implies that nominal expenditure rises concomitantly with price increases. As inflation persists, government expenditure rises faster than revenue; forcing the authorities to increase their issuance of money even further. In the extreme case, the self-perpetuating process of inflation could lead to hyperinflation, which could cause serious economic instability. Therefore, even if in the long run government revenues match government expenditures, the lag structure in the government's budgetary mechanism creates a deficit in real terms as well as in nominal terms in the presence of inflation (Aghveli and Khan, 1977).

Thus, a nation with higher inflation rates than the rest of the world is likely to face persistent BoP deficits. Given that deficits cannot continue indefinitely, the nation will therefore, need to restrain its excessive rate of inflation. In contrast, a flexible exchange rate system does not instil similar price discipline since any BoP imbalances are corrected automatically through changes in the exchange rate, making it possible for domestic authorities to over-stimulate the economy for political reasons (Salvatore, 2004: 711).

3.2.2.4 Negative Effects of Exchange Rate Depreciation

Economic literature states that fixed exchange rates are more appropriate for developing countries, which face difficulties allowing the nominal exchange rate to adjust freely. It is argued that the advantages of flexible exchange rates are not attainable in developing countries due to a lack of credibility in their institutions. Thus, these countries ought to adopt fixed exchange rates to solve the credibility problem (Guillaume and Stasavage, 1999; Baqueiro *et. al*, 2003).

This particular argument against flexible exchange rates is based on the hypothesis that for some countries, nominal exchange rate depreciations have negative effects and as such, these countries actively try to minimise exchange rate fluctuations. There are two main reasons for depreciation to have negative effects, the “original sin” hypothesis and high exchange rate pass-through.

The “original sin” hypothesis, which was first advanced by Eichengreen and Hausmann (1999), asserts that depreciations are costly in situations where the domestic currency cannot

be used to borrow abroad or to borrow long term even domestically. When the government is unable to borrow through these afore mentioned means, it will borrow in foreign currency. However, the high volatility associated with flexible exchange rates results in international investors demanding a risk-premium in lending. Similarly, the currency exposure restricts the ability of monetary policy to accommodate a negative terms of trade shock through nominal depreciation and hence, drive interest rates up.

The second reason for the negative effects associated with depreciation is exchange rate pass-through. Depreciation/ devaluation results in an increase in both the domestic-currency price of imported final goods as well as imported inputs and hence, putting upward pressure on domestic prices. If domestic inflation is largely determined by import prices and the exchange rate, i.e., there is a high level of exchange rate pass-through, the increase in prices could outweigh the positive effect of an improvement in international competitiveness that arises from the depreciation. This may prompt authorities to devalue again.

The greater the depreciation or devaluation, the greater is its inflationary impact on the domestic economy and the less effective are changes in the exchange rate as a method of correcting for BoP deficits. The authorities may, therefore, be inclined to minimise the effect of an adverse shock on the domestic price level by raising interest rates rather than allowing the exchange rate to depreciate (Baqueiro *et. al*, 2003: 223). In addition, depreciation may result in an increase in the value of foreign debt to domestic assets²⁴, which in turn may lead to an increase in the number of illiquid and bankrupt firms (especially banks) (Plümper and Troeger, 2007:6).

Both situations imply that monetary policy would effectively be constrained and that it plays an accommodating role to achieve exchange rate stability. The authorities, therefore, seek to stabilise their currencies by pegging the exchange rate to a key currency or basket of currencies. As a result, the flexible exchange rate becomes a *de facto* peg or soft peg (Calvo and Reinhart, 2002; Baqueiro *et. al*, 2003; Plümper and Troeger, 2007).

²⁴ especially where global capital markets prefer denominating debt to a key currency.

3.2.3 Comparison between Fixed and Flexible Exchange Rates

This subsection makes a comparison between the adjustments necessary under fixed *versus* flexible exchange rates in the face of shocks. The adjustment processes necessary in each scenario are illustrated in the examples presented in the subsections below. Traditionally, it is argued that flexible exchange rates provide much more insulation to the domestic economy from *external* shocks (e.g. an exogenous change in the nation's exports) than do fixed exchange rates. This argument particularly applies to an economy in which large components of its exports are commodities because it is exposed to terms of trade shocks and would therefore benefit by allowing the exchange rate to absorb them.

On the other hand, if the economy experiences minimal exposure to external shocks, then it would benefit from the stability offered by adopting a fixed exchange rate system. It is argued that the arrangement is more suited for an economy subject to large *internal* shocks (e.g. an autonomous increase in investments) (Baquero *et. al*, 2003; Salvatore, 2004).

3.2.3.1 An Exogenous Change in the Nation's Exports

Mundell (1961:658) uses a two-country model with country A and country B, to assess the adjustment processes required under both fixed and flexible exchange rate systems in the face of a shift in global demand away from goods produced by country B towards those of country A. The two countries are initially at full employment and balance of payments equilibrium. The model assumes that money wages and prices are rigid downwards in the short run without causing unemployment, and that monetary authorities act to prevent inflation.

The decline in the demand for goods produced in country B results in a decline in output produced in that country. Assuming that domestic spending in country B does not decline at the same rate as the fall in output, then the country would experience a current account deficit and possibly a budget deficit too. The current account of a nation comprises exports less imports. Hence, if country B's exports decline while its imports do not change, it will experience a deficit in its current account. Similarly, assuming that the amount of taxes collected is proportional to the level of output produced; a decrease in output results in a proportional decrease in taxes. However, social security payments increase with an increase in unemployment (brought about by the fall in domestic production), hence domestic spending increases. As such, country B would be faced with a budget deficit as well (Horvath and Komarek, 2002:9).

Under a fixed exchange rate system, country B cannot devalue its currency in order to gain competitiveness in its export market. Hence, the automatic adjustment necessary requires a reduction in its real income to bring it back to equilibrium. This is attained through a reduction in the domestic money supply that arises when monetary authorities exchange domestic money balances for foreign exchange at the central bank in order to meet the excess demand for foreign currency in the economy. Under a fractional-reserve banking system, this subsequent loss of reserves leads to a reduction in the domestic money supply by a multiple of the trade deficit. If the monetary authorities do not sterilise the reduction in the money supply, interest rates would rise.

The increase in interest rates in turn would discourage domestic investment and through the multiplier process, result in a fall in domestic income. The reduction in income leads to a fall in imports, which in turn leads to a reduction in the trade deficit. In addition, the increase in domestic interest rates attracts foreign capital inflow, which aids in financing the deficit. Furthermore, the reduction in the money supply and income in country B tends to reduce domestic prices relative to prices in country A, further improving the trade balance. The opposite occurs in country A (Salvatore, 2004: 608).

If however, the two countries were members of an optimum currency area²⁵, then monetary adjustments in the BoP will not be possible and hence, the required reduction in real income in country B will not be attainable through the terms of trade. Therefore, country B would have to reduce its output and employment (Mundell, 1961:658).

If country A chose not to increase its output in response to the increase in demand for its goods, then the excess demand that arises will exert inflationary pressure on domestic prices. However, if prices in country A rose faster than those in country B, then its economy would partially absorb the burden of adjustment for country B. If, on the other hand, country A tightened its monetary policy to restrain the inflationary pressures, then all the burden of adjustment would fall on country B. Thus, under fixed exchange rates, country B would have no choice but to live with the recessionary effects of the shift in demand away from its goods (Mundell, 1961:658).

²⁵ The theory of optimum currency areas is discussed in Section 3.4.

There are alternative mechanisms that could necessitate the required adjustment in the two countries. To begin with, adjustment could be achieved through migration of labour and/or capital from country B to country A. This would eliminate the excess labour demand in country A; wages would remain constant while unemployment and inflation vanish. Alternatively, wages need to be flexible in both countries. A fall in real wages in country B and a rise in country A would clear labour markets in both countries. Lastly, fiscal transfers could be implemented whereby country A increases its taxes (in order to decrease its aggregate demand) and transfers the additional revenue to country B. The current account deficit in country B would persist but country A would finance it (Mundell, 1961:659)²⁶.

Furthermore, if the countries maintained their national currencies, their central banks could set up a mechanism that would ensure that the burden of international adjustment fell on the surplus country (country A), which would then inflate until unemployment in country B is eliminated. If on the other hand, the countries had a common currency and a single central bank, the level of inflation would be determined by the willingness of central authorities to allow unemployment in deficit countries (country B). However, the currency area would not be able to prevent simultaneously unemployment and inflation (Mundell, 1961:659).

If, on the other hand, the two countries maintain flexible exchange rates, then country B could respond to the recession by means of monetary expansion and depreciation of its national currency. This would stimulate demand for its goods and return the economy to desired levels of employment and output more rapidly than would happen in the case under the automatic mechanisms of adjustment on which a fixed rate country must rely. Similarly, a contractionary monetary policy and an appreciation of the national currency in country A would curb the inflationary pressures and stabilise the economy (Frankel, 1999:12).

Rajan (2004:4) argues that flexible exchange rates are particularly more appropriate for developing countries given that their economies are more susceptible to large external shocks, such as changes in foreign interest rates, terms of trade and regional spill over effects. A greater degree of exchange rate flexibility would thus provide a less costly mechanism by which relative prices adjust in response to such shocks. The financial crises experienced in

²⁶ These alternative adjustment mechanisms formed the basis of the theory of optimum currency areas.

Latin American and East Asian countries in the 1990s are examples of cases where the gradual adjustments required under fixed exchange rates prolonged the necessary response to external shocks and thus, proved to be costly.

Furthermore, most developing countries have diversified trade structures that are mainly dependent on the United States (US), Japan, Europe and intra-Asian trade. Such economies are more suited to maintain flexible exchange rates. This proposition is explored further in the discussion on the theory of optimum currency areas in Section 3.4. Mundell (1961:659) however, argues that if the two countries do not constitute an optimum currency area, then adjustment under flexible exchange rates would not simultaneously bring both countries back to equilibrium. The countries would be able to curb either inflation in country A or unemployment in country B.

3.2.3.2 An Autonomous Increase in Investments

An autonomous increase in investments will, through the multiplier process lead to an increase in national income, which will in turn lead to an increase in imports. Under fixed exchange rates, *ceteris paribus*, the increase in imports will result in a deficit in the BoP. The nation will have to live with the deficit, which may be financed through international reserves in the short term. However, under flexible exchange rates, the deficit in the BoP will prompt a depreciation in the national currency, which in turn will stimulate exports. The increase in exports will reinforce the initial increase in income (Salvatore, 2004:712).

In general, a fixed exchange rate system is more suitable for a small open economy that trades mostly with one or a few larger economies, and in which disturbances are more of a monetary nature. On the other hand, a flexible exchange rate system is more suitable for a large, relatively closed economy with diversified trade and a different inflation-unemployment trade-off than its main trading partners, and facing primarily disturbances originating from the real sector abroad.

Salvatore (2004: 705) notes that the debate over the appropriate exchange rate mechanism between trading partners is essentially a debate over what amounts to an optimum currency area, i.e. how large an area covered by permanently fixed exchange rates can be before the benefits of fixed rates are overcome by their disadvantages.

3.3 THE IMPOSSIBLE TRINITY PRINCIPLE

The theory of the impossible trilogy²⁷ provides additional arguments for the need for monetary integration when pursuing regional economic integration. This principle asserts that only two of the following three features are mutually compatible: full capital mobility, independence of monetary policy, and a fixed exchange rate (Wyplosz, 1997:4). In other words, the principle implies that the simultaneous pursuit of financial market integration, monetary policy independence and exchange rate stability, amidst trade liberalisation, are incompatible. Van der Haegen and Viñals (2003:8) refer to the principle as the “inconsistent quartet”, explicitly including free trade as contributing to the inconsistency.

The principle has its origins in the interest parity condition stipulated by the Mundell-Fleming model of a small open economy, which asserts that under full capital mobility, the domestic interest rate is always at par with the world interest rate. *Ceteris paribus*, any difference between the rates will lead to massive capital flows in favour of the nation with the higher interest rates. This will continue until the rates equalise (Dornbusch and Fischer, 1994: 168).

The interest parity condition implies that any differences between the domestic and world interest rates are equal to the expected rate of depreciation of the exchange rate. Algebraically, the condition is expressed as:

$$i_t - i_t^* = E_t(e_{t+1}) - e_t \quad (3.1)$$

Where: i is the domestic interest rate, i^* is the world interest rate, e is the expected rate of depreciation of the exchange rate (in logs), and t is an index of time.

If for instance, interest rates are 5% in the domestic market and 3% in global markets, and given that complete capital mobility implies that expected asset returns in the domestic and global market remain at par, the implication therefore, is that global currency markets expect the domestic currency to depreciate by 2% during that period. Thus, the interest parity condition implies that assets denominated in a currency expected to depreciate must offer an exactly compensating higher yield (Wyplosz, 1997:4).

²⁷ Also known as the inconsistent trinity.

The above condition implies that a small open country, with full capital mobility, that decides to peg its exchange rate, i.e.

$$E_t(e_{t+1}) = e_t = e_0 \quad (3.2)$$

Where: e_0 is the peg, must set its domestic interest rate to be exactly equal to the rate in the country to which it pegs its currency.

If for instance, the country were to conduct an independent contractionary monetary policy, the rise in interest rates would attract huge capital inflows that would result in a BoP surplus. To prevent the exchange rate from appreciating, the central bank would have to buy the excess foreign currency in the market. This would in turn, increase the money supply in circulation²⁸ and negate the initial monetary contraction. This would continue until the domestic interest rates revert to equilibrium with the world market rates. Thus, independent monetary policy is ineffective under fixed exchange rates and perfect capital mobility (Dornbusch and Fischer, 1994: 168).

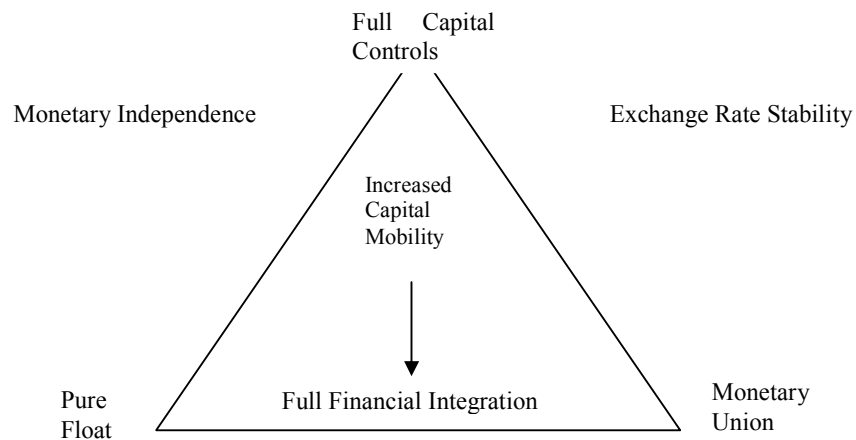
This therefore, implies that monetary policy in the small open country will effectively be determined by the anchor country. Conversely, a country that wishes to conduct an independent monetary policy, that is, raising or lowering interest rates for domestic stabilisation purposes, must allow its exchange rate to fluctuate in the market. Then, e_t in the interest parity equation becomes endogenous²⁹ (Wyplosz, 1997:4).

However, increased globalisation implies that financial markets are steadily becoming more and more integrated internationally. The move towards full financial integration therefore, forces the choice down to giving up either on exchange rate stability or on monetary independence. Figure 3.1 below illustrates the inconsistency.

²⁸ This however could be inflationary.

²⁹ This reasoning ignores risk aversion, which gives rise to a risk premium term.

Figure 3.1: The Impossible Trinity



Source: Frankel (1999:8)

Each of the sides of the triangle depicts an attraction for a small open country: monetary independence, exchange rate stability, and full financial integration. As explained above, only two of the three goals are mutually compatible with free trade. The move towards full financial integration tends to push countries towards the lower part of the triangle (Frankel, 1999:8). In order to achieve domestic price stability, priority would need to be given to either a nominal domestic anchor, e.g. an inflation target (which requires monetary independence), or an external anchor, e.g. an exchange rate target (which requires exchange rate stability) (van der Haegen and Viñals, 2003:8).

Thus, the decision to adopt a common currency is the outcome of constrained optimisation, the constraint being the impossible trilogy: given free capital mobility, the choice is between freely floating exchange rates and monetary unification. However, wide, long-lasting fluctuations in the exchange rate are incompatible with fully open markets and the complete removal of border posts. Thus, monetary union tends to dominate a free float (Wyplosz, 1997:7).

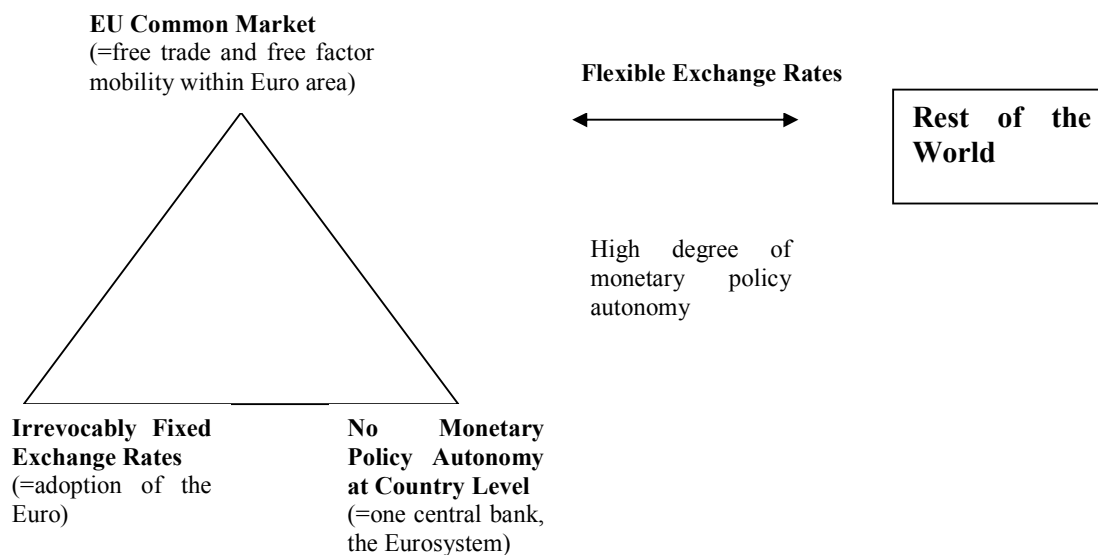
The EU countries encountered the impossible trinity during the process of economic integration. The countries attempted to stabilise their intra-regional exchange rates by adopting a fixed exchange rate mechanism under the European Monetary System (EMS), where they fixed their currencies to the Deutsche Mark because German was larger in relative economic size, and had a strong reputation for fighting inflation and keeping its currency

strong. The smaller countries thus, were able to import monetary credibility and stability from German (Arroyo, 2003:74).

However, the subsequent freeing of capital flows between the member countries resulted in the loss of monetary independence in each of them, except Germany whose central bank, the Bundesbank, was effectively setting monetary policy for the region. To overcome the inconsistency and hence, regain some influence over their monetary policies, the EU countries opted for monetary integration (Wyplosz, 1997:6). The move towards monetary integration subsequently resulted in the adoption of the euro. Figure 3.2 below illustrates how the EU countries solved the impossible trinity.

Figure 3.2: The European Solution to the Impossible Trinity

European Union/ Euro Area



Source: Mongelli (2008:11)

Figure 3.2 shows that the EU member states maintain irrevocably fixed exchange rates within the union (in the form of using a common currency, the Euro). In addition, there is free capital mobility within the common market as well as monetary policy independence *vis-a-vis* the rest of the world (even though there is no policy autonomy at country level within the union). Thus, the Eurozone was able to achieve simultaneously exchange rate stability (by using a common currency), full financial integration and monetary policy independence, and hence, overcome the impossible trinity.

The implications of the principle of the impossible trinity for the SADC countries are, therefore, that: as the countries deepen regional economic integration, with the complete removal of borders and freeing of capital flows, they would be required to make a decision on the degree of exchange rate flexibility. As explained above, flexible exchange rates are incompatible with fully open markets; hence, the countries would need to adopt a fixed exchange rate system.

South Africa is the dominant country in the SADC region, with a strong currency and a reputation for fighting inflation. The non-Common Monetary Area (CMA) SADC countries could benefit from fixing their national currencies to the South African Rand (ZAR). Presently, only the CMA countries import monetary credibility and stability from South Africa. However, free capital mobility and a fixed exchange rate mechanism within the SADC region implies that the South African Reserve Bank (SARB) would effectively determine monetary policy for the region. This however, may not be acceptable to the non-CMA countries.

3.4 THE THEORY OF OPTIMUM CURRENCY AREAS

According to Salvatore (2004: 712), an optimum currency area (OCA) or bloc refers to a group of nations whose national currencies are linked through *permanently* fixed exchange rates and the conditions that would make such an area optimum. In turn, the currencies of member nations float jointly with respect to currencies of non-member nations. Regions of the same nation constitute an optimum currency area, as they share the same currency.

The OCA theory, developed by Mundell and McKinnon in the 1960s³⁰, has evolved over the years. There are four major streams of literature on the OCA theory. The first stream of literature was developed during the 1960s-1970s period, also known as the “pioneering phase”. This particular stream of literature tried to find the crucial economic characteristics that determine where the (illusionary) borders for a currency area ought to be drawn, and to initiate the analysis on the resulting benefits and costs. The literature came up with the so-called traditional OCA criteria, which define what constitutes an OCA (Horvath and

³⁰ This was a period characterised *inter alia* by the Bretton Woods fixed (but adjustable) exchange rate regime, capital controls in many countries and the incipient process of European integration.

Komarek, 2002:7). These criteria and the criticisms often raised will be discussed in Section 3.4.2.

The second stream of literature was developed during the 1970s, also known as the “reconciliation phase”. This particular phase saw the OCA properties being analysed and weighed against one another to gauge their relative importance. Of particular significance, this phase brought a new “meta-property”, the similarity of shocks, and gave more structure to the analysis of the costs and benefits of a currency area (Mongelli, 2002:7). Section 3.4.3 will adequately review this phase of OCA theory.

The third phase, known as the “reassessment phase of OCA literature” occurred during the 1980s-early 1990s period. This literature is in favour of currency unions and argues that there are greater benefits of currency areas and less costs associated with the loss of domestic monetary policy autonomy (Mongelli, 2002:7). Section 3.4.4 will review this phase and bring out its contributions to the OCA theory.

Lastly, the fourth phase, also known as the “empirical phase” of OCA literature, spans from the late 1990s to the present. The empirical phase of the OCA literature grew along with the developments in econometric techniques. The literature under this phase investigates the degree to which countries meet the OCA criteria. Furthermore, it assumes that any single country fulfils completely the requirements to make it an optimal member of a monetary union. As such, it does not search for characteristics identified as important for choosing the participants in a currency union. Rather, it focuses mainly on assessing the costs and the benefits of monetary integration (Horvath and Komarek, 2002:7).

Bayoumi and Eichengreen (1997:762) stipulate that, although the OCA theory covers only a *subset* of characteristics worth considering when evaluating the desirability of a currency union against a fixed exchange rate system, it is the workhorse of analyses related to monetary integration. This section begins with a review of the benefits and costs associated with an optimum currency area in Section 3.4.1. This is followed by a discussion on the OCA theory in Section 3.4.2.

3.4.1 Benefits and Costs of an Optimum Currency Area

A monetary union maintains permanently fixed exchange rates among members, although they may vary jointly with respect to other currencies. Hence, a monetary union constitutes an OCA. Thus, the following discussion in essence, outlines the costs and benefits associated with monetary integration.

3.4.1.1 Benefits of an Optimum Currency Area

The case for the formation of an OCA is to some extent, the case for fixed as opposed to flexible exchange rates. This is because some of the benefits from forming an OCA are obtainable from the looser form of economic relationship provided by a fixed exchange rate system. The subsections below review the benefits associated with the formation of an OCA.

3.4.1.1.1 Eliminates Uncertainty

The formation of an OCA eliminates the uncertainty that arises when exchange rates are not permanently fixed, thus stimulating specialisation in production as well as the flow of trade and investments among member regions/ nations. Furthermore, an OCA encourages producers to view the entire area as a single market and to benefit from greater economies of scale in production (Salvatore, 2004: 713).

An OCA also assures trade partners that free markets would continue to exist within the region and that intra-union economic relations would not be jeopardised by exchange controls or exchange rate adjustments (Lundahl and Peterson, 1991). This is preferred to a flexible exchange rate system, which has traditionally been associated with volatility and overshooting of the exchange rate. The latter creates a lot of uncertainty and discourages trade and investment (Lundahl and Peterson, 1991; Salvatore, 2004: 713).

3.4.1.1.2 Fosters Price Stability

According to Salvatore (2004: 713), with permanently fixed exchange rates, an OCA is likely to experience greater price stability than if exchange rates fluctuate between the member countries. This is because random shocks in different regions/ nations within the area tend to cancel each other out. Any residual disturbance would be relatively smaller when the area is increased. Furthermore, the greater price stability encourages the use of money as a store of value as well as to effect economic transactions and in the process, discouraging inefficient barter deals that arise under more inflationary circumstances.

3.4.1.1.3 Reduces Risks and Transactions Costs

Permanently fixed exchange rates within an OCA reduce the different types of risks that traders are exposed to, such as credit, payment and exchange rate risks (Lundahl and Peterson, 1991; Bayoumi and Ostry, 1995; Ogunkola, 2005). Frankel (1999:10) however, argues that nowadays, forward exchange markets and/or other credit instruments are used to hedge against credit and payment risks, hence the argument does not hold much weight. Salvatore (2004: 713) however, points out that an OCA still saves on the cost of official interventions in foreign exchange markets involving the currencies of member nations and the cost of hedging.

An OCA offers further reductions in transactions costs associated with exchanging one currency for another to pay for imports of goods and services and when citizens travel between member nations (where a common currency is adopted). Furthermore, Ogunkola (2005) points out that most developing countries are characterised by exchange rate policies that are generally unstable and unpredictable, having the potential of destabilising RIAs. Hence, the use of a common currency is the most appropriate tool for addressing problems associated with currency convertibility and exchange rate risk in these countries.

The elimination of currency risk reduces country risk premia, which in turn leads to a reduction in the cost of issuing debt. The interest rates in developing countries are embedded with premia that cater for exchange rate, devaluation, currency and in some countries, sovereign or default risks. An OCA reduces and in some cases, eliminates some types of risk.

Sovereign risk reflects the possibility of a developing country's default on its foreign debt, either by government on official debt or domestic residents on their individual obligations. There are several ways through which sovereign risk may be reduced; through the elimination of devaluation risk, which in turn eliminates the risk of currency mismatch in assets (which are usually denominated in domestic currency) and liabilities (which are usually denominated in foreign currency), and thus leads to a reduction in default risk. Similarly, the elimination of the use of capital controls to defend the value of the domestic currency (which may force domestic borrowers to default on their foreign debts) leads to a reduction in default risk (Chang, 2000b:8).

Exchange rate stability that arises from membership in an OCA increases investor confidence, which in turn secures more stable capital inflows. Furthermore, exchange rate stability results in reduced costs of borrowing, which combined with more stable capital inflows, would result in lower fiscal costs of servicing the public debt and, in a higher level of investment and economic growth (Berg and Borensztein, 2000; Araujo and Leon, 2003).

An OCA may eliminate exchange rate, currency and devaluation risks but the sovereign/default risk may persist. Eliminating devaluations prevents the central bank from acting as lender of last resort to domestic banks. This implies that if domestic banks have foreign debts, there is a possibility of bank runs and therefore, sovereign risk would increase (Chang, 2000b:8). Similarly, the elimination of devaluations implies that the domestic economy cannot benefit from the expansionary economic effects of devaluation, which could possibly improve fiscal revenue and thus, reduce default risk. Despite these possibilities, interest rates would still decline in response to the elimination of the other risks (Berg and Borensztein, 2000:13).

However, the reduction in the cost of issuing debt creates the incentive to run larger fiscal deficits. Thus, member nations need to put in place mechanisms to constrain national fiscal policy to counter such risks. These can be in the form of fiscal policy rules, which are specifiable in terms of upper ceilings on the level of deficit and debt of each country. The union could then have monetary penalties for non-complying countries³¹ (Economic Commission for Africa, 2004; Drábek, 2005).

3.4.1.1.4 Provides a Credible Nominal Anchor for Monetary Policy

A central bank that wants to fight inflation can gain credibility for its monetary policy by fixing its exchange rate to a more stable or “hard” currency that exhibits strong monetary discipline, or even giving up its currency altogether (i.e., dollarisation). The commitment prevents the central bank from undertaking an expansionary monetary policy without jeopardising the viability of the exchange rate peg. In turn, when economic agents perceive future levels of inflation to be low, they will set their wages and prices accordingly, thus

³¹ The need for a fiscal policy framework within a monetary union is elaborated on in Section 3.8.

ensuring that the country is able to attain a lower level of inflation for any given level of output (Frankel, 1999:11).

Monetary integration may also facilitate long periods of financial and exchange rate stability where national currencies are pegged to a stable currency. This was observed in the case of the peg between the Communauté Financière d'Afrique (CFA) and French francs, where the exchange rate between the two currencies was fixed for more than forty-five years (Chang, 2000a:14).

However, pegging the exchange rate between regional currencies and currencies outside the region may be problematic; competitiveness of the member states may deteriorate if regional costs of production rise relative to costs in the anchor country. Similarly, competitiveness may deteriorate *vis-à-vis* third countries if the anchor currency appreciates against the regional currencies. For example, a series of real appreciations in the French franc resulted in a severe slowdown in growth and large current account deficits in the CFA zone, prompting a massive devaluation in their currency in 1994 (Chang, 2000a:14).

3.4.1.2 Costs of an Optimum Currency Area

The disadvantages to an individual nation of joining an OCA include loss of autonomy over its monetary and exchange rate policies, loss of seignorage revenue as well as the lender of last resort option. All these policies are crucial for stabilisation purposes to a nation facing particular economic problems that do not affect the rest of the member nations.

3.4.1.2.1 Loss of Monetary Policy Independence

The greatest disadvantage of an OCA is that each individual member nation cannot use independent stabilisation and growth policies in the pursuit of national macroeconomic goals such as maintaining full employment, accelerating economic growth, counteracting fluctuations in business activity or keeping price levels more stable than they are abroad.

For example, a member of an OCA undergoing a recession may require expansionary fiscal and monetary policies to stimulate its economy and reduce an excessive unemployment rate, while members that are more prosperous might require contractionary policies to curb

inflationary pressures³². The greater flow (arbitrage) of capital and labour from regions/nations of excess supply (where returns and earnings tend to be low) to regions/nations of excess demand (where returns and earnings are higher) minimises the costs of the recession. It does not however eliminate interregional/ international differences within the OCA (Salvatore, 2004: 714).

In the extreme case, a depressed nation may be better off seceding from the OCA in order to address their special problems. However, this may not be feasible for a depressed region within the national framework. Rather, the central government provides aid, such as investment incentives, to depressed regions (Salvatore, 2004: 714).

3.4.1.2.2 Loss of Exchange Rate Policy Independence

An OCA maintains permanently fixed exchange rates or in the extreme case, a common currency between its member countries. As such, member countries cannot manipulate the exchange rate when experiencing domestic balance of payments problems. This implies that differences in member countries' current account balances could persist and possibly result in problems of internal balance³³. However, the overall balance of payments for the region can be maintained through the automatic adjustment of the external exchange rates (Lundahl and Peterson, 1991:300).

Similarly, members of an OCA forgo the possibility of using intra-group nominal exchange rate changes to exploit exchange rate illusion and, hence, to increase intra-group real exchange rate changes and the level of employment³⁴. Furthermore, the countries forgo the possibility of reconciling real exchange rate changes that occur, even in the absence of nominal exchange rate changes, with the maintenance of domestic price level stability in each member country. This is the only reason why monetarists may not always prefer currency unions to a system of flexible exchange rates (Vaubel, 1978:320).

³² See the example given in Section 3.2.3.2 on the adjustment processes necessary in the face of internal shocks.

³³ See the example given in Section 3.2.3.1 on the adjustment processes necessary in the face of external shocks.

³⁴ This cost was derived using the Keynesian framework, which assumes that there is a long run exchange rate and money illusion, and hence a trade-off between inflation and unemployment as argued by the Phillips Curve model.

Monetarists believe that no genuinely economic cost is involved in forgoing those nominal exchange rate changes, which are due to differences in national propensities to inflate. To them, the problem is purely political and due to ‘Phillips Curve Illusion’ on the part of governments. They argue that a trade-off exists only between unemployment and inflation; thus, harmonisation of inflation rates for monetary integration poses only a problem of transition (Vaubel, 1978:320).

3.4.1.2.3 Loss of Seignorage Revenue

Another cost to individual member nations of an OCA is the loss of seignorage revenue. A country with fiscal problems cannot print new currency to finance its deficit without jeopardising the peg or, where there is a common currency, the value of the currency (Chipeta and Mkandawire, 1994; Berg and Borensztein, 2000; Mundell, 2000; Masson and Pattilo, 2003).

3.4.1.2.4 Eliminates Lender of Last Resort Option

An independent central bank, acting as a lender of last resort, has the autonomy to print domestic currency in order to funnel liquidity assistance on short notice to banks and other financial institutions in trouble. This prevents bank runs when there is a loss of confidence in the financial system. Such an institution is crucial in a system of banks with fractional reserves in order to reassure bank depositors and short-term creditors that their claims on the banks would be honoured if they attempt to liquidate them (Chang, 2000b:5). However, such an act conflicts with a commitment to fix the exchange rate and encourages speculators to attack the peg (Chang and Velasco, 2000).

This line of argument does not however apply to the OCA as a whole given that the exchange rates are fixed or rather disappear *within* the area, whereas the exchange rate between the common currency and currencies of countries *outside* the region need *not* be fixed. Thus, if the common currency is *not* bound to keep a fixed parity against international vehicle currencies such as the US dollar or the euro, then the regional central bank can stand ready to assist financial institutions experiencing a crisis without worrying about the exchange rate implications of liquidity assistance. This stance could also deter speculative attacks on the exchange rate (Chang, 2000a:19).

To summarise, an OCA should aim at maximising the benefits from permanently fixed exchange rates and minimising the costs. Nations, therefore, form a currency area in expectation that current and future benefits exceed costs. However, it is extremely difficult to measure the net benefits accruing to each member nation (Mongelli, 2008:7).

In general, an OCA is likely to be more beneficial under the following conditions: (1) greater mobility of resources among the member nations, (2) greater structural similarities, and (3) the more willing nations are to coordinate their fiscal, monetary and other policies (Salvatore, 2004: 714). These conditions make up the OCA criteria, which when present, make joining an OCA more advantageous to member nations than maintaining national currencies.

3.4.2 The Traditional OCA Theory

There has been minimal advancement in the OCA theory since the seminal works of Mundell (1961), Mckinnon (1963) and Kenen (1969) that introduced the traditional OCA criteria. Despite being advanced over 50 years ago, the OCA theory attracted much attention only in recent years due to the impetus provided by the debate over European monetary unification. The traditional OCA theory generally asserts that the stronger the linkages between member nations of an OCA, the greater the potential gains to be realised (Bayoumi and Eichengreen (1997:762).

Furthermore, the literature stipulates that the presence of the OCA criteria make the adjustment of the exchange rates between the national currencies unnecessary as an absorption mechanism when member nations are exposed to shocks. This would therefore, minimise the costs of joining an OCA (Araujo and Leon, 2003:149). The subsections below review the early OCA criteria and the criticisms raised on them.

3.4.2.1 A High Degree of Factor Mobility

A foundation of the OCA literature was already present in Friedman (1953) who makes an argument for the need for flexibility in nominal prices and wages between and within countries, which reduces the need for nominal exchange rate adjustments. Friedman (1953) points out that in such an environment, the transition towards adjustment following a shock is less likely to be associated with sustained unemployment in one country and/or inflation in another. However, nominal wages and prices are normally rigid downwards and thus, are not

a reliable adjustment mechanism. As such, adjustment may require flexibility in the exchange rate.

However, an OCA maintains permanently fixed exchange rates between member nations. Mundell (1961:661) therefore, suggests that the costs of an OCA are minimised when factors of production (especially labour) can move freely within the area. The argument is that if productivity or other shocks affect one nation/ region, resulting in a decline in its output and real wages, factors of production may migrate to places of excess demand within the currency area. The movement of factors of production avoids the need to adopt distinct monetary policies by individual countries when shocks affect member countries differently.

However, Horvath and Komarek (2002:11) note that labour may not be as flexible in practice as is predicted by Mundell (1961). Economic agents face strong information barriers such as the duration of a crisis; as such, they will not be quick to relocate to places of high demand in response to an economic shock. In addition, there are high costs associated with migration. Thus, there may not be sufficient labour migration to bring the countries back to equilibrium. Chipeta and Mkandawire (1994:15) further note that factors such as formal immigration restrictions, social services and pensions that are not available to migrants, and language and cultural differences hinder the mobility of labour, especially in developing countries.

The costs of giving up the exchange rate as a policy instrument are reduced further when there is free mobility of capital within the region. For example, if there is a temporary shift in demand from one union member to another, a high degree of capital mobility facilitates the financing of the transitory current account deficit in the former nation. The deficit nation can either borrow from the surplus nation or de-cumulate net foreign assets that can be reverted when the effects of the shock are over. This process acts as a partial substitute for an exchange rate adjustment (Mundell, 1961; Arroyo, 2003; Mongelli, 2008).

In addition, free capital mobility ensures that the slightest difference in interest rates induces equilibrating capital movements across partner countries thus, easing the financing of external imbalances and fostering an efficient allocation of resources (Mongelli, 2008:6). Furthermore, free capital mobility ensures that in the short-run, banks in the negatively affected nation can sustain the purchasing power of their customers with loans obtained through short-term borrowing via inter-branch and inter-bank transfers, or from the integrated

capital market. Similarly, firms in the deficit nation that are divisions of firms located in the surplus nation can borrow from their parent companies. The two processes enable the ease of inter-regional payments adjustment (Arroyo, 2003: 86).

However, Mongelli (2008:6) notes that capital mobility should not be a substitute for a permanent adjustment when necessary because it only serves to facilitate the adjustment process in the short term. The temporary capital flows may induce a postponement of real adjustment and render it more difficult at a later stage, or even result in a destabilisation of capital movements.

3.4.2.2 A High Degree of Trade Openness

The weight of tradable goods in the cost of living is high in open economies hence; the exchange rate has a significant impact on the cost of living. Any changes in the exchange rate are transmitted more rapidly to the price of tradables and hence, the domestic cost of living. As such, consumers tend to be very aware of changes in the exchange rate and therefore, there is little money and/or exchange rate illusion by wage earners. As a result, nominal wages and prices tend to react quickly to a devaluation of the currency, making it less effective (McKinnon, 1963; Arroyo, 2003).

Thus, the advantages of fixed exchange rates increase with economic openness, while those of flexible rates decline (Frankel and Rose, 1996:14). McKinnon (1963:7) therefore, notes that a high degree of trade openness prior to forming an OCA increases the benefits and reduces the costs of doing away with the exchange rate as an adjustment tool.

3.4.2.3 A High Degree of Product Diversification

Kenen (1969) notes that nations ought to have highly diversified economies prior to forming an OCA; product diversification ensures that an economy has a degree of insulation against a variety of shocks. If a nation that produces a variety of goods were hit by a shock, the subsequent changes in the prices of the goods would also vary differently. Hence, if the shock is specific to a good or industry, there is a possibility that the economy as a whole will not be as adversely affected as that particular good or industry (Araujo and Leon, 2003:150).

Similarly, if trade between members of an OCA is highly diversified, the law of large numbers implies that the probability and the size of changes in each country's terms of trade

is reduced when hit by an economic shock (Vaubel, 1978; Bayoumi and Ostry, 1995). Analogously, if two nations have different but specialised productive sectors, the effect of economic shocks on each of these economies tends to be more asymmetrical (Araujo and Leon, 2003:150). Thus, *ceteris paribus*, more diversified economies are likely to face less frequent terms of trade shifts and therefore, have less need for frequent changes in the exchange rate for macroeconomic adjustment (Kenen, 1969; Vaubel, 1978; Chipeta and Mkandawire, 1994; Bayoumi and Ostry, 1995; Araujo and Leon, 2003).

3.4.2.4 Trade Interdependence

The traditional OCA criteria were extended over time to include the trade interdependence criterion, which requires that nations wishing to form an OCA trade highly with one another. A high degree of trade interdependence in a group of countries increases the incentives for them to stabilise their exchange rates including, by using a common currency.

If an area trades extensively with an external partner (or other countries using its currency), its combined share of trade with the external partner and intra-area trade may be high enough to justify the adoption of the partner's currency even though intra-regional trade might be too low for the region to adopt a common currency. However, this is only feasible if the trading partner issues a strong and stable currency (Arroyo, 2003:109).

3.4.2.5 Weaknesses in the Early OCA Theory

A major weakness in the traditional OCA theory is that the boundaries of states rarely coincide exactly with optimum currency areas. Similarly, changes in boundaries that cause changes in currency domains rarely reflect shifts in optimum currency areas (Goodhart, 1995:452).

Another drawback of this string of literature is that the OCA properties were difficult to reconcile due to the lack of a unifying framework and the unclear empirical content of most properties (Tavlas, 1994; Mongelli, 2002). This limitation is referred to as the “*problem of inconclusiveness*” of the traditional OCA criteria. An evaluation of an OCA based on selected criteria may give different recommendations as to where borders can be drawn for a currency area. For example, a country might be quite open in terms of reciprocal trade with a group of partner countries. This may suggest that a fixed exchange rate regime, or even a currency union, would be preferable for that country and its main trading partners. However,

the same country might display a low mobility of factors of production *vis-à-vis* these trading partners, suggesting instead that a flexible exchange rate arrangement might be desirable.

The traditional OCA theory is also criticised for the “*problem of inconsistency*” in the criteria for determining an OCA. For example, the openness criterion and the diversification in production criterion exhibit an inconsistency when considered together. The openness criterion recommends a fixed exchange rate system or monetary integration between small open economies and their main trading partners. However, based on the diversification in production criterion, the same small economies are more likely to be less differentiated in production than larger ones. Hence, a flexible exchange rate system would be more appropriate between them (Tavlas, 1994).

3.4.3 The Reconciliation Phase

This phase of the development of the OCA theory moved away from the analysis of the OCA criterion, which may be inconclusive, to the analysis of the costs and benefits of monetary integration. Authors such as Corden (1972), Ishiyama (1975), and Tower and Willet (1976) analysed the costs and benefits of an OCA.

Ishiyama (1975) notes that OCAs cannot be defined based on a single property and thus, each country needs to weigh the pros and cons of being a member of an OCA *from the point of view of its own self-interest and welfare*. Differences in wage increases and inflation rates due to different social preferences and conflicting national demand management policies may be more important than several other OCA properties, such as differences in exposure to micro-shocks (most of which are temporary).

Furthermore, the loss of autonomy over monetary and exchange rate policy in an OCA implies forsaking national *expenditure switching policies* (that is, changes in the exchange rate in the form of a devaluation or a revaluation)³⁵. To the extent that nominal prices and wages are rigid downwards, the loss of exchange rate policy therefore, implies a cost to a nation.

³⁵ For example, a devaluation switches expenditures from foreign to domestic commodities and can be used to correct a deficit in the nation's BoP (Salvatore, 2004: 626).

A nation that experiences an adverse demand shock to its exports will need to rely on *expenditure absorption policies* (such as fiscal tightening or expansion) to restore equilibrium. The nation would also need to rely on changes in the *real* exchange rate, which are brought about by flexibility in nominal prices and wages in the presence of some shocks and imbalances. Flexibility in nominal prices and wages in turn reduces the amount of absorption policy required. Therefore, there is a trade-off between real exchange rate flexibility (which is market based and operates rapidly) and the amount of expenditure absorption policy (which is less rapid) (Corden, 1972; Mongelli, 2002).

Weaknesses in the early OCA theory led to the revaluation of the properties and the introduction of a “meta-property”, the requirement of a similarity in shocks and business cycles. This property is also referred to as the “catch all” OCA property because it captures the interaction between several OCA properties (Mongelli, 2002:9) and is presented below.

3.4.3.1 Similarity of Shocks and Business Cycles

The “catch all” OCA property states that countries exposed to similar shocks or possessing mechanisms for the absorption of asymmetric shocks may find it optimal to form an OCA. To elaborate, if the incidence of supply and demand shocks and the speed with which individual economies adjust (taking into consideration the policy responses) are similar across partner countries, then the need for monetary policy autonomy is reduced and the cost of losing direct control over the nominal exchange rate is reduced. In other words, countries whose output and prices vary together are likely to experience the least costs of losing autonomy over their exchange rates (Bayoumi and Eichengreen, 1994; Trautwein, 2004; Bayoumi and Ostry, 1995; Mongelli, 2008).

In reconciling the traditional OCA properties, the “meta-property” states that shocks to the economies of member nations are likely to be symmetric and business cycles synchronous when trade between them is intensive and largely intra-industrial. In such circumstances, the benefits of an OCA are likely to outweigh the costs and individual countries can afford not to use the exchange rate as a shock absorber. If, on the other hand, trade is intensive but largely inter-industrial, the costs of monetary integration are likely to outweigh the benefits, unless wage and price flexibility, factor mobility, fiscal transfers and/or other alternative adjustment mechanisms are strong enough to replace exchange rate variability as shock absorbers (Trautwein, 2004:3).

3.4.4 The Reassessment Phase

This phase in the development of the OCA theory witnessed the crumbling of the analytical framework behind the theory. Literature that emerged during this period determined that there is no ready-to-use theory for assessing the costs and benefits of economic and monetary union. Several economists disputed the perceived greatest cost associated with monetary integration, *viz*, the loss of monetary policy independence. Some economists argued that, to the extent that monetary policy is not implemented properly as a stabilisation tool, the loss of monetary policy independence was not a substantial cost³⁶.

Other economists argue that even countries facing similar shocks may require different policy responses due to differences in their initial economic positions, degree of price and wage flexibility, tax structures, trade responsiveness and preferences. Similarly, individual nations may have different preferences for inflation and may be worse off by forming an OCA (Mongelli, 2002:15).

Furthermore, some economists argue that countries do not necessarily need to have similar inflation rates before forming an OCA. A country that is prone to high inflation and breaking low inflation promises can immediately gain a low-inflation credibility by joining a monetary union with a country with a strong reputation for fighting inflation, which would effectively set monetary policy for the union. Therefore, there are fewer costs (in terms of loss of monetary policy independence) and more benefits (in terms of credibility gains) of monetary integration for a high-inflation country³⁷ (Giavazzi and Giovannini, 1989; Goodhart, 1989; Rogoff, 1996).

Lastly, others argue that differences in labour market institutions could lead to divergent developments in wages and prices, even in the presence of similar shocks. The degree of centralisation of wage bargaining determines the extent to which supply shocks affect economic activity. The more centralised wage bargaining is, the more internalised will be the inflationary effects of wage increases and hence, changes in real wages will be contained and

³⁶ See for example Bayoumi and Eichengreen (1994), Guillaume and Stasavage (1999), Calvo and Reinhart, (2002), Masson and Patillo (2004), Balogun (2007), and Corsetti (2008).

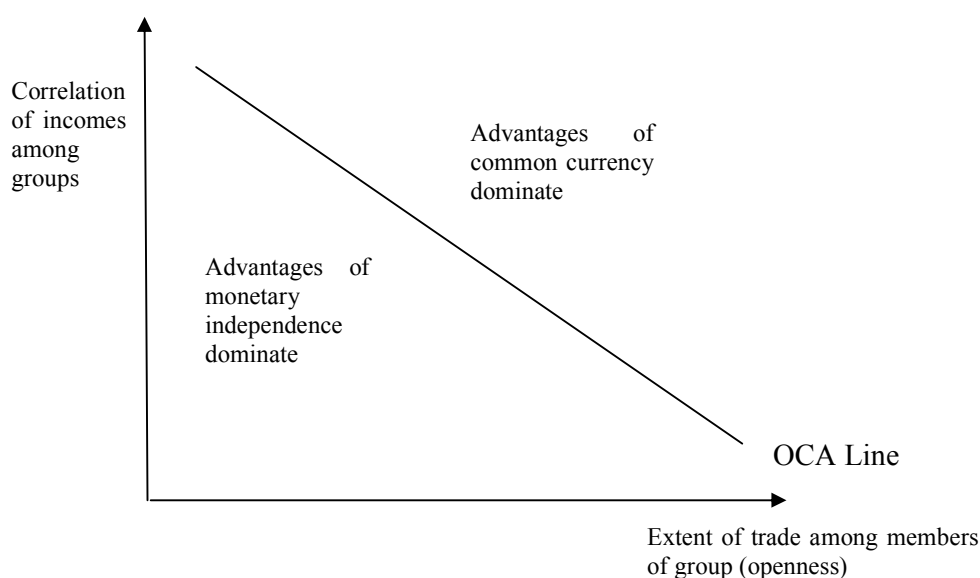
³⁷ The condition requiring a similarity in inflation in member countries would thus, be met *ex post*.

the negative supply shocks will have a shorter duration. Therefore, negative supply shocks will be less disruptive to economic activity (Bruno and Sachs, 1985; De Grauwe, 2000).

3.4.5 Specialisation *versus* Endogeneity Of OCA Criteria

According to Frankel (1999), countries sharing a high level of either reciprocal trade (i.e., high degree of openness) or income correlation³⁸, but preferably both properties, will find it beneficial to have a common currency. Figure 3.3 below illustrates the trade off between these two properties, using a downward sloping OCA line.

Figure 3.3: Two Key OCA Properties



Source: Frankel (1999)

The graph shows the combination of openness and correlation of incomes beyond which the advantages from a common currency would dominate for a group of partner countries. Below the OCA line, the advantages from monetary independence dominate.

There is a consensus in literature that reciprocal trade and income correlations increase among members of an OCA in response to a reduction in transportation costs and volatility in the exchange rate. However, there is disagreement concerning the extent to which these properties change. There are two opposite paradigms, with two different implications; the

³⁸ This criterion captures diverse other properties over time.

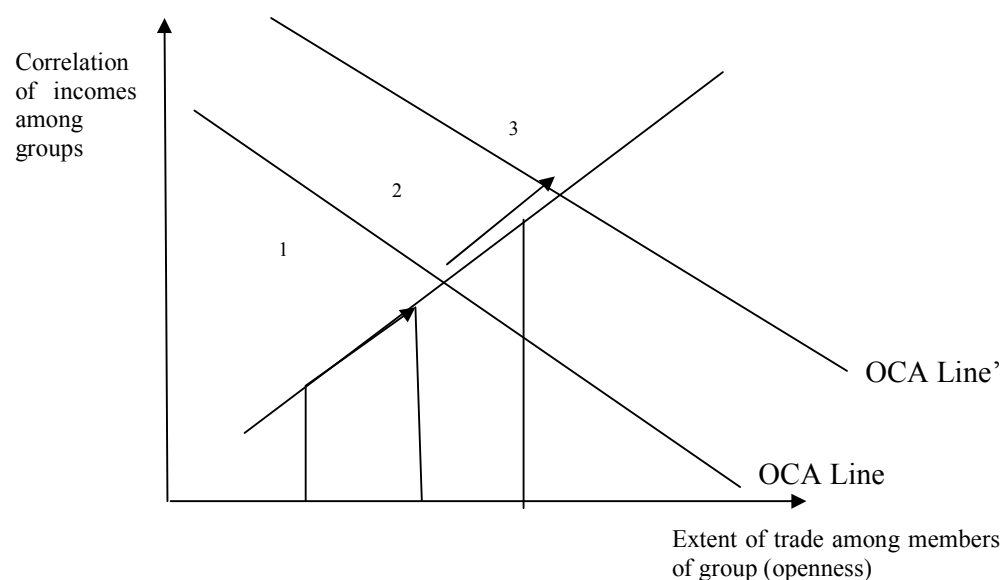
Endogeneity of OCA Hypothesis, which states that there is a positive link between income correlation and trade integration, and the *Krugman Specialisation Hypothesis*, which postulates that trade integration results in specialisation in production, which in turn leads to less diversified economies. These hypotheses are discussed below.

3.4.5.1 Endogeneity of OCA Hypothesis

The traditional OCA theory is criticised for assuming that a country's structural characteristics remain unaltered following monetary integration. Some economists point out that an OCA may inherently trigger changes in the structure of the member economies that will facilitate meeting the OCA criteria. They argue that regardless of the stage of development and economic structures, monetary integration can deepen intra-regional trade, economic and financial integration, as well as business cycle synchronisation among member nations (Frankel and Rose, 1996; Frankel, 1999; Rose, 2000; Horvath and Komarek, 2002; Arroyo, 2003; Carrere, 2004; Balogun, 2008; Mongelli, 2008).

When countries deliberately link their national currencies to those of some of their most important trading partners, there is an increased propensity of partner countries to import from each other due to the elimination of exchange rate volatility. Similarly, their monetary policies become closely-linked due to the disciplining effect of the monetary and exchange rate arrangement. This could *result* in high trade and income linkages between member nations rather than the linkages arising from an aspect of economic structure that is invariant to exchange rate regimes (Frankel and Rose, 1996:25). The endogeneity of OCA hypothesis is illustrated using Figure 3.4 below.

Figure 3.4: Endogeneity of OCA



Source: Frankel and Rose (1996)

Figure 3.4 depicts an example with two possible scenarios for a group of countries that starts at area 1, on the left of the OCA line as independent states. In the first scenario, we assume that production in these countries is fairly diversified and they share similar shocks and preferences for low inflation, their economies are quite open, they share high price and wage flexibility and labour mobility, and they share some forms of fiscal integration. If these countries form a “union”, e.g. the EU, both trade integration and income correlations are likely to rise, and they will gradually move to area 2. If the countries were to form a currency area, such as the European economic and monetary union (EMU), the extent of trade integration and income correlations will increase even further and they will end up at area 3, which is beyond the OCA line. Net positive benefits are expected from the EMU.

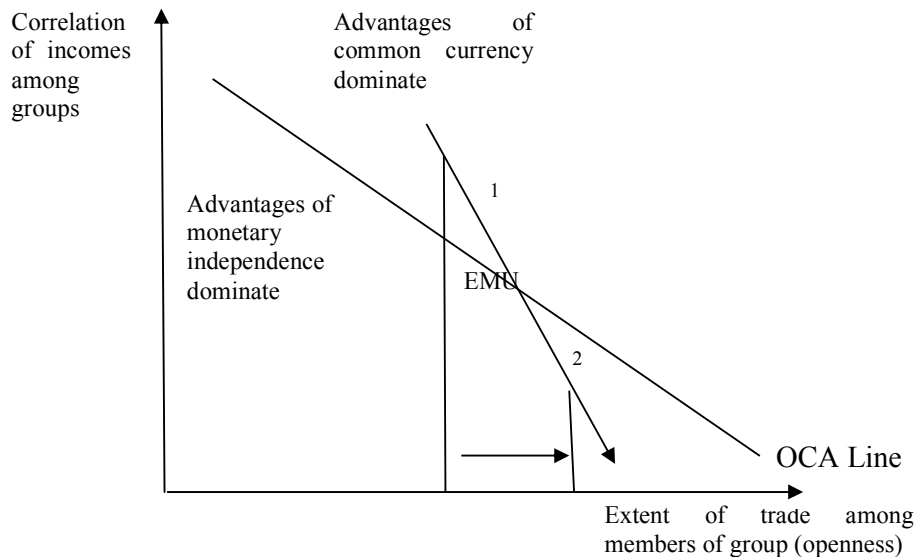
The endogeneity of OCA hypothesis, therefore, implies that if a country fails to meet the OCA criteria *ex ante* but manage to *ex post* it could still join an EMU. However, for a group of countries (such as in the second scenario) that score poorly on the OCA criteria mentioned above, they should wait before monetary unification. The relevant OCA line for this group of countries may be further to the right, such as *OCA Line'* (Mongelli, 2008:29).

3.4.5.2 The Specialisation Hypothesis

The specialisation hypothesis is rooted in trade theory and economies of scale, which postulate that as countries become more integrated (and their openness rises) when they share

a common currency, they will also specialise in the production of those goods for which they have comparative advantage. Hence, members of a currency area will become less diversified and more vulnerable to supply shocks. Similarly, their incomes will become less correlated (Krugman, 1993; Mongelli 2008). The specialisation hypothesis is illustrated in Figure 3.5 below.

Figure 3.5: The Effects of Specialisation



Source: Mongelli (2008:29)

Figure 3.5 depicts the effects of monetary integration on a group of countries, which are initially above the OCA line at area 1. An increase in integration among the countries due to sharing a single currency will move a member nation from area 1 to area 2 (more openness less correlation). Hence, a region may fail to meet the OCA criteria *ex post* even if it met them *ex ante*.

A paradox therefore arises concerning the effects of monetary integration on a group of countries. If the crucial aspect is diversification, then the countries can resolve the problem by expanding the domain of an OCA since larger geographical entities are more diversified. If, however, the countries are not sufficiently diversified, then they should not share a common currency. Instead, they should break up into smaller currency areas whose exchange rates float against each other. However, this will result in even less diversified units, which will break up into even smaller entities. This process will continue until the world comprises

fully specialised individuals. This presents an unstable system with no interior solution. However, such a paradox does not exist in reality (Frankel, 1999).

3.4.5.3 Exogeneity of OCA Properties

There is an emerging hypothesis that the OCA properties may be *exogenous* to some countries. The theory asserts that members of a union that score below others (or below a certain benchmark) for some OCA criteria could experience more peer pressure to undertake structural reforms in order to improve their performance. The pressure comes from institutional forces.

For example, within the European countries, the execution of the three stages of EMU and in particular, the run-up to the launch of the euro intensified ongoing structural reforms, such as those fostered and monitored by the European Commission, the European central bank, the Organisation for Economic Co-operation and Development (OECD) and other organisations. Studies conducted on EU integration found a causal link between institutional integration and economic integration (proxied by trade deepening). In particular, it was determined that institutional integration granger-caused economic integration, while at the same time economic integration also granger-caused institutional integration (but with a lower intensity) (Mongelli, 2008:18).

3.5 AN ALTERNATIVE CONSIDERATION TO MONETARY INTEGRATION

The theory of optimum currency areas (OCAs) postulates that countries with large asymmetric shocks are poor candidates for forming a monetary union because they require monetary policy autonomy for macroeconomic stabilisation. However, in economies where independent monetary policies have not been effective in determining macroeconomic performance indicators, literature suggests that the countries would be better off surrendering monetary policy to a regional authority (Bayoumi and Eichengreen, 1994; Guillaume and Stasavage, 1999; Masson and Patillo, 2004; Balogun, 2007; and Corsetti, 2008).

Some arguments for surrendering policy autonomy include restraining monetary authorities that misuse national monetary policy rather than employ it to facilitate domestic stabilisation,

e.g. using monetary policy to monetise public debt (which is inflationary³⁹), would be better off surrendering monetary policy to a regional authority.

There are circumstances whereby the misuse of national monetary policy results in asymmetric demand shocks between countries. In such cases, monetary unification with other countries less prone to such pressures may be beneficial to the profligate countries as they would be required to surrender policy autonomy to a supra-national body that would practice prudent monetary policy. The countries would therefore, not require autonomy over demand-management instruments to offset the demand shocks (Bayoumi and Eichengreen, 1994:7).

In economies where money is neutral, monetary policy is ineffective in offsetting domestic disturbances. Hence, even if countries experience large, asymmetric shocks, the use of domestic monetary policy may not facilitate stabilisation. Thus, such countries do not stand to lose out by surrendering national monetary policy to a regional authority.

In addition, structural factors such as a high degree of specialisation in production between the countries (which is associated with asymmetric shocks and favours flexible exchange rates) may influence the nature of disturbance between countries wishing to form a monetary union. However, flexible exchange rates imply that the rate fluctuates each time there are changes in the market for its dominant export commodity, thus subjecting consumers to fluctuations in their purchasing power. The consumers would, therefore prefer a fixed exchange rate system or monetary integration, which would insure their purchasing power (Kenen, 1969; Bayoumi and Eichengreen, 1994; Chipeta and Mkandawire, 1994; and Araujo and Leon, 2003).

Flexible exchange rates present additional problems in developing countries where other factors such as political instability can greatly increase the likelihood that a country will devalue its currency independently of whether economic considerations warrant such a move. In addition, few of these countries have political institutions characterised by significant checks and balances to hinder the reversal of legal central bank independence. Thus,

³⁹ See the discussion on the arguments for fixed exchange rate systems in Section 3.2.2.3 of Chapter 3. This was the instance in Zimbabwe in the early 2000s when the monetisation of the fiscal deficit led to hyperinflation.

participation in international arrangements may be the most effective way to promote credibility (Guillaume and Stasavage, 1999; Baqueiro *et. al*, 2003).

There are extreme cases where an environment of low credibility simply results in a devaluation-inflation spiral. For instance, when a nation is hit by a negative supply shock, it may prompt the monetary authorities to devalue the exchange rate in an attempt to regain international competitiveness. However, devaluation increases both the domestic-currency price of imported final goods as well as imported inputs and hence, puts upward pressure on domestic prices. If domestic inflation is largely determined by import prices and the exchange rate, the increase in prices could outweigh the effect of the initial improvement in competitiveness, thereby prompting policymakers to devalue again.

The accommodation of the monetary authorities to maintain a target level of income or employment following the supply shock is a crucial contributing factor to the devaluation-inflation spiral. If the quantity of money were kept stable, forces are released that bring the movements of prices and of the exchange rate to a standstill and adjust prices and rates of exchange to one another, as asserted by the theory of purchasing power parity.

However, in an environment of low credibility or where money supply reacts passively to any inflationary pressures, it is possible for exchange rate depreciation to play a key role in sustaining the inflationary spiral regardless of whether the process is actually initiated by internal rather than external factors. The expansion in money supply would result in an increase in demand, which in turn would lead to a further increase in prices and an appreciation in the real exchange rate. Thus, further inducing a depreciation in the nominal exchange rate. The process could end up turning into a devaluation-inflation spiral⁴⁰ (Dornbusch, 1988; Chhibber and Shafik, 1990; Burdekin and Burkett, 1996; and Nindi, 2007).

⁴⁰ This was the case during the German and Zimbabwean hyperinflations in the early 1990s and 2000s respectively.

Lastly, the option to retain fiscal policy autonomy may entice countries that value policy autonomy to join a monetary union⁴¹. However, fiscal policy may be an imperfect substitute for monetary policy given that its effects take longer to impact on the economy. Furthermore, there is a possibility that some union members may free-ride on other countries by issuing debt beyond their ability to service it hence, forcing other members to bail them out (Bayoumi and Eichengreen, 1994:7)⁴². This however, can be avoided by adopting regulations that limit the fiscal autonomy of member countries, such as the arrangement under the CFA franc zone and the stability and growth pact (SGP) of the Eurozone⁴³.

Accordingly, an alternative approach to evaluating the desirability of monetary integration has been suggested that is based on the assumption that countries would weigh the advantages of maintaining monetary policy independence against the costs of surrendering autonomy to a regional authority. If it is ascertained that independent monetary policies have not been effective in determining macroeconomic performance indicators, the implication is that the concerned countries would be better off surrendering monetary policy autonomy to a regional authority (Guillaume and Stasavage, 1999; Masson and Patillo, 2004; Balogun, 2007; Corsetti, 2008).

3.5.1 The Theory of Dollarisation

Literature suggests that dollarisation may provide an alternative to monetary integration in some developing countries⁴⁴. Small countries tend to adopt the currency of a larger, more stable country to benefit from its fiscal discipline and gain monetary policy credibility. Dollarisation, especially when carried out through a Treaty with the anchor country, has the advantage of effectively lowering uncertainty in the small countries and increasing both the predictability and credibility of monetary policy. This is because dollarisation signals more than just the adoption of a foreign currency, but also an irreversible commitment towards low

⁴¹ This is the case in the United States, where state and local governments can accumulate large fiscal deficits in periods of recessions.

⁴² The EU countries are currently experiencing a similar problem with the sovereign debt crisis.

⁴³ This is discussed in Section 3.8.

⁴⁴ See Masson and Pattilo (2003); Buiguit and Valev (2005); Aziakpono *et. al* (2007); and Johns (2009) for discussions relevant to SADC countries, and Calvo (1999); Berg and Borensztein (2000); Schmitt-Grohé and Uribe (2000); and Araujo and Leon (2003) among others for discussions relevant to Latin American countries.

inflation, price stability, fiscal responsibility and transparency (Calvo, 1999; Berg and Borensztein, 2000; Chang, 2000b; Araujo and Leon, 2003; Masson and Pattilo, 2003).

In countries experiencing rapid inflation, individuals tend to switch their currency holdings to a stronger, more stable currency to protect themselves against the loss of purchasing power. This is known as unofficial dollarisation. In some instances, the governments of these countries validate unofficial dollarisation by allowing residents to open bank accounts denominated in the foreign currency and by including the currency in circulation and in their own monetary statistics (Chang, 2000b:2). The subsections below review the advantages and disadvantages of dollarisation. This is followed by a comparison between dollarisation and monetary integration.

3.5.1.1 Advantages of Dollarisation

The advantages of dollarisation are discussed in the subsections below, some of which are similar to those of monetary integration.

3.5.1.1.1 Elimination of Risk Premia

According to Berg and Borensztein (2000:5), the elimination of currency risk that comes with dollarisation reduces country risk premia, which in turn results in a reduction in interest rates. The interest rates in developing countries tend to be embedded with premia that cater for exchange rate, devaluation, currency and in some countries, sovereign or default risks. By doing away with the use of the domestic currency, dollarisation eliminates the risk of currency devaluation. As such, there is a possibility that the cost of foreign credit would be reduced and thus, stimulate investment and economic growth⁴⁵ (Chang, 2000b:8).

The stability in the exchange rate due to dollarisation increases investor confidence, which in turn would secure more stable capital inflows (Berg and Borensztein, 2000:5). Similarly, exchange rate stability results in reduced costs of borrowing, which combined with more stable capital inflows, would result in lower fiscal costs of servicing the public debt and, in a higher level of investment and growth (Araujo and Leon, 2003:155).

⁴⁵ However, for those borrowers that previously opted to take out loans in domestic currency who would now be forced to borrow in foreign currency, dollarisation would be costly.

Dollarisation also eliminates the risk of currency crises, which can be a major source of financial instability, especially in countries with a large proportion of their bank assets and liabilities denominated in foreign currency. Currency crises can have devastating effects on the economy, for example the incidence of recessions experienced by Mexico in 1995 and Asian countries in 1998 (Berg and Borensztein, 2000:13)⁴⁶.

Sovereign risk reflects the possibility of a developing country's default on its foreign debt, either by government on official debt or domestic residents on their individual obligations. There are several ways through which sovereign risk may be reduced, firstly the elimination of the devaluation risk eliminates the risk of currency mismatch in assets (which are usually denominated in domestic currency) and liabilities (which are usually denominated in foreign currency), and thus leads to a reduction in default risk. Secondly, dollarisation eliminates the use of capital controls to defend the value of the domestic currency, which may force domestic borrowers to default on their foreign debts (Chang, 2000b:8).

Dollarisation may eliminate exchange rate, currency and devaluation risks but the sovereign/default risk may persist (Berg and Borensztein, 2000:13). Eliminating devaluations prevents the central bank from acting as lender of last resort to domestic banks. This implies that if domestic banks have foreign debts, there is a possibility of bank runs and therefore, sovereign risk would increase (Chang, 2000b:8). Similarly, the elimination of devaluations means that the domestic economy cannot benefit from the expansionary economic effects of devaluation, which could possibly improve fiscal revenue and thus, reduce default risk. Despite these possibilities, interest rates would still decline in response to the elimination of the other risks (Berg and Borensztein, 2000:13).

3.5.1.1.2 Stability and Integration

Dollarisation signals more than just the adoption of a foreign currency, but also signals an irreversible commitment towards low inflation, price stability, fiscal responsibility and transparency (Calvo, 1999; Berg and Borensztein, 2000; Araujo and Leon, 2003). In addition, dollarisation promotes closer economic and financial integration with the anchor country and

⁴⁶In the case of SADC countries, the effects of a currency crisis are observable in the recent economic collapse in Zimbabwe.

the global economy as a whole. It leads to greater integration in trade volumes and price levels and thus in the goods markets of the dollarised economies and the anchor country. This in turn would accelerate the rate of income convergence of these economies (Berg and Borensztein, 2000:5).

The elimination of currency risk strengthens the soundness of the financial systems of the dollarised economies, making them more attractive to the rest of the world and thus, strengthening their integration with international financial markets. In addition, dollarisation makes the imposition of capital controls more difficult as it would be possible to convert all assets to hard cash. This would therefore, make financial integration much easier and insulation of the domestic financial institution more difficult (Berg and Borensztein, 2000:15)⁴⁷.

3.5.1.1.3 Elimination of Economic Contagion

Developing countries are highly vulnerable to external factors, hence the prevalence of economic contagion. According to Calvo (1999:2), imperfect information, especially information about the macro-economy and the financial sector, is the leading cause of contagion in developing countries. These countries cannot afford the costs of information gathering and monitoring of macroeconomic variables. Furthermore, some of these countries are also characterised by frequent government intervention, which increases uncertainties about economic performance in the face of regime changes and in the extreme case, economic collapse.

Dollarisation offers a solution to these problems. Given that once dollarised the small country adopts the monetary policy of the anchor country, dollarisation would effectively increase its size and thus lower uncertainty and increase incentives to learn about its specific macroeconomic conditions (Calvo, 1999:2). Similarly, by eliminating exchange rate risk, dollarisation limits the incidence and magnitude of crises and contagion (Berg and Borensztein, 2000:14).

⁴⁷ It is however difficult to quantify these effects, especially for the factors that require institutional changes in response to greater financial integration.

However, dollarisation does not eliminate the risk of contagion due to external crises. As such, investors may still flee due to problems of sustainability of the domestic fiscal position or the soundness of the financial system arising from external crises. Similarly, large swings in capital flows from abroad may cause fluctuations in the business cycles of developing countries even when they do not involve balance of payments crises, thus causing investors to flee (Berg and Borensztein, 2000:13).

3.5.1.2 Disadvantages of Dollarisation

The disadvantages associated with dollarisation are discussed in the subsections below, some of which are similar to the disadvantages of monetary integration.

3.5.1.2.1 Loss of Seignorage Revenue

One of the main costs associated with dollarisation is the loss of seignorage revenue for the dollarised economy. When a country adopts a currency of another country, the stream of its seignorage revenue will flow to the central bank of the anchor country. The magnitude of the loss of seignorage revenue depends on the ability of the dollarised state to negotiate a revenue-sharing agreement with the anchor country (Schmitt-Grohé and Uribe, 2000; Berg and Borensztein, 2000; Chang, 2000b).

Dollarisation carries two implicit costs to the domestic monetary authorities, the “stock” and “flow” costs. The “stock” cost (which is incurred at the onset of a dollarised system) is due to the need for the domestic monetary authorities to “purchase” the stock of the national currency held by the public and banks in order to withdraw the currency from circulation and replace it with the foreign currency. This process would effectively return all the seignorage that had accrued over the years to the consumers and banks hence, the monetary authorities give up the revenue (Berg and Borensztein, 2000; Chang, 2000b).

Most developing countries are however, unlikely to have sufficient foreign currency reserves at the time of dollarisation to purchase all the domestic currency in circulation. If the country were credit constrained and cannot borrow the funds, it would have to generate current account surpluses to accumulate them. However, if the optimal policy of the country entails running current deficits, then it would have to forego substantial amounts of investments in order to generate surpluses. Similarly, even if the country were able to borrow the required foreign currency, it would substantially increase the amount of its external debt. This may

increase its risk of debt crisis hence; its risk premium will increase and thus result in an increase in domestic interest rates (Berg and Borensztein, 2000:17).

The “flow” cost is implicit in the nature of dollarisation. By adopting a foreign currency, monetary authorities would no longer be able to print new currency to satisfy any increases in domestic money demand and hence, they lose the “flow” of future revenue earnings from seignorage (Berg and Borensztein, 2000:15). Flow seignorage refers to the amount of resources that the dollarised economy would have to transfer to the anchor country annually to receive the foreign currency (Chang, 2000b:4).

However, the loss in seignorage revenue is only from the inability of monetary authorities to print new currency; it would still be possible to earn seignorage revenue from reserve requirements on banks (Berg and Borensztein, 2000:15). According to Chang (2000b:5), the loss in seignorage revenue may be beneficial in cases where it forces irresponsible governments of the dollarised states to choose sound policies.

3.5.1.2.2 Loss of Monetary Policy Autonomy

Dollarisation implies relinquishing domestic monetary and exchange rate policy to the anchor country. In situations where economic shocks affect the dollarised and anchor economies asymmetrically, the loss of autonomy over monetary policy may have potentially devastating effects for the dollarised economy (Schmitt-Grohé and Uribe, 2000; Berg and Borensztein 2000; Araujo and Leon, 2003).

The anchor country would formulate stabilisation policy to respond to the state of its business cycle (Schmitt-Grohé and Uribe, 2000:1). However, large shocks may require excessive exchange rate adjustments in the dollarised economy. Since devaluation of the exchange rate would not be possible, the dollarised economy may need to lower nominal wages and prices of certain goods, which may not be feasible in countries without causing a substantial recession, especially in economies with less flexible mobility in their labour markets⁴⁸. Similarly, such a prolonged deflation, if unplanned, would result in high real interest rates and large transfers from debtors to creditors. The rise in real interest rates would in turn limit

⁴⁸ This is the case in many developing countries.

the extent to which real interest rates are required to fall in order to stimulate domestic demand that is necessary to mitigate the decline in output (Berg and Borensztein, 2000:18).

3.5.1.2.3 Eliminates the “Exit Option”

In addition to eliminating the possibility of devaluing the national currencies, dollarisation makes it very difficult for the dollarised countries to exit from the arrangement due to the high cost of reintroducing the national currencies in the economy (Araujo and Leon, 2003:155). Reintroducing a national currency is likely to be a lengthy and complex process, particularly in cases where the new currency is weaker than the foreign currency it would be replacing. In addition, it would be difficult to replace a foreign currency in cases where a legal arrangement between the dollarised economy and the anchor country stands (Berg and Borensztein, 2000:18).

Due to the difficulty of exiting from a dollarisation system, countries that have introduced their own currencies did so under exceptional circumstances, such as at independence, and in most cases, they were replacing a weak, inconvertible currency rather than a strong one. Botswana is an example of a country that is an exception to this generalisation as it successfully managed to introduce its own currency in 1976 after existing from the Rand Monetary Arrangement (Berg and Borensztein, 2000:18).

3.5.1.2.4 Limits the Lender of Last Resort Function

An independent central bank, acting as a lender of last resort, has the autonomy to print money and thus, prevent bank runs when there is a loss of confidence in the financial system. Such an institution is crucial in a system of banks with fractional reserves in order to reassure bank depositors and short-term creditors that their claims on the banks would be honoured if they attempt to liquidate them (Chang, 2000b:5). However, under dollarisation, the central bank loses the ability to inject liquidity into the financial system through money creation, and thus cannot serve as lender of last resort (Schmitt-Grohé and Uribe, 2000:1).

Although the central bank of a dollarised economy would not be able to perform the role of lender of last resort, there are alternative ways of fulfilling this role. The monetary authorities could create a *stabilisation fund* to provide short-term liquidity in the economy or assistance

to small banks in crisis (Berg and Borensztein, 2000:21). Alternatively, the government could secure contingent lines of credit from international banks⁴⁹ that could be drawn only in the event of a banking crisis (Chang, 2000b:6). Lastly, the authorities could sign a treaty with the anchor country for seigniorage sharing (Calvo, 1999:3).

However, the above options can neither guarantee the whole payments system nor back all bank deposits should a sudden bank run occur in the whole economy given that a dollarised economy does not have the ability to print money, which is the only way to guarantee that all claims in domestic currency are honoured (Berg and Borensztein, 2000:21).

3.5.2 Monetary Integration *versus* Dollarisation

The costs and benefits associated with either monetary integration or dollarisation are similar. Both monetary arrangements offer potential benefits of increasing credibility of monetary policy of the participating countries, instilling fiscal discipline, eliminating transaction costs as well as reducing risk and uncertainty in trade. Similarly, both arrangements are associated with the loss of monetary policy independence and seigniorage revenue by individual countries for domestic purposes. In addition, they limit the lender of last resort function of national central banks to prevent bank runs. However, there are distinct differences between the two monetary arrangements. A comparison between these arrangements is made below.

To begin with, monetary policy within a monetary union is determined collectively by member states and is implemented by the union central bank. Each member state has a say on the pace of monetary policy, which is determined through voting. On the other hand, monetary policy in a dollarised country is that of the anchor country. A dollarised state has no say in the pace of national monetary policy because by adopting a foreign currency, it effectively surrenders policy determination to the anchor country.

Members of a monetary union may have an agreement in place for sharing seigniorage revenue⁵⁰; while on the other hand, dollarisation does not guarantee such an agreement. However, it is possible for the anchor and dollarised economies to negotiate one through a

⁴⁹ Which are cheaper under dollarization because there would be no risk of devaluation-related bankruptcies.

⁵⁰ For example the arrangements within the EU and the CMA members.

treaty (Calvo, 1999; Schmitt-Grohé and Uribe, 2000; Berg and Borensztein, 2000; Chang, 2000b; Araujo and Leon, 2003).

In addition, the relationship between members of a monetary union is that of parity, with countries having the power to vote in the decision-making process. With dollarisation however, the relationship is that of hierarchy between the anchor and the dollarised countries (Schmitt-Grohé and Uribe, 2000; Berg and Borensztein, 2000; Araujo and Leon, 2003).

Monetary integration is sustainable as long as there is a hegemonic country or related ties and commitments among the participating states, which can influence each member to stick to the monetary arrangement. On the other hand, dollarisation may be unsustainable if the anchor country establishes an agreement for seignorage sharing, in order to compensate the dollarised country against political risks (Araujo and Leon, 2003:158).

Lastly, monetary integration provides a lesser commitment to price stability than dollarisation because it allows devaluation of the common currency to correct for external imbalances (Araujo and Leon, 2003:158). A dollarised economy, on the other hand, may be powerless to respond to external shocks that are asymmetric to the anchor country, particularly because of the high cost of later reverting to a more flexible regime (Schmitt-Grohé and Uribe, 2000; Berg and Borensztein 2000; Araujo and Leon, 2003).

On the other hand, dollarisation provides large credibility gains because monetary policy is determined by the anchor country, which usually has a strong commitment towards low inflation (Chang, 2000b:10). In contrast, under a monetary integration arrangement, political pressure can be exerted by member countries to devalue. The more responsive the central bank is to political pressures, the weaker its commitment to price stability would be (Araujo and Leon, 2003:158).

3.6 CONVERGENCE IN MACROECONOMIC STABILITY INDICATORS

The Maastricht Treaty (1992) established by members of the EU set several macroeconomic convergence (MEC) criteria, which stipulate the maximum allowable levels of key macroeconomic indicators that have to do with fiscal discipline, as well as monetary and financial stability. The treaty aimed to centralise EU members' macroeconomic policies and to reduce exchange rate margins.

The treaty further set several conditions for joining the European Monetary Union (EMU) and included a detailed timetable for the adoption of a single currency. The underlying notion of convergence in macroeconomic stability indicators is that unless countries enter the union with similar inflation rates and fiscal positions, the single currency will be unsustainable (Wyplosz, 1997:6).

When the European Union introduced the Euro in 2002 not all member countries satisfied all the convergence criteria. Rossouw (2006:8) points out that such non-compliance did not put in jeopardy the continued existence of the European Union, the Euro as a single currency or the functioning of the European Central Bank. Thus, assessment of the continued progress towards the convergence criteria by participating countries is a better indication of a commitment to unification, rather than actual compliance at any given period in time. The convergence criteria therefore ought to be considered as goals that integrating countries should aim to achieve, even after monetary unification, rather than conditions that should always be applied, even before unification. The MEC criteria set by the EU countries are reviewed in the subsections below.

3.6.1 Inflation Rate

The inflation condition is one of three conditions that deal with monetary convergence. The EU set the prerequisite that each country had to have its inflation rates converging close to (not exceeding 1.5% of) the average rate of the three member nations with the lowest rate.

Large differences in economic growth, inflation rates, or budget deficits among members make monetary integration difficult. The argument is that a country suffering from rising inflation would be under pressure to devalue, which would make a fixed exchange rate arrangement difficult for such a country (Jenkins and Thomas, 1997:8). If member countries display persistent inflation differentials, the costs incurred by not employing the exchange rate as an adjustment tool for macroeconomic stabilisation will be larger than the benefits of monetary integration (Khamfula and Tesfayohannes, 2004:39).

The desirability of monetary union among a group of countries can be assessed by considering the degree of divergence in the inflation rates of the countries. Honohan and Lane (2003:4) note that divergent inflation rates are harmless if the variations are due to differing initial price levels of the countries. Thus, convergence towards a common price

level will entail divergent inflation rates in the interim. If countries have different baskets of goods, the basket average will differ even when individual prices are the same. Similarly, when the long-run relative price level across countries is a function of relative incomes, relative wealth levels or relative productivities, a faster growing country tends to have temporarily higher inflation in the transition to its new long-run equilibrium relative price level⁵¹. All these sources of inflation differentials are harmless to a monetary union.

Divergent inflation rates are a cause for concern when there is a possibility of non-convergence in the long term due to the possibility of sustained high inflation in some countries. For instance, transport costs and the border effect could be the cause of inflation differentials in a common market where tariffs, trade quotas and other informal trade barriers have been eliminated (Allington *et al*, 2004; Engel and Rogers, 2004). Studies such as Masson (2006), and Longo and Sekkat (2004) indicate that transport costs (partly because of poor infrastructure and conflict) are high in African countries.

Allington *et al* (2004:3) provide another explanation of the price dispersion in trading partners, suggesting that highly traded goods contain significant non-traded components that frustrate price convergence. The prices of finished goods incorporate the input costs such as rent, shipping costs, labour costs, and insurance premiums from non-traded goods. These factors may affect the prices of non-traded intermediate goods and hence, the degree of price dispersion for traded final goods⁵².

Inflation differentials are also a cause for concern if they are a reflection of underlying weak intra-regional adjustment mechanisms to shocks. In such a situation, the region will be characterised by frequent and prolonged relative price misalignments or alternating overheating and recession. For example, if there are short-run supply rigidities in the region, a positive aggregate demand disturbance will lead to an increase in domestic inflation and a real exchange rate change. Price misalignments imply that even the temporary price increases could trigger persistence mechanisms that continue to operate when the original shock has disappeared or supply responses have kicked in. In such a scenario, the countries would still

⁵¹ This is known as the Balassa-Samuelson hypothesis.

⁵² See also Honohan and Lane (2003:4).

face temporary asymmetric shocks to relative price levels from a variety of sources even when convergence occurs in the long run (Honohan and Lane, 2003:5).

Lastly, inflation differentials could persist if members of a monetary union trade at different levels with third countries. Countries that import a substantial amount of goods from outside the union may experience imported inflation if the exchange rate of the regional currency depreciates. Thus, countries that import from non-members would face higher inflation than those that import from member countries (Honohan and Lane, 2003:6).

3.6.2 Interest Rates

Long-term nominal interest rates on government debt must not exceed more than two points the average interest rate of the three countries with the lowest inflation rate. The inclusion of this criterion is a way of taking advantage of the forward-looking character of financial markets, because expectations about future inflation, exchange rates and fiscal policy are embodied in the interest rate premium (Jenkins and Thomas, 1997:8).

3.6.3 Exchange Rate

The average exchange rate must not fall by more than 2.25% of the average of the EMS for at least two years prior to joining the monetary union without any measures to stop the free flow of foreign exchange. This criterion was designed to rule out a last devaluation push immediately prior to full integration in order to gain a competitive advantage or to amortise excessive public debt (Jenkins and Thomas, 1997:8).

3.6.4 Deficit-to-GDP and Debt-to-GDP Ratios

The two ratios are inter-linked. Under the Maastricht Treaty, the EU requires that the deficit-to-GDP ratio for each country should not exceed 3%; while on the other hand, the public debt-to-GDP ratio should not exceed 60%. The argument is that budget deficits hinder stable exchange rates, which thus become a stumbling block on the path to an irreversible fixed exchange arrangement. Thus, there is a need to keep budget deficits at minimum levels. These convergence criteria, therefore effectively instil fiscal discipline throughout the union (Jenkins and Thomas, 1997:8).

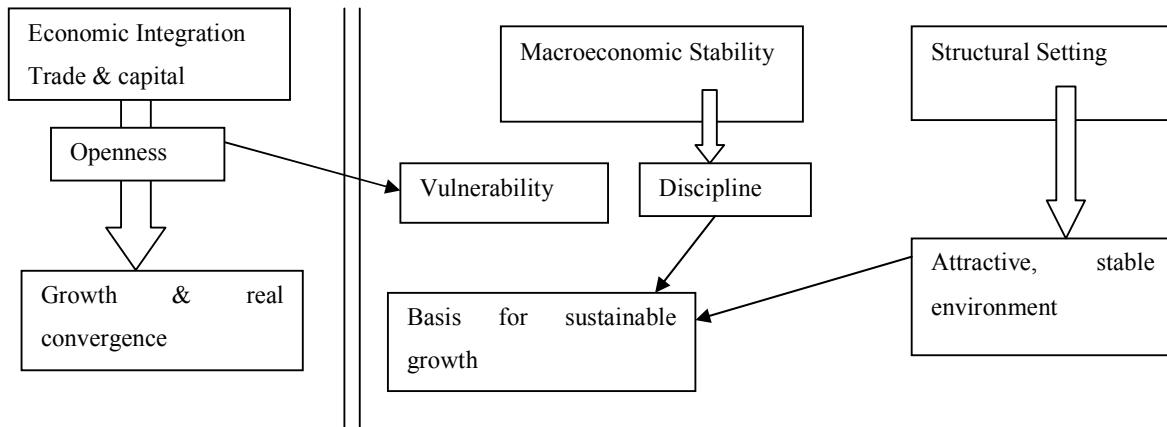
3.7 THE THEORY OF REAL ECONOMIC CONVERGENCE

Literature on monetary integration often refers to convergence in macroeconomic stability indicators, because they make up part of the conditions considered as essential for monetary integration under the OCA theory. However, for developing countries with substantial regional inequalities, regional integration requires that the countries also attain real economic convergence.

McCarthy (2002:8) notes that developing countries need to attain convergence around a higher level of economic growth to enable them to “catch-up” with industrialised nations. Furthermore, they need to attain convergence around a higher level of regional average per capita income to reduce the inequalities in per capita income levels in their respective regions. Convergence in per capita income levels would also ensure that the benefits of regional economic integration are realised more evenly among the countries.

Alberola *et al* (2003:27) further state that economic integration ought to be complemented by adequate structural settings in the participating countries to encourage real convergence in the integrating economies. A combination of increased openness, macroeconomic stability, as well as adequate structural settings should result in an environment that is conducive to attracting a continuous flow of capital and to consolidating the functioning of the economy, which in turn would be conducive to sustainable growth and real economic convergence between the integrating countries. Figure 3.6 below illustrates the inter-linkages between economic integration, macroeconomic stability, adequate structural settings and, economic growth and convergence.

Figure 3.6: Bases for Real Convergence and Growth



Source: Alberola *et al* (2003:26)

The theory of economic convergence asserts that there are two types of economic convergence, micro- and macro- economic convergence. Macroeconomic convergence (divergence) is defined as a tendency of the disparity in aggregate variables such as income or output across economies to narrow (widen) over time. Microeconomic convergence, on the other hand, is defined as a tendency towards the equalisation of income of identical factors across economies (Rassekh, 1998:86).

The convergence hypothesis explains the two types of economic convergence in its classification of the main sources of economic convergence, *viz*, diffusion of technology, differing capital- labour ratios (as per the neo-classical growth model) and globalisation. This hypothesis is reviewed below.

3.7.1 The Convergence Hypothesis

This hypothesis asserts that there is a tendency for low-income economies to grow much faster than high-income economies, with growth in high-income economies eventually slowing down. Thus, low-income economies would eventually “catch-up” with high-income economies (Jenkins and Thomas 1997; Rassekh, 1998). According to Jenkins and Thomas (1997:7), although economic convergence amongst all the countries in the world has not

occurred, it does occur within smaller groups known as “convergence clubs”⁵³. The sources of economic convergence are discussed in the subsections below.

3.7.1.1 Diffusion of Technology

Hume (1758) first postulated that the diffusion of technology fosters economic convergence between countries. The theory asserts that the transfer of technology and low wages from more advanced (leader) economies to less advanced (follower) economies provides the latter with an impetus to grow faster than the former.

The argument is that leader economies experience diminishing returns to manufacturing, which prompts them to relocate their production from advanced to follower economies that offer cheaper provisions and labour. The follower economies will in turn experience higher rates of growth until diminishing returns set in. Manufacturing companies will then relocate to other countries whose economies are not well developed where they will experience increasing returns to manufacturing. The process will therefore, continue until all follower economies “catch-up” with the leader economies, thus achieving economic convergence (Hume, 1758; Gerschenkron, 1952; and Abramovitz, 1986).

The opportunities inherent in industrialisation in the follower countries vary directly with the backwardness of the country. When leader economies replace old technology, the increase in their productivity is limited by the degree of improvement in the technology, while for the follower economies; the increase in their productivity is determined by their relative backwardness. The more technologically-backward the follower economies, the greater the leap in their productivity. Thus, follower economies tend to “catch-up” faster if they are initially more backward (Gerschenkron, 1952; and Abramovitz, 1986).

By imitating technology developed by leader economies, follower economies avoid the high costs associated with errors incurred during technological innovation. Therefore, the larger the productivity gaps between the economies, the higher the potential for growth in productivity and, *ceteris paribus*, the faster the expected growth rate of the follower economies (Abramovitz, 1986:386).

⁵³These are a group of countries whose poorer members are able to “catch-up” in income levels with the richer ones.

The necessary conditions for follower economies to take advantage of their relative backwardness and experience rapid growth include an adequate pool of technical and managerial skills, stable political and financial institutions, and public policies conducive to productive entrepreneurial activities (Rassekh *et al*, 2001:148). Furthermore, follower economies should be endowed with usable resources and should not have any barriers to industrialisation (Gerschenkron, 1952:6).

Japan is an example of a follower economy that paved the way for economic growth by ensuring it had adequate institutions to take advantage of technological innovations. On the other hand, India and South American countries were unable to take advantage of their backwardness because they did not reform their institutions (Rassekh, 1998:87).

3.7.1.2 Neo-Classical Growth Models

Neo-classical growth models such as Solow (1956), Cass (1965) and Koopmans (1965), assert that regional incomes differ because of differing capital-labour ratios and that, a country's growth rate is inversely related to its initial level of per capita income.

The Solow growth model is the most commonly referred to of the neo-classical models in discussions of economic growth and convergence. The model was developed on the assumption of diminishing returns to capital and predicts that rich countries (with high levels of capital) experience low marginal returns to capital and *vice versa* for poorer countries that have low levels of capital. As such, capital flows from rich countries to poorer ones, enabling their economies to grow at a faster rate than rich countries and therefore, "catch-up"⁵⁴ (Solow, 1956; Rassekh, 1998 and; Kim, 1998)⁵⁵.

3.7.1.3 The Effect of Globalisation

The Heckscher-Ohlin (HO) trade model comprises of four theorems; the Factor Price Equalisation (FPE) theorem, the Stolper-Samuelson theorem, the Rybczynski theorem and the Heckscher-Ohlin trade theorem. The FPE theorem is mostly used to provide an

⁵⁴ This is in contrast to predictions of endogenous growth models, such as by Romer (1986), Lucas (1986) and Barro (1989), which do not predict economic convergence. The models predict that differences in per capita incomes between countries will persist indefinitely even when they have the same savings and population growth rates.

⁵⁵ The Solow Growth Model is presented in Box A.1 of Appendix A.

explanation for the source of economic convergence. The theorem asserts that free trade in commodities results in the equalisation of relative commodity prices in trading partners; which would in turn lead to the equalisation of real factor prices and possibly, in national incomes (Kim, 1998; Bajona and Kehoe, 2006).

The FPE theorem explains how countries producing the same goods, using the same technology and facing the same relative product prices would end up with an equalisation in their factor prices⁵⁶. There are incidences in which the FPE process leads to a *divergence* rather than a convergence in incomes. In a situation where one region/nation is endowed with more of every factor on a per capita basis than the other, the FPE outcome ensures that free trade keeps per capita income in that region/nation always higher than in the other region/nation. Furthermore, the integration of goods and capital markets implies that goods produced at least cost flow from rich countries (which have predominantly industrialised economies) to poor countries (which have predominantly agricultural economies), reducing the incentives to accumulate capital in poor countries. The latter would instead intensify production on primary products, which are labour-intensive (Kim, 1998; Bajona and Kehoe, 2006).

The primary products from the developing countries have inelastic demand and thus, often do not substantially increase the markets for the poor economies or their levels of production and employment. Furthermore, their wages and export returns per unit of product are low since the supply of unskilled labour is almost unlimited. The elimination of the source of productivity improvement in developing countries would therefore, result in the widening of the income gap between the rich and poor countries. Thus, by promoting the equalisation of factor incomes, the FPE process prevents the equalisation of per capita incomes (Myrdal, 1956:51).

⁵⁶ Box A.2 of Appendix A presents the FPE theorem.

3.8 FISCAL POLICY FRAMEWORK

In addition to the MEC targets, there is need for a framework for the coordination and multilateral surveillance of the fiscal policies of member nations of a monetary union. There are three main reasons cited in economic literature to justify the need for constraining fiscal policies under a monetary union as well as the imposition of binding fiscal limits on member countries. These arguments are discussed below.

Firstly, economic literature argues that a currency union should have an appropriate fiscal-monetary policy mix, which requires a degree of coordination of national fiscal policies. This is particularly relevant when either there is no common regional budget or that budget is too small to influence the region's overall fiscal stance.

Secondly, binding fiscal limits are necessary to reinforce the anti-inflationary policy, as well as strengthen the credibility of the region's common central bank. This is particularly important when the central bank has recently been set up and has yet to establish its credibility for fighting inflation.

Lastly, fiscal limits may be required to offset the possible deficit bias that may arise in some nations due to being part of a monetary union. Literature argues that membership of a large and credible monetary union may create incentives to certain members to run large deficits and borrow excessively because the union provides access to a larger pool of savings. Furthermore, they may take advantage of the benefits from the monetary credibility and fiscal discipline of the partner countries, and from the market perception that the common institutions or the other member countries will bail them out in the case of a debt crisis (Jenkins and Thomas, 1997; Arroyo, 2003).

This could lead to excessive government borrowing and higher real interest rates throughout the union. Similarly, it could shift resources from the fiscally prudent nations to the profligate ones in an unfair way. The argument is based on the assumption that the constraints imposed by market forces might not enforce sufficient and timely discipline to reckless nations by

charging them higher interest rate premiums; markets will either be too slow and weak or too sudden and disruptive⁵⁷ (Arroyo, 2003:112).

For countries that have, in the past, run high and persistent budget deficits and thus, have high volumes of public debt, there are additional political incentives for adopting fiscal policy rules. Tying the hands of national governments into a binding supranational agreement imposes fiscal discipline on the member countries. Similarly, for the countries with a strong national currency and low inflation, an appropriate framework for fiscal discipline assures its residents that joining a monetary union would not result in their country adopting a weaker currency and higher inflation (Arroyo, 2003:114).

However, critics of the fiscal policy rules under a monetary union argue that they restrain the capacity to use independent national fiscal policies to compensate for asymmetric shocks⁵⁸. Considering that members of a monetary union give up autonomy over their monetary and exchange rate policy, it is imperative that they retain their ability to use their national fiscal policy as an adjustment tool (Arroyo, 2003:14). Box A.3 of Appendix A presents a case study on the EU's fiscal policy framework, which may be a guideline for other regions wishing to form a monetary union.

3.9 FINANCIAL DEVELOPMENT

The nature and level of financial development in individual countries plays an important role in the outcome of monetary integration, which is not frequently cited in economic literature. On the other hand, there is extensive research on the role financial development plays in contributing to economic growth. The “finance-led” economic literature⁵⁹ on growth asserts that financial development improves total factor productivity and, ultimately, economic growth through the functions inherent to the system, which include mobilising savings, allocating capital, monitoring borrowers and transforming risk (Garcia-Herrero *et. al*, 2003: 334).

⁵⁷ To combat this, the EU included a “no bail out” clause in the Maastricht Treaty, which prohibits the assumption of the liabilities of one member nation by another or the EU budget.

⁵⁸ This is particularly relevant for regions that suffer from a high incidence of such shocks.

⁵⁹ cf., Levine (1991), King and Levine (1993).

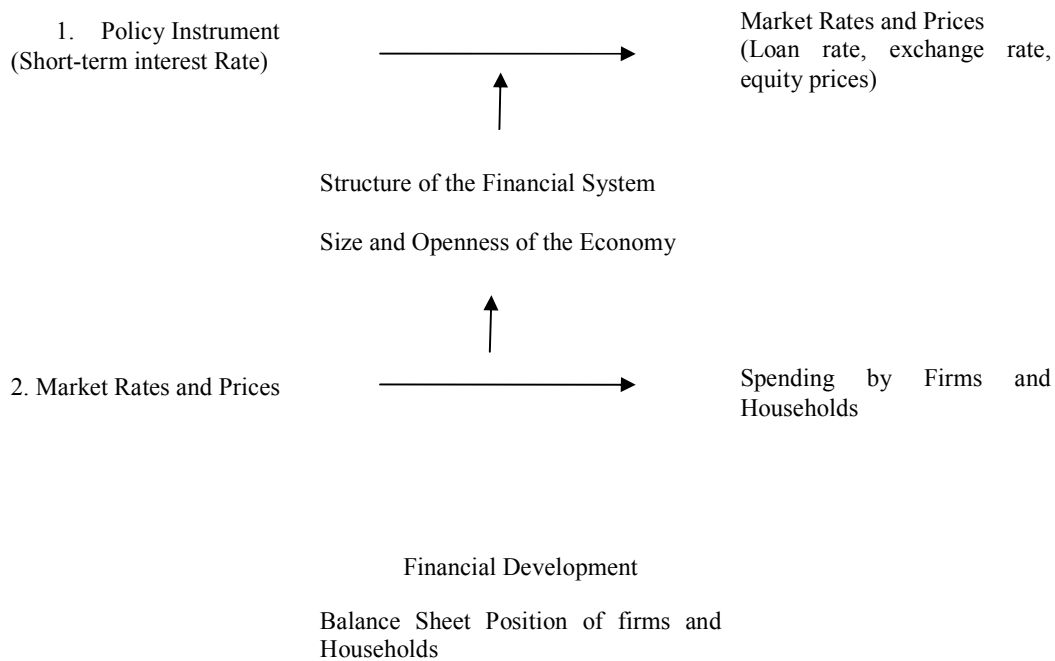
There is increasing research on the role financial integration plays in fostering financial development. Economic literature states that opening up the financial system to the rest of the world fosters financial development, particularly for small economies (Garcia-Herrero *et. al*, 2003: 336). Of particular relevance to this study is the literature on the inter-relationship between the state of financial development and openness to international trade and capital (i.e., financial integration), as well as the nature of the transmission of monetary policy in potential union members, which ultimately affects their suitability for monetary integration.

Improving the breadth and depth of the internal market by increasing *intra-regional* financial integration renders the region less vulnerable to potentially disruptive developments in the global economy and smoothes the adjustment to asymmetric shocks. This in turn, reduces the costs associated with the loss of the exchange rate as an adjustment tool (Arroyo, 2003:86).

On a different note, the depth and structure of the financial system⁶⁰ and, the size and openness of the economy influence the effectiveness of domestic monetary policy, as well as the importance of different transmission mechanisms. This relationship is illustrated in Figure 3.7 below.

⁶⁰ The depth and structure of the financial system refers to whether the financial system comprises mainly of banks or a variety of institutions, whether it is run publicly or privately, and whether it offers a variety of products.

Figure 3.7: Factors that Influence the Transmission of Monetary Policy



Source: Loayza and Schmidt- Hebbel (2002:8)

Figure 3.7 shows that the extent to which changes in the short-term interest rate by the central bank are transmitted into changes in market rates and prices depends on the structure of the financial system as well as the size and degree of openness of the economy. The more diversified the financial institutions and products, the quicker and easier monetary policy is transmitted to the economy. In turn, the level of financial development as well as the balance sheet positions of household and firms determines the extent to which changes in market rates and prices influence consumption and investment decisions. When households and firms are not constrained financially but can exercise their choice both inter-temporarily and across goods and services, they are more responsive to changes in market rates and prices and hence, changes in monetary policy are more effective on the economy.

Differences in the structure of financial systems across countries entail differences in the importance of transmission mechanisms in each country (Montiel, 1991; Loayza and Schmidt- Hebbel, 2002; Buigut, 2006). If the financial system of a particular country is shallow (i.e., dependent on a few financial institutions) and poorly diversified (i.e., there are limited alternative products), it implies that the financial institutions can exercise monopolistic power in the determination of market rates and prices, independent of central

bank actions. In such a scenario, the asset price channel is not that important because capitalisation of the stock market would be low, and the interest rate channel would be weak due to the monopolistic power held by the banks (Loayza and Schmidt- Hebbel, 2002: 9).

Loayza and Schmidt- Hebbel (2002: 9) further note that the exchange rate channel tends to be irrelevant in financially under-developed economies because such economies tend to impose exchange controls on foreign transactions. In such a scenario, the credit channel is likely to dominate due to the moral hazard and adverse selection problems that are characteristic of shallow financial systems.

Montiel (1991) and Buigut (2006) note that a similar monetary policy action in a monetary union comprising countries with divergent financial systems is likely to result in varying changes in output and prices across countries and possibly widen cyclical variation between countries. This is because the transmission of the policy action will vary across union members, depending on the relative importance of each transmission channel. As such, monetary integration requires that the transmission mechanisms across member states be similar, which in essence translates to that monetary integration requires a similarity in the financial systems of member states.

3.10 CONCLUSION

The chapter comprised discussions on the theoretical frameworks of monetary integration, which include the arguments for the need for a fixed exchange rate between trading partners, the impossible trinity principle as well as the theory of optimum currency areas. In addition, the need for monetary integration in a group of countries pursuing regional economic integration was highlighted in the review on the Impossible Trinity Principle. The discussion provided further support for a fixed exchange rate system between integrating countries.

The review on the theory of optimum currency areas discussed the theoretical benefits and costs of OCAs, and hence, monetary integration. Furthermore, the OCA criteria that are a necessary condition for monetary integration to be beneficial were identified, which include a high degree of trade openness, a high degree of trade inter-dependence, a high degree of product diversity, and a high degree of mobility of the factors of production. If these conditions were present, then individual countries would have alternative adjustment mechanisms for domestic stabilisation when facing asymmetric shocks. This in turn implies

that giving up autonomy over their monetary and exchange rate policy would not be costly. Thus, monetary integration would be beneficial to the countries.

In addition, the need for convergence in macroeconomic stability indicators prior to monetary integration was highlighted in this chapter. It was ascertained that members of a monetary union also needed to achieve a degree of convergence in their inflation rates, interest rates, exchange rates as well as their levels of debt to reduce the costs of losing national monetary policy autonomy to effect domestic stabilisation.

The discussion on the need for a fiscal policy framework further highlighted the fact that members of a monetary union also require a degree of harmonisation in their fiscal policies for the union to be sustainable. Fiscal policy coordination is necessary to reinforce the anti-inflationary policy of the union central bank, to offset the possible deficit bias that may arise in some nations as well as to maintain an appropriate monetary-fiscal policy mix within the union.

Lastly, the discussion on financial development reinforced the need for members of a monetary union to be financially integrated, which among other things, enables the smooth adjustment to asymmetric shocks. This in turn reduces the costs associated with the loss of the exchange rate as an adjustment tool. In addition, similar financial systems among union members imply a similarity in the importance of transmission mechanisms in each country. Hence, a union monetary policy action would have the desired results in member states and therefore, reduce the likelihood of cyclical variation between countries. The current nature of the importance of different transmission mechanisms in the SADC countries is investigated in Chapter 7.

In conclusion, countries wishing to form a monetary union need to have a binding fiscal policy framework as well as adequately developed financial sectors, in addition to meeting the OCA criteria and the MEC targets. Furthermore, the countries require a degree of real economic convergence, which would ensure that the benefits of regional economic convergence are realised more evenly among the countries.

CHAPTER FOUR

THE EXTENT OF INTEGRATION WITHIN THE SADC COUNTRIES

4.1 INTRODUCTION

This chapter assesses the extent to which the SADC countries are integrated based on the OCA criteria discussed in Chapter 3. The chapter begins with a review of empirical studies conducted on the degree to which the SADC countries meet the OCA properties in Section 4.2. It was noted that there has been limited research on monetary integration within the SADC countries. Furthermore, most of the empirical studies conducted focused on either the extent of financial integration (cf. Nielsen *et al*, 2005; Aziakpono, 2006; Aziakpono *et al*, 2007) or the nature of the response to shocks in the member countries (cf. Grandes, 2003; Khamfula and Huizinga, 2004; Buiguit and Valev, 2006; Obinyeluaku and Vieg, 2009).

Some empirical studies focused on the degree of macroeconomic convergence within the member countries (cf. Jenkins and Thomas, 1997; Agbeyegbe, 2003; Johns 2009). However, most studies on convergence are of a theoretical and comparative nature (cf. Maruping, 2005; Rossouw, 2006; Kweka *et al*, 2006; Jefferis, 2007). Section 4.3 assesses the applicability of the OCA criteria to the SADC member states. The problem of the inconclusiveness of the traditional OCA criteria discussed in chapter three was found to exist in the case of the SADC countries. In light of this observation, other relevant criteria for determining the suitability of monetary integration are considered in Section 4.4. Section 4.5 highlights the challenges facing the SADC countries in achieving economic convergence. Section 4.6 considers the possibility of approaching monetary integration through either dollarisation or an extension of the CMA arrangement. Lastly, Section 4.7 concludes the chapter.

4.2 REVIEW OF EMPIRICAL LITERATURE

The review of each study highlights what the study investigated before discussing the methods of analyses used in the study and its findings. The studies differ in terms of the aspects of the OCA theory they consider, the period of analyses, as well as, the sample of countries included in the study. As such, it is difficult to compare the findings of the studies. However, the review on the studies has been categorised under the headings of the OCA properties that the studies considered, to highlight the aspects of the OCA theory investigated.

It is essential to note the findings and recommendations of other researchers on the suitability of monetary integration within the SADC countries. It is apparent that a region-wide monetary union is not feasible at the onset of the union; hence, a collective consideration of available literature should indicate which countries would form the union at onset. A summary of the literature reviewed below is presented in Table B.1 in Appendix B.

4.2.1 Intra-Regional Financial Integration

The sample of countries included in the studies conducted to test the degree of financial integration in the SADC countries differs. Nielsen *et al* (2005) investigated the degree of financial integration in the CMA countries, while Aziakpono (2006) considered the SACU countries. Only one study by Aziakpono *et al* (2007) has so far considered financial integration within the SADC countries as a whole. These studies are discussed below.

Study by Nielsen et al (2005)

Nielsen *et al* (2005) investigated the degree of financial integration in the CMA countries using the concept of uncovered interest rate parity (UIP). Based on arbitrage conditions, UIP states that the interest rate differential between two countries should equal the expected change in the exchange rate. Thus, a higher domestic interest rate indicates an expected devaluation of the domestic currency, while a lower domestic rate than the reference interest rate indicates an expected appreciation of the domestic currency (Holtemöller, 2003; Nielsen *et al*, 2005).

The sample included Lesotho, Namibia, South Africa and Swaziland (the CMA countries), as well as Botswana, Zambia and Zimbabwe (for comparative analysis). The study investigated the impact of foreign interest rates (i.e., South African rates) on domestic rates (i.e., rates of the LNS countries, Botswana, Zambia and Zimbabwe) using both the money market rates and credit market rates in these countries. Monthly data was used in the analyses from January 1994-December 2004 for the LNS countries and January 1995-December 2004 for Botswana and Zambia, while data for Zimbabwe excluded the series for 2004 to avoid distorting the results with extremely high rates.

The results indicated that the markets for Lesotho, Namibia and Swaziland (the LNS countries) were integrated financially with that of South Africa, while those for Botswana, Zambia and Zimbabwe were not. In addition, the rates in the LNS countries showed a

tendency of convergence towards those of South Africa, while Botswana, Zambia and Zimbabwe displayed large discrepancies and no tendency towards convergence.

It was therefore, concluded that the scope for the LNS countries to exercise an independent monetary policy under the CMA arrangement was very limited and as such, they could not use monetary policy for domestic stabilisation purposes (Nielsen *et al*, 2005:720). It was however, noted that as long as the currencies of the LNS countries were pegged to the ZAR and South Africa pursued a policy of stable and low inflation, then the impact of South African monetary policy will be transmitted to the LNS countries speedily and these economies will encounter economic growth. It was further noted that the LNS countries, have in the past, benefitted from the CMA arrangement in the form of lower prices, economy on trading costs, and a large increase in trade volume and cross-border financial transactions (Nielsen *et al*, 2005:710).

Study by Aziakpono (2006)

Aziakpono (2006) used the concept of interest rates pass-through to measure the degree of financial integration amongst the SACU countries for the period January 1990- September 2004 using monthly interest rate data. In addition, the study determined whether both the arbitrage condition and the South African Dominant Hypothesis (SADH) existed in the SACU region.

The premise of the study was that interest rate parity exists in a highly integrated financial market hence; similar assets should yield the same return irrespective of the country of domicile and the currency in which they are denominated, provided there is free capital mobility. It is assumed that interest rate parity arises either from the presence of arbitrage opportunities or from the use of interest rates as policy instruments. Under the former assumption, it is argued that given a high degree of capital mobility, two countries' financial assets should be substitutes for each other and hence, arbitrage equates one country's interest rates with those of the other, plus the forward premium on the two currencies (Aziakpono, 2006:2).

Under the latter assumption, it is argued that co-movement in interest rates is due to policy convergence, which occurs when a smaller country (financial unit) aligns its interest rates (policy) with that of a dominant economy (financial unit) to gain credibility. Alternatively,

convergence can occur within the framework of an EMU where monetary policy is coordinated from a central point (Aziakpono, 2006:3).

The study therefore investigated the response of official interest rates as well as retail interest rates (deposit and lending rates) in the smaller SACU countries to changes in the official interest rate in South Africa. In addition, the study examined the response of retail interest rates in the smaller SACU countries to changes in market interest rates in South Africa.

The results showed that a degree of integration existed in the financial systems of each of the smaller SACU countries with that of South Africa. However, there was a hierarchy in the level of integration, with Namibia at the top, followed by Swaziland, then Lesotho, and lastly, Botswana. Furthermore, the results suggested that the prevailing integration between the financial systems was mainly a result of policy convergence, rather than market convergence, which implied limited arbitrage opportunities between the countries. The lack of arbitrage opportunities was attributed to the poor institutional development and lack of investment opportunities in the smaller countries, which has resulted in an asymmetric flow of funds to South Africa. Lastly, the results confirmed the dominant role of South Africa in SACU region (Aziakpono, 2006:15-21).

Study by Aziakpono et al (2007)

Aziakpono *et al* (2007) investigated the state and potential development of financial and monetary integration in the SADC countries for different periods, i.e. using rolling time windows. In particular, the study determined the nature and underlying causes of banking market integration among SADC countries using principal component analysis (PCA) and interest rate pass-through analysis for monthly interest rate series.

It was noted that cointegration analysis may not be appropriate during a process where nominal convergence is taking place because inflation rates would be aligning in anticipation of a monetary union. As such, a long-run relationship may not exist between the variables. Therefore, they propose the use of principal component analysis to test for co-movements in interest rates, adding that this method can also identify groups of countries for which interest rates move in the same direction (Aziakpono *et al*, 2007:3).

Thus, the study applied PCA to central bank (monetary policy) interest rates, deposit and loan interest rates, respectively for the SADC countries. This was done in order to ascertain the progress and development of financial integration over time. In addition, the study determined the driving forces of banking market integration, with particular interest in the role of an efficient pass-through of national monetary policy onto bank interest rates and the role, if any, of a common or dominant monetary policy (Aziakpono *et. al*, 2007:4).

The results of the study showed that the degree of financial integration was increasing in some but not all SADC countries. Banking market integration was driven predominantly by increasing monetary integration, although a genuine banking market integration process was also observable in some countries. However, the results indicated that integration was not developing uniformly in all countries, but rather concentrated on a “convergence club” with the CMA countries in its centre and dominated by South Africa (Aziakpono *et. al*, 2007:28).

The study therefore concluded that a few non-CMA SADC countries, namely Seychelles, Zambia and Botswana, were potential first candidates for a CMA enlargement. However, an expansion required more policy coordination and nominal convergence, as well as addressing financial market imperfections. Furthermore, it was concluded that the rest of the countries were still far from consideration for the eligibility for monetary integration from a pure financial integration point of view (Aziakpono *et al*, 2007:29).

4.2.2 Similarity of Shocks and Business Cycles

Studies to investigate the nature of shocks and business cycles within an OCA consider different aspects of the economies. In the case of the SADC countries, Grandes (2003), and Khamfula and Huizinga (2004) considered the degree of correlations in the exchange rates, while Buiguit and Valev (2005) investigated the degree of correlations of shocks to output and inflation. On the other hand, Obinyeluaku and Vieg (2009) considered the relevance of fiscal and monetary policy in the determination of inflation in selected SADC countries.

The response of the SADC countries to shocks to each of these variables differs. Hence, different recommendations were offered by each study. The above-mentioned studies are reviewed below and the findings of each study are highlighted in each review.

Study by Grandes (2003)

Grandes (2003) investigated whether or not the SACU countries form an OCA by testing the existence of a long-run relationship between the bilateral real exchange rates (RER) of the SACU countries *vis-à-vis* that of South Africa using cointegration techniques. The study used quarterly data for the period 1990-2001. The assumption was that correlations in the real exchange rate reflect common fundamental trends in economic variables such as long run productivity growth and the tradability of domestically produced goods. Hence, stationarity in the exchange rates implied that the countries faced symmetric shocks.

The Generalised Purchasing Power Parity (G-PPP) approach was applied to test the applicability of the long-run relationship among all bilateral RER. The G-PPP postulates that though bilateral real exchange rates are generally non-stationary, they will exhibit common stochastic trends if the fundamental variables (i.e. the forcing variables) are sufficiently inter-related. When interpreted in terms of optimum currency areas, the RER between two countries comprising the domain of a currency area should be stationary. Similarly, in a multi-country scenario, the forcing variables will be sufficiently inter-related, so that the real exchange rates themselves will share common trends. Hence, within a currency area there ought to be at least one linear combination of the various bilateral real exchange rates that is stationary (Grandes, 2003:10).

The results of the study found the existence of common long-run trends in the bilateral RERs; suggesting that the countries form an OCA. It was concluded that further microeconomic efficiency gains could still be attainable if these countries formed a complete monetary union. However, they still faced a level of divergence in terms of trade shocks, a lack of export diversification and the predominance of inter-industrial trade patterns, among other things, which all are not conducive to the successful implementation of a full monetary union.

Study by Khamfula and Huizinga (2004)

Khamfula and Huizinga (2004:703) made use of a Generalised Auto-Regressive Conditional Heteroscedasticity (GARCH) model to estimate correlations of unanticipated components of bilateral real exchange rates of nine SADC countries against the South African rand. They analysed the conditional short- and long-run real exchange rate (RER) disturbances between South Africa and the member countries for the period 1980-1996 using both monthly and quarterly data.

Their argument was that the main economic cost of a monetary union resulted from the loss of nominal exchange rate flexibility as a tool for RER adjustment between regions exposed to asymmetric shocks. Since goods and factor prices are normally sticky downwards, RER adjustment is achieved more easily if nominal exchange rates rather than regional price levels change. Thus, the importance of flexible exchange rates would be highest in the presence of strongly asymmetric shocks to or pronounced differences in shock-absorbing mechanisms of the countries pondering monetary union (Khamfula and Huizinga, 2004:701).

The results of the short- and long-run analyses suggested that the conditional variances of the RER disturbances between South Africa and most fellow SADC members were comparable. It was suggested that Botswana, Lesotho, Malawi, Mauritius, Namibia, South Africa, Swaziland and Zimbabwe could be the initial members of the monetary union. Tanzania and Zambia had extraordinarily high RER variability, which could potentially expose the union to much higher variation of relative prices, thus destabilising the union. Thus, the two countries had to achieve a manageable degree of RER variability before their ascension to the union. It was recommended that the countries fix their currencies to the rand at predetermined rates in an effort to stabilise their RER variability.

However, the results from the estimations indicated relatively low degrees of symmetry of both short- and long-run RER shocks across most of the SADC countries. As such, it was concluded that the SADC region as a whole was not ready to start a monetary union. It was observed that the countries were “simply too different to form an optimal currency area” and that the costs of such a union far exceeded the benefits (Khamfula and Huizinga, 2004:712).

The study recommended that the countries reduce trade barriers in an attempt to stimulate regional growth, which would in turn promote increased economic co-operation. However, it is worth noting that with the implementation of a SADC FTA in 2008 (which is not yet fully functional); it is too early for the member countries to realise the dynamic effects of the trade liberalisation scheme. Consequently, the implication is that it is too early, if at all, for the countries to respond symmetrically to RER shocks. Lastly, it was suggested that future research could be conducted from the angle of estimating a Structural Vector Auto-Regressive (SVAR) model for SADC members that would allow the identification of both monetary and real shocks. Buiguit and Valev (2006) conducted a study along those lines; and this is reviewed below.

Study by Buiguit and Valev (2006)

Buiguit and Valev (2006:12) applied Blanchard and Quah's (1989) two-step statistical method in SVAR analysis to identify separate demand and supply shocks from the GDP and inflation data of a sample of eastern and southern African (ESA) countries for different sample periods.

The results from the impulse response functions showed, on average, small impulse responses for most countries. The impulses seemed to dissipate quickly by the second or third year. Only those countries that experienced major civil strife showed a marked difference in size and speed of adjustment. However, Buiguit and Valev (2006:12) expected the shocks to the economies to reduce as these countries stabilised. Thus, they concluded that monetary integration was feasible for some of the ESA economies.

Results from the variance decomposition analysis showed that demand shocks accounted for a high proportion (over 80%) of the price level variability across most economies. However, few countries showed wide variations, with some countries less than 10%. Therefore, it was concluded that structural supply and demand shocks did not contribute to output changes and price variations in the same way across the ESA countries.

No evidence to support ESA-wide monetary integration was found, and thus it was suggested that a tri-polar route to monetary integration be followed, which is based on the countries that exhibited a greater degree of symmetry. The first monetary union would consist of the SACU countries, together with Mozambique and Zambia. The second would be an EAC monetary union, which could gradually expand to include Ethiopia, Sudan and Egypt. The third monetary union would be an Indian Ocean Commission (IOC) monetary union.

Study by Obinyeluaku and Viegli (2009)

Obinyeluaku and Viegli (2009) investigate the relevance of fiscal and monetary policy in the determination of inflation in 10 SADC countries⁶¹ using VAR analysis for the period 1980-2006. The aim of the study was to ascertain the extent to which fiscal policy actions influence inflation in the SADC countries, with the assumption that if it were significant, then

⁶¹ Angola, DRC, Mozambique and Namibia were excluded due to data unavailability.

surrendering monetary policy to a regional authority would not provide price stability within the region.

Three different phenomena were analysed in the study. To begin with, the study analysed the nature of the responses by national fiscal authorities to shocks in government liabilities and primary surpluses using impulse response analysis. The study also investigated the source of the positive response of future surpluses to current surpluses to ascertain if lower nominal income was the main source. The implication is that a fiscal dominant regime would exhibit lower national income in response to a positive shock. Lastly, the study made use of variance decomposition techniques to determine whether fiscal or monetary policy best explained inflation variability in the SADC countries (Obinyeluaku and Vieg, 2009:9).

The study showed that fiscal policy dominated monetary policy in the determination of inflation in Lesotho, Botswana, Malawi, Zambia and Zimbabwe. On the other hand, South Africa, Swaziland, Mauritius, Seychelles and Tanzania exhibited a monetary dominant regime. Based on the results obtained for Lesotho and Botswana, it was noted that even countries with independent monetary policy could still exhibit a fiscal dominant regime. Thus, it was emphasised that it is essential for the SADC countries to coordinate their monetary and fiscal policies in order to attain price stability (Obinyeluaku and Vieg, 2009:14).

4.2.3 Endogeneity of OCA Properties

There has been very little research testing the theory of the endogeneity of the OCA properties in the SADC countries, with one notable study by Carrere (2004) on this matter. The study is similar to studies conducted by Frankel and Rose (1996) and Rose (2000) who, like Carrere (2004), make use of gravity models to investigate the extent to which increased trade between countries results in correlations in shocks to their economies.

Study by Carrere (2004)

Carrere (2004) investigated the impact of regional trade agreements and the use of a common currency within Sub-Saharan African countries for the period 1962-1996 using a gravity model. The West African Economic and Monetary Union (UEMOA) and the Central African Economic and Monetary Community (CEMAC) are the only regional groupings that are also

currency unions. Thus, the impact of using a common currency was measured only for these two regional groupings.

A basic gravity model presents the flow of trade between a pair of countries as being directly proportional to their national income and inversely proportional to the distance between them. The model can be augmented with several variables to measure the effects of different factors on trade. The effects of a currency union were captured using the volatility of the bilateral nominal exchange rate between the currency area and the rest of the world. The rationale was that the exchange rate was expected to be stable within a currency union. Volatility was measured by the standard deviation of the first-difference of the monthly bilateral exchange rate for the year preceding the current period being observed.

The use of a common currency was found to increase trade between member countries of the two regional groupings by more than double the initial level. The results of the study were, however, inconclusive as to whether membership in a regional body increases trade between SADC countries. In addition, the study did not investigate the impact of a currency union on trade within the SADC region.

4.2.4 Macroeconomic Convergence

A number of researchers (cf. Maruping, 2005; Rossouw, 2006; Kweka *et al*, 2006; Jefferis, 2007; among others) have done a comparative analysis on the performance of macroeconomic stability indicators in the SADC countries. The studies differ in the period of analysis and in some cases, on the subset of countries that comprise the convergence club in the region.

Maruping (2005:142) compared the extent of macroeconomic convergence in the SADC countries for the period 2001-2004 and found that the SACU countries and Mauritius were the most convergent in their inflation rates, while post conflict countries of Angola and the DRC showed a significant decline in their inflation rates. It was noted that the DRC, Malawi, Mozambique, Tanzania and Zambia, which depend highly on aid, were above target level for the fiscal deficit-GDP ratio. The implication is that their fiscal deficits would be unsustainable were donor support not available or drastically reduced. Swaziland and Zimbabwe also recorded extremely high levels of fiscal deficit-GDP ratios. The high budget

deficits in Swaziland were due to the expansionary fiscal policies undertaken during this period, while Zimbabwe experienced an economic crisis.

Rossouw (2006:159) analysed the extent of macroeconomic convergence in the SADC countries by 2004 and found that the SADC countries had made significant progress in attaining the set MEC targets, leading to the conclusion that the region was on track to its goal for monetary integration. Kweka *et al* (2006:255), on the other hand, investigated the extent of macroeconomic convergence for the period 1980-2005 and found considerable variability in the attainment of the MEC targets.

The variability was due to the inherent differences in socio-economic structures of these countries. The stronger economies such as Botswana and South Africa met the targets earlier than the set deadlines, while the weaker countries such as Malawi, Tanzania and Zambia showed variability in certain targets. The latter countries, which have a high dependency on external aid, were behind target in their budget deficits, savings/investment ratios and external reserves, although they did comply with the targets for inflation rates, GDP growth rates and money supply indicators.

Jefferis (2007:98) investigated the extent of macroeconomic convergence for the period 1990-2002 and found a degree of convergence in the SADC countries, further noting that not all the countries converged. The results from the analysis indicated that a convergence club consisting of Botswana, Lesotho, Mauritius, Mozambique, Namibia, Swaziland and Tanzania around the South African rates existed in the region.

Although the above studies reported different trends in the degree of convergence in the SADC countries, they all indicated that the SACU countries displayed convergence. On the other hand, convergence in the non-SACU SADC countries varied, with some more stable economies such as Mauritius displaying a degree of convergence. Below are reviews of empirical studies conducted to determine the extent of convergence in the SADC countries.

Study by Agbeyegbe (2003)

Agbeyegbe (2003) uses the methodology of time varying analysis to establish economic convergence on nine, non-CMA member countries of SADC. The parameters investigated were inflation and the exchange rate. The analysis is based on the methodology developed by

Hall *et al* (1992) who advocate for the use of the time varying parameter approach to measure convergence given that it is a gradual and on-going process. They point out that analyses such as the standard method of testing for cointegration in non-stationary variables are limited in that they assume structural stability. As such, the tests are unable to correctly detect whether or not convergence occurs over a period of time.

The results of the cointegration tests on the exchange rates suggested no evidence of convergence. The results from the time varying analysis also showed differing degrees of non-convergence among the non-CMA currencies to the rand exchange rate with the exception of the Malawian Kwacha. Similarly, results from tests for inflation convergence suggested non-convergence in the inflation rates of the non-CMA countries to the average of the CMA countries. It was concluded that chances were quite low that the SADC member countries could satisfy some form of Maastricht-type convergence criteria (Agbeyegbe, 2003:9).

Study by Johns (2009)

Johns (2009) investigated the extent of the pass-through of monetary policy in ten SADC countries using an interest rate pass-through model. The pass-through model is similar to that of Aziakpono *et al* (2007) as well as that of Aziakpono and Wilson (2008), who made use of the rolling window approach. The countries included in the sample were Botswana, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia. The study made use of monthly interest rate data for the period 1990-2007. In addition, two interest rates were analysed namely, the bank rate and the lending rate.

The results of the short-run pass-through analysis indicated that the interest rate adjustment was sluggish in Lesotho, Madagascar, Mozambique, Namibia, Tanzania and Zambia particularly from 1999 onwards, while South Africa showed an improvement in its adjustment from 1993, and Botswana and Malawi from 2002 onwards. Lastly, Swaziland was found to have a quicker and more stable pass-through over the entire estimation period in comparison with the rest of the countries (Johns, 2009:44).

The results of the long-run analysis indicated that the pass-through for Botswana, Malawi, Namibia, South Africa, Swaziland and Zambia tended to move together. Thus, a level of convergence was identified in these countries. On the other hand, the analysis identified a

pattern of divergence for Madagascar and Tanzania in the long term. Lastly, long-run pass-through analysis could not be conducted for Lesotho for 1998 onwards as the study found no cointegrating relationship between its lending rate and the banking rate.

The results from the estimates of the mean adjustment lag indicated that the speed of adjustment was relatively low and stable for Malawi, Namibia, South Africa and Swaziland. On the other hand, Madagascar, Mozambique, Tanzania and Zambia had a diverging speed of adjustment. It was noted that although the results from the long-run pass-through analysis for Zambia indicated that the pass-through was high, it took longer for it to be accomplished. This was attributed to the rigidity in its domestic market due to market imperfections.

The study therefore, concluded that a convergence group consisting of Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland and, to some extent, Zambia existed. It was suggested that these countries could form an intermediate monetary union, which would be an extension of the CMA arrangement.

4.2.5 Real Economic Convergence

There has been limited research on the extent of economic convergence in the SADC countries, with one notable study by Jenkins and Thomas (1997), who found evidence of a convergence club around the SACU countries. The study is reviewed below.

Study by Jenkins and Thomas (1997)

Jenkins and Thomas (1997) investigated the degree of macroeconomic convergence between SADC countries using three measures of convergence over the period 1960-1990, using convergence in real *per capita* GDP as an indicator of real economic convergence. The σ -convergence approach, the β -convergence test, as well as Quah (1996)'s approach were used in the analysis. Quah (1996) made use of a Markov chain-type methodology to estimate the probability that relatively poorer (richer) countries will raise (lower) their *per capita* income in the next period and thereby converge. Although the analysis is descriptive, and therefore does not explain convergence/divergence, it does shed light on how poorer countries behave relative to richer ones (Jenkins and Thomas, 1997:14).

The σ -convergence approach is a measure of dispersion, which attempts to determine whether the dispersion in income levels of a group of countries diminishes over time using

the standard deviations (σ) of *per capita* income (Jenkins and Thomas, 1997:11). The coefficient of variation (CV) may also be used as a proxy for dispersion (Rassekh, 1998:97). The analysis focuses on how the entire cross section behaves rather than whether a single economy shows convergence. Thus, a declining σ or CV over time would imply convergence in the economies in question.

Quah (1996: 1365) however cautions that the σ -convergence approach should be interpreted as an indication of the average behaviour of the sample rather than that of the entire distribution because the σ or CV of cross sectional data may approach a constant, but never reach zero when the economies are exposed to shocks. Furthermore, the σ or CV values may appear to be declining in a period where some economies display non-convergence, while some may even have diverged.

The β - convergence test attempts to determine whether countries with lower income levels grow faster than high-income countries during a sample period, after controlling for the variables that influence growth. Convergence is said to occur when the β - coefficient of a regression of (time-averaged) growth rates on initial levels of *per capita* income is negative (Jenkins and Thomas, 1997; Rassekh *et al* 2001).

Quah (1993), and Bernard and Durlauf (1996), among others, cite criticisms of the β -convergence test. Quah (1993:433) applies Galton's Classical Fallacy to argue that a negative β - coefficient does not necessarily imply convergence, pointing out that a situation may arise where low-income economies grow much faster than high-income economies; leaving as much dispersion at the end of the period as at the beginning, though in the opposite direction. This would still produce a negative β though the dispersion in income data may not have diminished over time.

Bernard and Durlauf (1996:167), on the other hand, argue that an ordinary least squares (OLS) regression can still produce a negative β even when some economies do not converge. They demonstrate that diminishing income differences between *some* pairs of economies produce a negative β . Thus, an analysis of a group of countries may provide a misleading impression that the whole sample is converging.

In all the three measures, no evidence of real convergence was found to occur within the SADC countries. However, the analysis indicated that convergence occurred within the subset of the Southern African Customs Union (SACU) countries while a degree of divergence occurred for the rest of the countries⁶². Jenkins and Thomas (1997:23) attributed the convergence in the SACU countries to the similar domestic economic policies, driven in part by the currency union in the CMA countries, as well as to the relative openness to international trade in these countries. They concluded that the region was not ready for monetary integration, warning that premature attempts at monetary integration could have political costs. A failed attempt at monetary integration could generate political disagreements and recriminations that could weaken the prospects for integration in other sectors.

4.2.6 Other Relevant Criteria

It is important to consider the degree of monetary policy autonomy in potential members of a monetary union prior to integration as an indication of the potential costs to member states of joining the union. A high level of policy autonomy implies higher costs of monetary integration. Aziakpono (2008) conducted a study along these lines on the SACU countries.

Study by Aziakpono (2008)

Aziakpono (2008) investigated the degree of financial and monetary autonomy and interdependence between South Africa and the other SACU countries for the period January 1990- May 2005 using monthly data. More specifically, the study made use of cointegration and error correction models, as well as long-run causality analysis (based on weak exogeneity tests) to assess the extent to which the South African Reserve Bank (SARB) has played its role as an anchor for monetary policy and has influenced the financial markets in the SACU countries.

The study analysed several behaviours of interest rates, beginning with the response of market interest rates (i.e., deposit, lending, money market and Treasury bill rates) in each of the SACU countries to changes in domestic central bank rates. The study also analysed the response of market interest rates and official interest rates in the other SACU countries to

⁶² This is in-line with studies conducted by Wang *et al* (2007:15), and Masson and Pattilo (2003:67), who found evidence of a convergence club comprising of the CMA countries.

changes in the official interest rate in South Africa, as well as the response of market interest rates in the other SACU countries to changes in market interest rates in South Africa.

The study was similar to that of Aziakpono (2006) but analysed more interest rates in an attempt to focus on the question of monetary and financial autonomy, and to that of Nielsen *et al.* (2005) who made use of rolling unit root tests and a moving regression. The study made use of the interest parity condition for the analyses, with the assumption that in a common monetary area where exchange rate risk is absent, the test of interest rate parity is reduced to a test of the co-movements between interest rates. A low β value would therefore be an indication of independence/policy rigidity or existence of market imperfections, hence low *de facto* integration. In contrast, in the case of within-country analysis, a high β value implies a high response of domestic interest rates to domestic policy stance *vis-à-vis* the central policy rate hence, policy independence and *vice versa* (Aziakpono, 2008:197).

The results from the tests for cointegration indicated that all the market interest rates in South Africa and Namibia were strongly cointegrated with the official rate, while those for Botswana, Lesotho and Swaziland showed a weak relationship. The results for South Africa conformed to expectations that, as per CMA arrangement, the economy led monetary policy formulation and therefore would have more policy autonomy than the other SACU countries. Similarly, the results for Lesotho and Swaziland conformed to expectations that the economies would have less policy autonomy. However, it was not expected that Botswana would have less independent monetary policy since it was not an official member of the CMA. The results further suggested that the influence of domestic policy in Namibia was very strong (Aziakpono, 2008:203-7).

In addition, the results from the investigation of the relationship between the market interest rates and official rates in the other SACU countries to changes in the official interest rate in South Africa showed a very strong response of the former to the latter. This indicated that the SARB overwhelmingly influenced policy stance and the money market behaviours of all the member states. Lastly, the results from the weak exogeneity test suggested a presence of two-way causal relationship between interest rates in Namibia and South Africa, while causality ran solely from South Africa to the other member states (Aziakpono, 2008:207-8).

The results from the analyses confirmed the dominant role of South Africa in the SACU region. It was therefore, concluded that a monetary unification, with the SARB as the sole central bank and the ZAR as a common currency was feasible. It was however, noted that the extent to which a monetary union would help to improve the efficiency of the domestic financial system would vary from country to country and was dependent on the prevailing situation in each country. For countries with relatively inefficient domestic monetary policy transmission, such as Botswana, Lesotho and Swaziland, a single central bank was likely to improve the transmission of monetary policy. On the other hand, for a country such as Namibia with more effective domestic policy, it could slightly slow down the monetary transmission in the economy (Aziakpono, 2008:209).

4.3 APPLICATION OF THE OCA PROPERTIES TO THE SADC COUNTRIES

The suitability of the SADC countries for monetary integration is assessed in this subsection based on the traditional OCA properties, which include the extent of openness to trade with the world, the level of trade interdependence in the region, and the extent of diversification in the production structures of the economies.

Trade Openness

The openness criterion may also be assessed using the degree of openness *vis-à-vis* the countries with which it intends to share a single currency, the share of tradable *versus* non-tradable goods and services in production and consumption, the marginal propensity to import, and the degree of international capital mobility. Although these concepts may overlap, they are not necessarily synonymous (Mongelli, 2008:6).

Using the ratio of foreign trade over GDP, Table 4.1 below presents an evaluation of the degree of trade openness of the SADC countries. The table indicates that overall, the SADC countries are highly open, with an average openness ratio of 67%. Angola, Lesotho, Mauritius, Swaziland and Zimbabwe display exceptionally high degrees of openness, exceeding 100%. On the other hand, South Africa and Tanzania had ratios below the regional average.

Table 4.1: Trade Openness of SADC Countries (in per cent of GDP), 2010*

	Ratio	Degree of Openness
Angola	100.18	Extremely High
Botswana	72.37	Very High
DRC	64.73	High
Lesotho	157.69	Extremely High
Madagascar**	81.65	Very High
Malawi	77.83	Very High
Mauritius	116.23	Extremely High
Mozambique	68.48	High
Namibia	76.75	Very High
South Africa	54.83	High
Swaziland	123.02	Extremely High
Tanzania	63.84	High
Zambia	79.13	Very High
Zimbabwe	126.25	Extremely High
SADC Average	67.41	Very High

Source: Own calculations using data is from the World Bank database (2010).

Notes: i. *Openness is defined as the ratio (exports + imports)/ GDP.

ii. ** Latest available data is for 2009.

iii. The regional ratio is a trade-weighted average.

Product Diversification

Table 4.2 below shows the nature of production in the SADC countries. The data indicates that there is limited diversification in the exports of the member states and therefore, the countries do not meet this OCA criterion.

Most SADC countries produce primary and “first stop processing” goods that comprise mainly of minerals, fresh- and processed food, and clothing. Particularly, Angola, Botswana, the DRC, Lesotho, Namibia and Zambia rely predominantly on a primary product. The dependency on primary production makes the member states vulnerable to terms of trade losses when there is a sharp decline in commodity prices.

Table 4.2: Main Exports and Imports of the SADC Countries (2009)

	Main Exports (USD, millions)	Some Main Imports (USD, millions)
Angola	Mineral fuels, oils & distillation products (98); Minerals (1)	Machinery (20); transport equipment (12); iron and steel (10); electronic equipment (10)
Botswana	Minerals (77) [diamonds]; clothing (3); fresh food (3)	Mineral fuels, oils & distillation products (13); machinery (10); vehicles (10); minerals (8)
DRC	Minerals (73) [diamonds]; petroleum (17); wood products (4)	Machinery (14); Petroleum (8); electronic equipment (7); vehicles (6)
Lesotho	Clothing (63); minerals (33)	Textiles (23); electronic equipment (22); vehicles (11); machinery (8); pharmaceuticals (8); cotton (7)
Madagascar	clothing (39); coffee, tea, mate & spices (9); Fresh food (8); Mineral fuels, oils & distillation products (4)	minerals (20); machinery (16); chemicals (10); electronic equipment (8);
Malawi	tobacco-related products (64); coffee, tea, mate & spices (7); sugar –related products (6); fresh fruit and seed (5)	Mineral fuels, oils & distillation products (10); vehicles (9); machinery (9); fertilisers (8); electronic equipment (7);
Mauritius	clothing (42); fresh food (13); sugar –related products (12); minerals (4)	Mineral fuels, oils & distillation products (16); machinery (9); electronic equipment (6); fresh food (6); vehicles (5)
Mozambique	Minerals (40) [unwrought aluminium]; Mineral fuels, oils & distillation products (17); tobacco-related products (8)	Mineral fuels, oils & distillation products (15); Minerals (12); vehicles (12); machinery (11); cereals (7)
Namibia	Minerals (53) [zinc, gold and diamonds]; Fresh food (17); chemicals (16);	Machinery (14); electronic equipment (14); ores (13); Mineral fuels, oils & distillation products (8); basic manufactures (6); textiles (6); vehicles (5)
South Africa	Minerals (36); Mineral fuels, oils & distillation products (11); vehicles (9); machinery (7)	Mineral fuels, oils & distillation products (21); machinery (16); electronic equipment (11); vehicles (7); basic manufactures (6)
Swaziland	Sugar-related products (21); essential oils, perfumes, cosmetics, toiletries (13); Processed food (11); clothing (12); machinery (6); wood-related products (6)	Minerals (15); textiles (10); tobacco-related products (9); machinery (7); electronic equipment (6); basic manufactures (5)
Tanzania	minerals (46); coffee, tea, mate & spices (7);	Mineral fuels, oils & distillation products (23); machinery (14); vehicles (12); electronic equipment (7);
Zambia	minerals (79) [copper, cobalt and related products]; sugar- and tobacco related products (2 each)	Machinery (15); mineral fuels, oils & distillation products (14); minerals (9); vehicles (7); electronic equipment (5); fertilisers (5)
Zimbabwe	Minerals (26); printed books, newspapers, etc (19); plants & trees (15); tobacco-related products (12); cotton (5)	Vehicles (15); mineral fuels, oils & distillation products (13); machinery (9); electronic equipment (7); cereals (6)

Source: International Trade Centre (2011).

Notes: i. The percentage shares of national exports/imports are in round brackets.

ii. The main exports/ imports are in square brackets.

Trade Interdependence

Table 4.3 below shows the level of trade interdependence of the SADC countries. The data indicates that there are low levels of trade flows between each member state and the rest of the SADC states and hence, the countries do not meet this OCA property.

Table 4.3: SADC Intra/Inter-Regional Trade (as a percentage of total trade for 2006)

Trade Conducted With:														
	Rest of SADC		Rest of Africa		ASEAN		EU		MERC		NAFTA		Rest of the World	
	X	M	X	M	X	M	X	M	X	M	X	M	X	M
Botswana	11.3	88.7	0.2	0.0	0.1	1.2	74.9	4.1	0.0	0.1	1.8	1.2	10.8	4.6
Lesotho**	27.6	82.2	0.0	0.0	-	-	1.1	0.5	-	-	79.1	0.2	0.1	17.1
Malawi	34	59.6	7.2	2.6	1.1	1.7	39.6	14.8	0.3	0.2	8.3	3.5	12.4	17.4
Mauritius	6.5	8.6	2.6	2.6	1.1	7.8	60.7	34.5	0.0	1.1	8.6	2.2	18.1	43.2
Mozambique	35.7	40.7	0.7	0.4	1.3	4.2	6.5	26.3	0.0	1.2	0.3	3.9	72.5	23.3
Namibia	33.5	83.7	0.9	0.1	2.9	0.7	45.0	5.9	0.0	0.5	6.2	1.6	12.1	7.5
South Africa	10.4	2.8	2.9	3.5	2.4	5.4	31.8	34.6	1.0	3.7	11.5	8.7	39.7	41.2
Swaziland**	76.8	95.9	4.3	0.0	-	-	1.6	0.5	-	0.0	7.5	0.1	7.2	3.4
Tanzania	5.3	13.7	8.5	5.2	1.9	6.6	23.4	17.5	0.0	0.6	1.7	3.8	44.5	52.5
Zambia	29.1	59.8	1.3	2.2	0.1	0.7	12.7	12.8	-	0.2	0.5	2.5	50.4	21.8
SADC Combined*	11.6	12.9	3.0	3.2	-	-	30.1	28.6	0.7	2.8	9.5	7.3	43.6	45.2

Source: Own calculations using statistical data from TIPS database

- Notes: i. * SADC Combined refers to the combined trade of reporting members i.e. the combined total trade for the 10 members currently reporting trade data to the TIPS database.
- ii. **Most recent data available is for 2003 for Lesotho and 2004 for Swaziland.
- iii. X denotes exports, and M denotes imports
- iv. Angola, the DRC and Zimbabwe were excluded from the analysis because they do not report data to UNCOMTRADE or TIPS.

The data indicates that more than 50% of the imports to Botswana, Lesotho, Malawi, Namibia, Swaziland and Zambia are from the SADC region. On the other hand, with the exception of Swaziland, these countries export less than 50% of their products to the rest of the SADC countries. In addition, the data indicates that South Africa and Tanzania trade minimally with the rest of the SADC countries. Overall, the data indicates that there is an imbalance of intra-SADC trade flows. The low levels of intra-regional trade can be attributed partly to the near homogenous nature of production in member states as seen in Table 4.2 above, which shows that most countries export predominantly raw materials and import manufactures. As such, there is no complementarity in production, which necessitates trade between the member states.

Furthermore, other factors such as the poor quality of infrastructure, high tariff protection, restrictive import licensing requirements, and other restrictive non-tariff barriers contribute to the low levels of intra-regional trade between the member states (Kritzinger-van Niekerk and

Moreira, 2002:36). In addition, the over-lapping membership in regional groupings introduces duplication of effort and thus, hinders intra-regional trade (Geda and Kebret, 2007:376).

The low levels of trade interdependence give little support for a region-wide monetary union in the SADC region. However, Botswana, Lesotho, Malawi, Namibia, Swaziland and Zambia import more than 50% of their goods from South Africa, while Mozambique imports over 40%. Hence, it can be argued that Botswana, Malawi, Mozambique and Zambia can benefit from a reduction in transaction costs if they adopted the ZAR as a means of exchange. Presently, only the LNS countries do not incur transaction costs in trade with South Africa as the CMA arrangement stipulates that there should be no transaction costs in conversion of the national currencies of the LNS countries to the ZAR and *vice versa* (Oosthuizen, 2006; Wang *et al*, 2007).

In summary, the evaluation of the performance of the SADC countries based on the traditional OCA properties gives inconsistent recommendations regarding the suitability of the countries for monetary integration. For example, the member states display a high level of trade openness (which implies that the region is suitable for monetary integration), while also having low levels of product diversification (which implies that a flexible exchange rate arrangement is more desirable, hence, they are not suitable for monetary integration).

Similarly, the assessment of the suitability of the SADC countries for monetary integration based on the traditional OCA properties presents the problem of inconclusiveness of the properties. For example, the member states are highly open (which implies that they are suitable candidates for monetary union) yet they display low levels of factor mobility (which implies that they have limited alternative adjustment mechanisms in the face of shocks hence, giving up the exchange rate instrument would be costly).

In addition, the high dependency of the rest of the SADC countries on South African imports suggests that the countries would be suitable for a “Rand” monetary union yet the lack of diversification in production suggests that the countries may require frequent changes in the exchange rate for macroeconomic adjustment hence surrendering the exchange rate instrument would be costly. The suitability of the SADC countries for monetary integration is thus further assessed using additional properties in the subsection below.

4.3.1 Macroeconomic Convergence in the SADC Countries

The suitability of SADC countries for monetary integration can also be assessed by examining the level of macroeconomic convergence within the regional grouping. The convergence criteria for the SADC countries comprise a memorandum of understanding (MOU) agreed upon by the Ministers of Finance of the member countries, which states that the countries need to converge on stability-oriented economic policies set on three progressive targets, the first of which was set for 2008, the second for 2012 and the final target for 2018. These targets are summarised in Table 4.4 below.

Table 4.4: Macroeconomic Convergence Targets for the SADC Countries

Criterion	2008	2012	2018
Inflation Rate	Single digits	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%
Government Debt	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
Central Bank credit to the government	Less than 10% of the previous year's tax income	Less than 5% of the previous year's tax income by 2015	Less than 5% of the previous year's tax income

Source: Rossouw (2006:384).

According to SADC Bankers (2009), the SADC member states opted to make inflation convergence their primary objective as they considered it a more appropriate and realistic convergence target. A broad-based body of macroeconomic indicators could be targeted once progress is made with market integration, to include the ratio of the budget deficit to GDP, the ratio of public sector debt to GDP, and the external balances of the economy.

Researchers have noted that South Africa, being the dominant country in the region that also has a strong currency and a reputation for fighting inflation, would especially need to be persuaded to join the SADC monetary union as the regional currency may not be as strong as the ZAR. Similarly, the monetary union may not have the same anti-inflationary bias as the South African Reserve Bank (SARB). Hence, macroeconomic conditions designed to entice South Africa, and the CMA in general, to partake in a regional monetary union were proposed. These conditions stipulate that:

- i. The inflation rate of any country wishing to join the SADC monetary union should not be more than 1.5% higher than the average of the CMA countries;
- ii. The exchange rate should not be more than 5% higher or lower than that of the CMA countries; and
- iii. The long-term interest rate should not be more than 2% higher than the average observed in the CMA countries (Agbeyegbe, 2003:5).

The performance of the SADC countries based on the macroeconomic convergence targets is assessed below.

Inflation Performance

Table 4.5 below shows the trend in inflation rates of the SADC countries, while Table 4.6 shows the descriptive statistics for the data.

Table 4.5: SADC Inflation Rates

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	268.4	116.1	105.6	76.57	31.02	18.53	12.2	12	12
Botswana	8.5	6.6	8	9.2	7	8.6	11.6	7.1	13
DRC	514	360	32	13	4	21	13	17	17
Lesotho	6.1	6.9	11.9	5.9	5.1	3.5	6	8	11
Madagascar	12	7	16.3	-1.7	13.9	18.4	10.8	10.3	9
Malawi	29.6	27.5	14.8	9.6	11.5	15.4	13.9	8	9
Mauritius	4.7	5.3	5.6	3.9	5.6	3.9	11.9	8.7	10
Mozambique	11.4	21.9	9.1	13.8	9.07	11.1	9.4	8	10
Namibia	9.3	9.3	11.3	7.3	3.9	2.2	5.1	6.7	10
South Africa	5.4	5.7	9.2	5.8	1.4	3.4	4.7	7.1	10
Swaziland	7.3	7.5	11.7	7.4	3.4	4.8	5.3	8.1	14
Tanzania	5.9	5.1	4.6	3.5	4.1	4.3	6.2	7	10
Zambia	25.9	21	38	17	17.5	18.3	9.1	10.7	12
Zimbabwe	55.9	71.9	133.2	365	350	585.8	1 281.8	2 441.1	-

Source: Own table derived from data taken from SADC Bankers (2009).

Table 4.6: SADC Inflation Descriptive Statistics (2000-2008)

	Mean	Median	Maximum	Minimum	Std. Dev.
Angola	87.7	44.0	325.0	12.0	102.6
Botswana	9.0	9.0	13.0	7.0	2.2
DRC	110.1	17.0	514.0	4.0	189.4
Lesotho	7.8	6.0	34.0	-10.0	11.5
Madagascar	10.8	11.0	19.0	-1.0	5.7
Malawi	15.0	14.0	30.0	8.0	7.2
Mauritius	6.3	5.0	10.0	4.0	2.3
Mozambique	11.4	13.0	17.0	7.0	3.2
Namibia	5.8	6.0	10.0	2.0	2.8
South Africa	5.1	6.0	10.0	-1.0	3.4
Swaziland	8.1	7.0	14.0	3.0	3.8
Tanzania	6.1	5.0	10.0	5.0	1.7
Zambia	17.6	18.0	26.0	9.0	5.7
Zimbabwe	3 349.6	292.0	2 4411.0	56.0	8 516.6

Source: Derived using Eviews 7

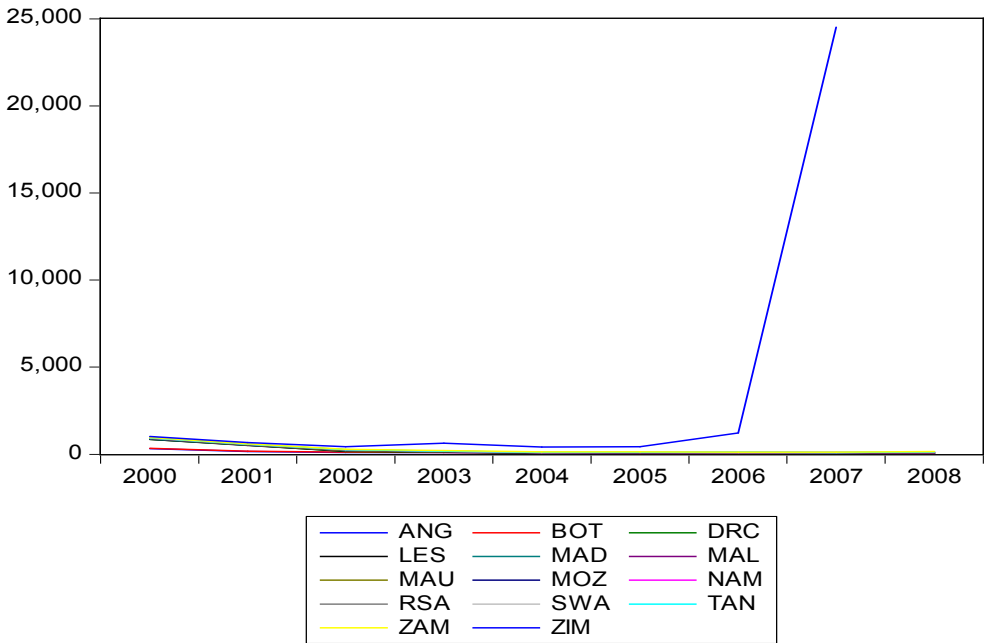
Table 4.5 indicates that the SADC countries experienced varying levels of inflation year-on-year. Table 4.6 shows that Zimbabwe had the highest rate of inflation in the region, with an average rate of inflation of 3 349.63% during this period when the country experienced economic meltdown and hyperinflation. Angola and the Democratic Republic of Congo also experienced hyperinflation during this period, attaining an average rate of 87.67% and 110.11%, respectively, due to the political turmoil they experienced during this period. However, the data indicates that inflation in Angola and the DRC declined significantly in recent years, attaining minimum rates of 12% and 4% respectively. Similarly, inflation in Zimbabwe declined to single digit levels in 2009 when the country abandoned the use of its national currency as a means of exchange⁶³.

Furthermore, the mean values in Table 4.6 indicate that on average Angola, the DRC, Malawi, Zambia and Zimbabwe failed to attain the SADC target of single digit inflation, while Madagascar and Mozambique, were barely above target. In contrast, the CMA countries, Botswana, Mauritius and Tanzania managed to attain single digit average rates of inflation, which they maintained during most of the period as indicated by their median values. South Africa attained the lowest inflation rates on average of 5.11%, while Lesotho at some point in time attained a -10% disinflation.

⁶³ It is important to note that the data for Zimbabwe covers the period during which the country experienced economic turmoil that led to the collapse of the national currency. At present, the country uses a system of multiple-currencies and the economy is slowly turning around. This makes it very difficult to assess the implications of the country joining the regional monetary union.

Figures 4.1 below, shows the inflation trends in the SADC countries between the years 2000-2008.

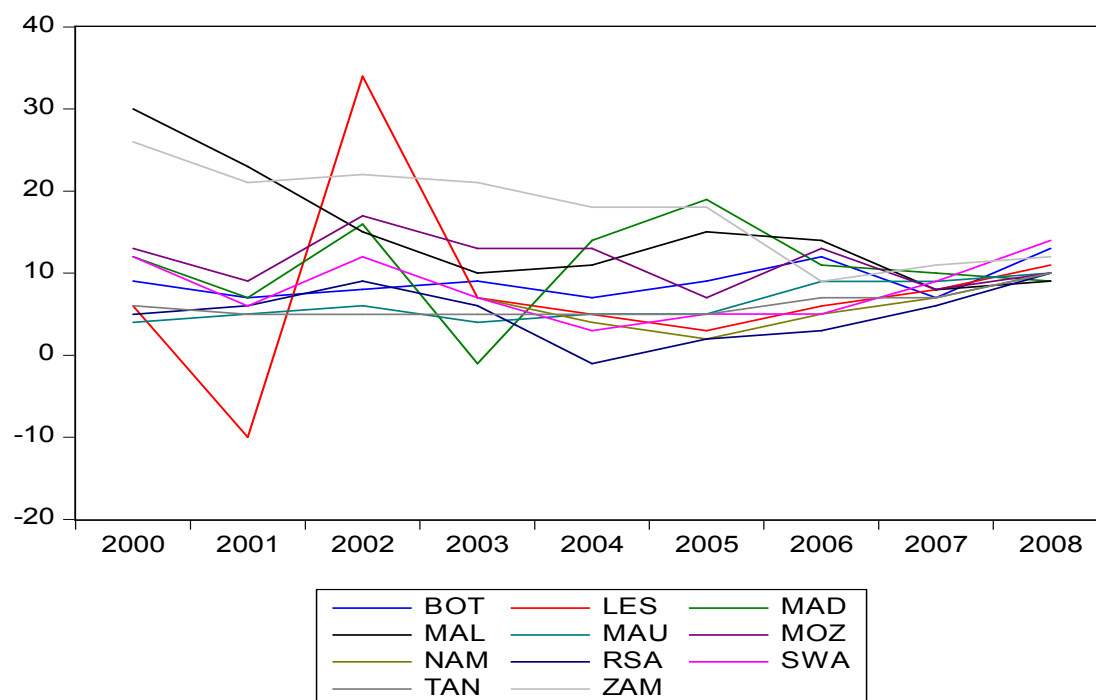
Figure 4.1: Inflation Trends in the SADC Countries (2000-2008)



Source: Derived using Eviews 7

The extremely high inflation rates for Angola, the DRC and Zimbabwe make it difficult to observe the trends in inflation in the rest of the SADC countries. Thus, Figure 4.2 below excludes data from these countries. Figure 4.2 shows that there is evidence of a degree of convergence in the inflation rates of the SADC countries.

Figure 4.2: Inflation Trends in the SADC Countries (excluding Angola, the DRC and Zimbabwe; 2000-2008)



Source: Derived using Eviews 7

The inflation performance of the member states is further assessed in terms of the divergence of the inflation rates of the rest of the countries from that of the CMA average in Table 4.7 below.

Table 4.7: SADC Inflation Differentials *vis-a-vis* CMA Average (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	97.4	93.7	89.6	91.4	88.8	81.2	56.7	37.7	6.3
Botswana	17.4	-11.4	-37.8	28.3	50.7	59.6	54.5	-5.3	13.5
DRC	98.6	97.9	65.5	49.2	13.8	83.5	59.4	56.0	33.8
Madagascar	41.5	-5.0	32.4	488.2	75.2	81.1	51.2	27.4	-25
Malawi	76.3	73.3	25.5	31.2	70.0	77.4	62.1	6.6	-0.25
Mauritius	-49.5	-38.7	-96.9	-69.2	38.4	10.9	55.7	14.1	-12.5
Mozambique	38.4	66.4	-21.2	52.2	61.9	68.7	43.9	6.6	-12.5
Tanzania	-19.1	-44.1	-139.7	-88.6	15.9	19.2	14.9	-6.8	-12.5
Zambia	72.9	65.0	70.9	61.2	80.3	81.0	42.0	30.1	6.25
Zimbabwe	87.4	89.8	91.7	98.2	99.0	99.4	99.6	99.9	

Source: Own table derived from data taken from SADC Bankers (2009).

Agbeyegbe (2003:5) asserts that for South Africa and the rest of the CMA countries to be convinced to join a SADC monetary union, the inflation rates of the non-CMA member states should not be 1.5% higher than the CMA average. The data in Table 4.7 above shows that the non-CMA countries overall do not meet this criterion. The negative percentages indicate

instances where the inflation levels of the respective countries were below the CMA average. Tanzania and Mauritius had the most instances where their inflation was lower than the CMA average, followed by Mozambique, Madagascar and Botswana.

On the other hand, Angola, the DRC, Malawi, Zambia and Zimbabwe on average had levels of inflation that were more than 50% higher than the CMA average. The consistently high inflation differentials between these countries and the CMA average may be a cause for concern for a SADC monetary union. As Honohan and Lane (2003:5) note, the divergent inflation rates may be a reflection of underlying weak intra-regional adjustment mechanisms to shocks. As such, the countries may still face temporary asymmetric shocks to relative price levels from a variety of sources even when convergence occurs in the long run.

The inflation differentials could also be attributed to the different rates at which these countries trade with third countries. Table 4.3 above indicates that, while the LNS countries import more than 80% of their goods from the rest of the SADC countries, South Africa in particular, the non-CMA countries with high inflation differentials import a substantial amount of goods from third countries. Hence, they suffer from imported inflation, which contributes to the inflation differentials.

In summary, Tables 4.5 and 4.6 as well as Figure 4.2 indicate that inflation in the SADC countries is declining, hence, showing signs of convergence. However, Table 4.7 indicates that, with the exception of Botswana, inflation in the non-CMA countries continues to be well above the CMA average. This implies that a region-wide SADC monetary integration would be unsustainable as the relatively higher inflation rates in the non-CMA countries may make it difficult for them to maintain a fixed exchange rate over an extended period and will eventually opt to float.

Furthermore, the CMA countries (South Africa in particular) will not be keen on undertaking monetary integration with high inflation countries, as this would jeopardise the value of its currency and counter its anti-inflationary bias. Thus, a monetary union that includes the CMA countries and the rest of the SADC countries may be unsustainable.

Exchange Rate

Table 4.8 below shows the trend in nominal exchange rates of the SADC national currencies against the United States dollar (USD) over the period 2000-2008.

Table 4.8: SADC Exchange Rates against the USD

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	16.9	32.0	58.9	79.1	85.6	80.8	80.2	75	75.2
Botswana	5	6	6	5	5	5	6	6	7
DRC	50	313.6	409.3	372.5	444.1	431.3	5 076.2	502.9	639.3
Lesotho	7	9	11	8	6	6	7	7	8
Madagascar	1 353	1 318	1 366	1 238	1 869	2 003	2 142	1 874	1 708
Malawi	60	72	77	97	109	118	136	140	141
Mauritius	26	29	30	28	27	29	32	31	28
Mozambique	15	21	24	24	23	23	25	26	24
Namibia	7	9	11	8	6	6	7	7	8
South Africa	7	9	11	8	6	6	7	7	8
Swaziland	7	9	11	8	6	6	7	7	8
Tanzania	800	876	967	1 038	1 089	1 129	1 252	1 245	1 196
Zambia	3 111	3 611	4 399	4 733	4 779	4 464	3 603	4 003	3 746
Zimbabwe	55.1	55.0	55.0	826.4	5 729.3	27.4	250	30 000	4 894 167

Source: Own table derived from data taken from the IFS database for the IMF (2010).

Table 4.8 shows that a high level of divergence in the exchange rates of the SADC countries. The SACU countries are at one extreme, maintaining very strong exchange rates against the US dollar throughout the period, while the rest of the countries had very weak exchange rates. The data indicates the importance of the exchange rate in the SADC countries as a stabilisation tool for macroeconomic policies, especially in the DRC, Madagascar, Tanzania, Zambia and Zimbabwe, which are the countries that maintained extremely high exchange rates. As McCarthy (2002:26) observes, this implies that removing the exchange rate from each member state's portfolio of policy instruments will restrict their ability to manage external shocks.

Agbeyegbe (2003:5) further proposes that for South Africa and the rest of the CMA countries to be convinced to join a SADC monetary union, the exchange rates of the non-CMA member states should not be more than 5% higher or lower than the CMA average. This proposition was considered in Table 4.9 below.

Table 4.9: SADC Exchange Rates *vis-a-vis* CMA Average (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	58.8	71.9	81.3	89.9	92.9	92.6	91.3	90.7	89.3
Botswana	-40.0	-50.0	-83.3	-60.0	-20.0	-20.0	-16.7	-16.7	-14.3
DRC	86.0	97.1	97.3	97.9	98.6	98.6	99.8	98.6	98.7
Madagascar	99.5	99.3	99.2	99.4	99.7	99.7	99.7	99.7	99.6
Malawi	88.3	87.5	85.7	91.8	94.5	94.9	94.9	95.0	94.3
Mauritius	73.1	68.9	63.3	71.4	77.8	79.3	78.1	77.4	71.4
Mozambique	53.3	57.1	54.1	66.7	73.9	73.9	72.0	73.1	66.7
Tanzania	99.1	98.9	98.9	99.2	99.4	99.4	99.4	99.4	99.3
Zambia	99.8	99.8	99.7	99.8	99.9	99.9	99.8	99.8	99.9
Zimbabwe	87.3	83.6	80.0	99.0	99.9	78.0	97.2	100	100

Source: Own table derived from data taken from the IFS database for the IMF (2010).

Table 4.9 shows that with the exception of Botswana that maintained a stronger exchange rate than the CMA average throughout the period, all non-CMA SADC countries maintained exchange rates that were over 50% higher than the CMA average. In the extreme case, Angola, the DRC, Madagascar, Malawi, Tanzania, Zambia and Zimbabwe had, on average, exchange rates that were over 90% higher than the CMA average. The data emphasises the importance of the exchange rate as a policy tool for these countries. This implies that the non-CMA countries are not ready to implement a permanently fixed exchange rate mechanism with the CMA countries and therefore, are not ready for monetary integration.

Nominal Interest Rate

Table 4.10 shows the long-term interest rate on government debt for the SADC countries, while Table 4.11 shows the difference between the interest rates of the rest of the SADC states and the CMA average.

Table 4.10: SADC Nominal Interest Rates (%; 2000-2008)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	-61	-6	-11	-3	28	25	4	13	-9
Botswana	3	9	13	13	10	4	0	1	0
DRC	-57	-45	26						
Lesotho	11	7	3	13	6	7	3	5	6
Madagascar	18	17	9	21	10	7	16	32	32
Malawi	17	24	-13	37	19	15	12	19	15
Mauritius	18	13	14	14	14	16	13	13	13
Mozambique	6	7	17	19	14	10	8	11	10
Namibia	-9	3	3	14	9	5	2	3	0
South Africa	5	6	5	10	5	5	4	4	4
Swaziland	14	6	5	8	5	4	2	2	4
Tanzania	13	12	10	7	5	-4	10	7	6
Zambia	7	18	20	17	10	9	9	6	8
Zimbabwe	8	-22	-39	-59	-21	-1			

Source: Own table derived from data taken from the IFS database for the IMF (2010).

Table 4.11: SADC Nominal Interest Rates *vis-a-vis* CMA Average (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	108.61	191.67	136.36	475.0	77.68	79.0	31.25	73.08	138.89
Botswana	-75.0	38.89	69.23	13.46	37.50	-31.25	-	-250	-
Madagascar	70.83	67.65	55.56	46.43	37.50	25.0	82.81	89.06	89.06
Malawi	69.12	77.08	130.78	69.59	67.10	65.0	77.08	81.58	76.67
Mauritius	70.83	57.69	71.43	19.64	55.36	67.19	78.85	73.08	73.08
Mozambique	12.5	21.43	76.47	40.79	55.36	47.50	65.63	68.18	65.0
Tanzania	59.62	54.17	60.0	-60.14	-25.0	231.25	72.5	50.0	41.67
Zambia	25	69.44	80.0	33.82	37.50	41.67	69.44	41.67	56.25
Zimbabwe	34.38	125.0	110.26	119.07	129.76	625.0	-	-	-

Source: Own table derived from data taken from the IFS database for the IMF (2010).

Note: The DRC was excluded due to insufficient data.

According to Agbeyegbe (2003:5), the nominal interest rates for the rest of the SADC countries should not be more than 2% higher than the average observed in the CMA countries. Table 4.11 however indicates that none of the countries had interest rates close to the CMA average. The negative values indicate instances where the respective interest rates were lower than the CMA average. Only Botswana and Tanzania had a few instances where their interest rates were lower than the CMA average.

On the other hand, Angola and Zimbabwe had the highest interest rate differential *vis-a-vis* the CMA average followed by Malawi, Madagascar and Mauritius. The disparity in the interest rates of the non-CMA members implies that the financial markets of these countries are not integrated with those of the CMA countries hence; the countries are not ready for monetary integration.

Deficit-to-GDP and Debt-to-GDP Ratios

Table 4.12 below shows data on the fiscal balance of the SADC countries. The requirement for monetary integration is that the fiscal deficit of each country should not exceed 3% of its GDP by 2012.

Table 4.12: SADC Deficit-to-GDP Ratio (2000-2008)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Angola	5	14	29	57	81	100	113	127	143
Lesotho	-	-3	-4	1	8	4	13	9	-
Mauritius	-1	-4	-4	-3	-3	-2	-3	-2	-
South Africa	-2	-1	-2	-3	-2	0	1	2	-
Tanzania	81	85	86	91	95	100	107	115	127
Zambia	-	2	-2	1	2	-5	2	-1	-

Source: Own calculations derived from data taken from the World Bank (2010).

Note: i. Botswana, the DRC, Madagascar, Malawi, Mozambique and Zimbabwe do not report on these variables to the World Bank.

ii. Namibia and Swaziland have several missing variables hence they were excluded.

Table 4.12 indicates that of the countries that report data on their fiscal balance, only Angola and Tanzania had deficit levels that are extremely high, exceeding 100% of GDP during the period 2000-2008. The rest of the countries, on the other hand, had favourable ratios implying that they would meet the required target. Lesotho, Mauritius, Namibia, South Africa and Zambia had negative deficit-to-GDP ratios for some periods, indicating periods where these countries had budget surpluses.

Table 4.13 below shows the level of public debt of the SADC countries. It is required that the public debt of the member states should not exceed 60% of their GDP.

Table 4.13: SADC Debt-to-GDP Ratio (2000-2007)

	2000	2001	2002	2003	2004	2005	2006	2007
Angola	103	94	76	62	47	41	23	21
Botswana	7	7	8	6	5	4	4	3
DRC	272	246	181	198	173	146	127	123
Lesotho	86	84	98	71	59	48	43	41
Mauritius	38	38	40	48	38	50	41	63
Mozambique	171	120	120	83	84	69	42	39
South Africa	19	20	23	16	13	13	14	15
Swaziland	18	20	27	20	18	17	15	14
Tanzania	76	66	70	68	69	55	30	30
Zambia	177	168	177	155	138	75	21	24
Zimbabwe	52	35	18	61	102	124	-	-

Source: Own table derived using data from the World Bank (2010).

Note: Madagascar, Malawi and Namibia do not report data on these variables to the World Bank.

The data indicates that the debt-to-GDP ratio in Angola, the DRC, Lesotho, Mozambique, Tanzania and Zambia was initially very high but has been declining over the years. The DRC is the only country that has not managed to reduce its debt levels, while Zimbabwe's debt levels appeared to be rising over the years. On the other hand, Botswana and South Africa, the strongest economies in the region, showed consistently low levels of the debt-to-GDP ratio, with Botswana reporting the lowest levels relative to all the SADC countries.

4.4 OTHER RELEVANT CRITERIA

An evaluation of the economic performance of the member states is conducted so as to determine the implications for economic convergence. The assumption is that if the poorer economies are growing at a faster rate than the richer ones, then the SADC economies are converging. However, if there were a disparity in their economic performance then they would have different and possibly conflicting priorities in terms of national macroeconomic objectives. This implies that individual countries would still require the use of national monetary and exchange rate policy to stimulate their economies. Thus, the countries would not be suitable for monetary integration at present.

4.4.1 Economic Performance of SADC Countries

Table 4.14 below shows the economic performance of the SADC countries since 1990 using the economic size and growth performance of the member countries. The table indicates that there is a large disparity in the GDP levels of the SADC countries, with South Africa having real GDP levels that were over hundred times greater than the rest of the countries. Angola, Tanzania and Botswana were the second, third and fourth largest performers, respectively.

Furthermore, the economies show a significant divergence in their growth rates. During the period 1990-1994, there was slow growth in the member states, with Zambia, the DRC and Angola experiencing negative growth rates, while Botswana, Lesotho, Namibia, Swaziland and Mauritius performed better than the rest of the countries. During the period 1995-1999, Angola, Botswana, Malawi, and Mozambique grew faster than the rest of the countries. These countries, with the exception of Malawi, consistently showed positive growth during the periods 2000-2004 and 2005-2008.

Table 4.14: Annual Average GDPs (USD mil.) and Annual Average Growth Rates (%)

	1990-1994		1995-1999		2000-2004		2005-2008	
	GDP	Growth	GDP	Growth	GDP	Growth	GDP	Growth
Angola	7 308.26	-11.7	7 926.18	7.58	10 569.06	7.88	19 511.34	19.1
Botswana	3 717.70	4.7	4 870.7	7.19	6 826.71	6.18	8 296.91	3.50
DRC	6 320.94	-8.58	4 965.48	-2.36	4 483.50	1.38	5 701.20	6.45
Lesotho	594.29	4.36	723.54	4.02	830.74	3.06	986.39	3.68
Madagascar	3 148.0	0.006	3 426.9	3.22	3 933.6	2.62	4 733.59	5.73
Malawi	1 290.79	0.67	1 593.94	7.94	1 689.07	1.56	2 073.01	5.30
Mauritius	3 022 057	5.15	3 855.14	5.00	4 863.89	5.24	5 703.35	4.60
Mozambique	2 639.39	1.73	3 549.21	8.50	5 115.84	7.72	7 214.74	8.06
Namibia	2 899.86	4.38	3 530.02	3.20	4 235.29	3.03	5 423.08	4.60
South Africa	109 866.88	0.20	122 564.68	2.58	141 975.69	3.61	172 716.21	5.01
Swaziland	1 085.91	3.90	1 268.87	3.54	1 549.87	2.20	1 744.28	2.80
Tanzania	6 994.20	2.52	8 046.91	3.98	10 333.46	6.56	13 904.33	7.15
Zambia	3 021.28	-0.36	3 027.20	2.30	3 538.95	4.28	4 482.48	5.90
Zimbabwe	6 795.14	2.72	7 900.99	1.64	6 716.15	-5.44	5 618.11	-6.00

Source: Own calculations using data from SADC bankers (2010) and the World Bank (2010).

Note: GDP is at current market prices.

In general, most economies showed positive growth rates, although Angola, Mozambique and Tanzania grew faster, on average, than the rest of the member states. Growth in South Africa however, has remained slow, even though it is the largest economy in the region, while Mauritius maintained almost the same growth rate throughout the period.

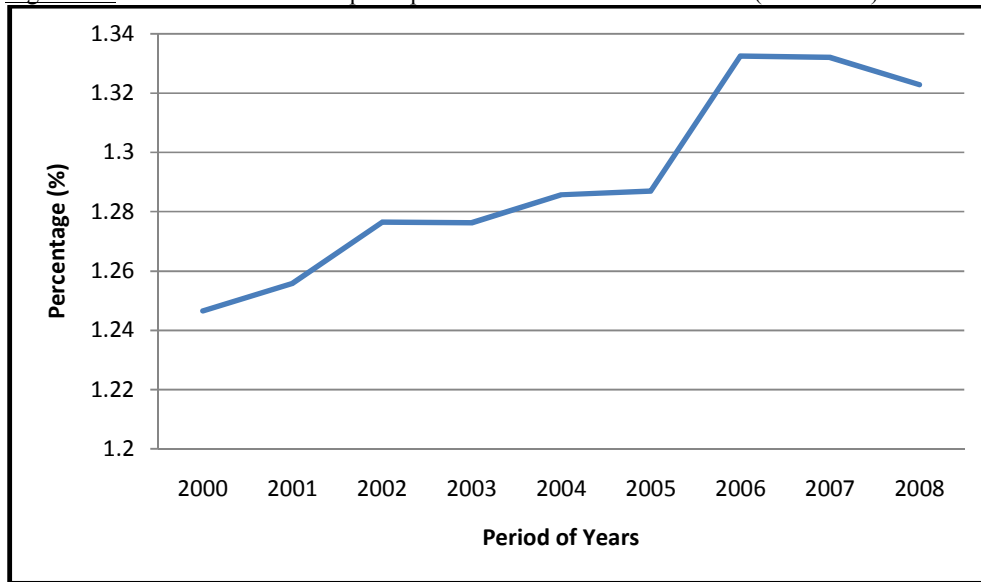
In conclusion, it appears that although the SADC countries display positive growth rates although there is no evidence of convergence in their economies. The richer countries continue to maintain GDP levels that are much higher than the poorer countries. This implies that the macroeconomic objectives of the richer and poorer countries will differ. The poorer countries will prioritise policies aimed at poverty reduction and stimulating economic growth, while the richer countries are more intent on improving their competitiveness. As such, the relative importance of domestic policy instruments differs between these countries. Therefore, the members states ought to take precautions against premature converge in macroeconomic stability indicators.

4.4.2 Level of Economic Convergence

The level of real economic convergence is measured using the standard deviation of per capita income of the individual countries (cf. Quah, 1996; Jenkins and Thomas, 1997; and

Rassekh, 1998). Figure 4.3 below displays the standard deviation of the log of per capita income of the SADC countries, while Figure 4.4 displays that of the subset of the SACU countries for the same period.

Figure 4.3: Standard Deviation of per capita GDP for the SADC countries (2000-2008)



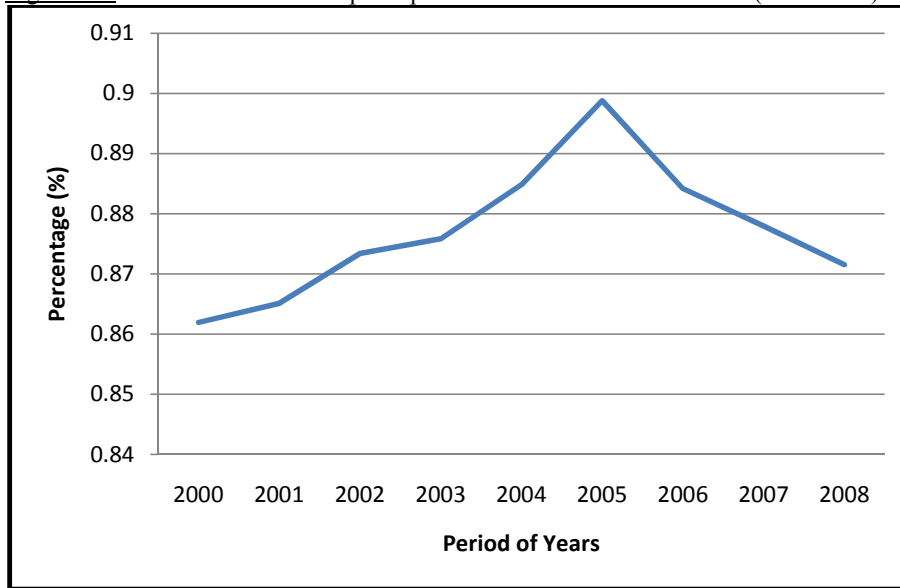
Source: Derived using data from the World Bank (2010)

Figure 4.3 indicates that the standard deviation in the per capita GDP of the SADC countries has been increasing from 2000 to 2007. The values of the standard deviation are greater than one, indicating that the divergence in the performance of the economies increased over the years. However, there was a slight decline in the standard deviation in 2008. This coincides with the launch of the SADC FTA in 2008.

It is hoped that the decline in the standard deviation would continue in the future. The SADC FTA opens up the South African market to exports from the smaller countries, which offers an opportunity for growth in these countries provided they are able to take advantage of the technological progress in South Africa and therefore “catch up” with the richer countries⁶⁴. However, the necessary changes to foster economic growth in the poorer countries are of a structural nature and will therefore; take time to reflect in the incomes of the member countries.

⁶⁴ Provided the poorer countries ensure they have the adequate institutions to take advantage of technological innovations in South Africa (Gerschenkron, 1952; Rassekh *et al*, 2001).

Figure 4.4: Standard Deviation of per capita GDP for the SACU countries (2000-2008)



Source: Derived using data from the World Bank (2010).

Figure 4.4 indicates that income levels in the SACU countries diverged from 2000 to 2005, although to a lesser extent than the SADC countries combined. However, the standard deviation in their incomes displayed a downward trend from 2006, implying that their incomes were converging.

It is important to note that Quah (1996) points out that the σ -convergence approach should be interpreted as an indication of the average behaviour of the sample rather than that of the entire distribution. For example, Kweka *et al* (2006:256) found that some countries with low GDP such as Tanzania were experiencing positive growth rates and thus “catching up” with good performers such as Botswana. This was observed in Table 4.14 above, where countries such as Angola, Mozambique and Tanzania grew significantly, while poorer countries such as Lesotho, Malawi and Zambia showed low levels of growth.

4.4.3 Level of Financial Development

There are three main indicators of financial depth cited in literature, which are: the ratio of liquid liabilities (or M_2) relative to nominal GDP, the ratio of commercial bank credit to the private sector relative to nominal GDP, and the ratio of private sector credit relative to liquid liabilities. The first indicator, the ratio of liquid liabilities to nominal GDP, is a measure of the size of the financial system in an economy. The ratio is an indicator of the extent to which

the commercial banks are able to mobilise deposit money relative to the size of the economy (Beck *et. al*, 2000:6).

The second indicator, the ratio of private sector credit to GDP, is a measure of the size and efficiency of the financial system. The ratio is an indicator of the important role played by the financial sector, particularly commercial banks, in financing the economy. There are two underlying assumptions behind this measure; the first one is that credit to the private sector generates larger increases in investment and productivity than credit to the public sector (Beck *et. al*, 2000:7). The second assumption is that central banks are less likely to identify profitable investments, monitor managers, facilitate risk management and/or mobilise savings (hence, the potential substitutability between public and private credit, particularly for less developed countries) (Garcia-Herrero *et. al*, 2003: 340). The third indicator, the ratio of private sector credit to liquid liabilities, is a measure of the efficiency of the financial system. The ratio is an indicator of the extent to which commercial banks are able to use deposit money from the economy to lend to the private sector.

The data in Table 4.15 below indicates that the financial systems in most of the SADC countries are shallow. The data indicates that the domestic commercial banks are inefficient in financing the economies of the member states. Angola, Mozambique and Zimbabwe had extremely high average ratios in some periods, which Mckinnon and Pill (1997), and Kaminsky and Reihnart (1999) caution could be an indication of financial crises. This assertion applies to the latter group of countries, which individually experienced economic turmoil at different times during the period under consideration.

Table 4.15: Average Ratios of Private Sector Credit to GDP (%)

	1990-1994	1995-1999	2000-2004	2005-2009
Angola	3 426 447.59	0.06	0.11	0.04
Botswana	-	11.79	-	0.09
DRC	-	0.05	0.04	0.03
Lesotho	-	-	0.22	0.22
Madagascar	-	-	0.42	0.03
Mauritius	-	0.36	0.09	0.00
Mozambique	2 425.59	144.71	15.61	0.14
Namibia	-	-	0.01	-
South Africa	0.93	0.34	0.05	0.02
Swaziland	0.23	0.17	0.10	0.02
Tanzania	-	-	-	0.67
Zambia	-	0.31	0.15	0.06
Zimbabwe	644.14	444.91	155.12	2 864.73

Source: Own calculations using data from SADC bankers (2010); IFS (2011)

From 4.16 below, it was observed that on average, the financial systems in Mauritius and South Africa are most efficient in mobilising deposit money relative to the size of the economy, followed by the financial systems in Lesotho, Namibia, Swaziland and Botswana, respectively. In addition, the data indicates that the financial system in Madagascar has steadily grown over the years, implying an improvement in financial development. Angola, the DRC, Mozambique and Zimbabwe had ratios that were too high in some periods, further affirming the occurrence of financial crises in these countries.

Table 4.16: Average Ratios of Liquid Liabilities to GDP (%)

	1990-1994	1995-1999	2000-2004	2005-2009
Angola	26 481 454.02	22.51	16.83	25.93
Botswana	21.25	19.90	21.89	-
DRC	947 531 215.95	0.30	3.78	11.01
Lesotho	34.16	34.77	31.89	39.45
Madagascar	0.00	0.00	18.14	19.78
Malawi	20.44	15.84	15.48	7.22
Mauritius	67.59	76.61	80.34	29.57
Mozambique	23 833.49	17 276.20	24 061.83	29.43
Namibia	28.23	39.47	29.69	-
South Africa	45.03	50.84	55.55	66.50
Swaziland	24.23	21.83	20.74	11.20
Tanzania	15.58	16.50	15.84	32.21
Zambia	15.05	17.53	14.26	20.83
Zimbabwe	0.00	0.00	0.00	548 805.38

Source: Own calculations using data from SADC Bankers (2010); IFS (2011)

Table 4.17: Average Ratios of Private Sector Credit to Liquid Liabilities (%)

	1990-1994	1995-1999	2000-2004	2005-2009
Angola	8.50	19.86	22.66	-
Botswana	66.39	59.91	73.31	46.64
DRC	5.80	8.09	13.75	32.92
Lesotho	44.59	53.94	31.70	27.40
Madagascar	-	-	39.98	52.99
Malawi	54.17	28.88	28.79	39.28
Mauritius	55.30	66.71	69.61	64.00
Mozambique	49.13	69.87	56.84	56.02
Namibia	81.04	95.92	106.56	-
South Africa	122.68	122.59	116.40	123.67
Swaziland	71.07	64.44	68.66	92.76
Tanzania	35.00	24.90	42.43	63.79
Zambia	40.09	43.03	47.96	51.02
Zimbabwe	-	-	-	12.05

Source: Own calculations using data from SADC Bankers (2010)

From Table 4.17 above, it was observed that Madagascar, Mauritius, South Africa and Namibia showed a consistent increase in the efficiency of their financial systems, while the rest of the countries had mixed patterns. Of particular interest is that private sector credit was consistently in excess of liquid liabilities in South Africa, while that in Namibia exceeded liquid liabilities from the year 2000. On the other hand, it was assumed that the excess credit was extended from external sources of funds. The increases in efficiency in Angola, the DRC and Zambia are once again considered with caution, as the too rapid growth in private credit may be an indication of financial crises.

In summary, the three measures of financial development indicate that Madagascar, Mauritius, Namibia and South Africa are improving in both the size and efficiency of their financial systems, while Malawi is slow in improving the efficiency of its financial system. The financial systems in the rest of the SADC states are still under-developed.

An additional measure of financial development is the degree of banking sector concentration in a country, which gives an indication of the level of competition in the financial sector. The measure makes use of an index ranging from 0-1, calculated as the assets of the three largest banks as a share of assets of all commercial banks in a particular country (Beck *et. al*, 2000). An index close to one indicates a high bank concentration, which implies that the three largest banks own most of the assets in the banking sector. As such, competition in the sector

is relatively low and these banks can exercise monopolistic power in the determination of market rates and prices independent of central bank actions. Figure 4.18 below, shows the degree of banking sector concentration in the SADC countries.

Table 4.18: Bank Concentration (1991-2004)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Botswana	1	1	0.9	0.9	0.9	0.9	0.9	1	1	0.9	0.9	0.9	0.8	0.8
Lesotho	-	-	-	-	1	-	-	-	-	1	1	1	1	1
Madagascar	-	-	-	1	1	-	-	1	0.8	0.8	0.8	0.8	0.8	0.9
Malawi	-	-	-	-	-	0.9	0.9	1	0.9	0.8	0.8	0.8	0.8	0.9
Mozambique	-	-	-	-	-	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	1
Namibia	-	1	1	1	1	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9
South Africa	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8
Swaziland	-	-	-	-	-	-	1	-	1	0.9	0.9	0.8	0.8	1
Tanzania	-	-	-	-	-	1	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6
Zambia	-	1	0.8	0.9	0.8	0.8	0.9	0.7	0.7	0.6	0.6	0.6	0.6	0.6

Source: Beck *et. al* (2000); Johns (2009)

Table 4.18 shows that banking sector concentration in most of the SADC countries is high, which is an indication that competition within the banking sectors of these countries is relatively low. Hence, the financial systems in the SADC countries are shallow. The implication drawn from the data is that the banking sector exercises monopolistic power in the determination of market rates and prices, which in turn hinders the transmission of monetary policy in these countries.

Lastly, Table B.4 in Appendix B shows the structure of the financial markets as well as the monetary policy instruments used in the SADC countries. The information shows that the financial markets in most of the member states are shallow and under-developed. This implies that the transmission of monetary policy will be inefficient in the member states. It is therefore, assumed that monetary integration between the SADC countries will result in varying changes in output and prices across countries. Sections 4.4.1 and 4.4.2 indicate that the SADC countries have divergent output level and the respective growth rates. From this, it can be assumed further that monetary integration is likely to widen cyclical variation between countries.

4.5 LESSONS AND CHALLENGES FOR MACROECONOMIC CONVERGENCE

Cobham and Robson (1992), McCarthy (2002), Masson and Pattilo (2003), Arroyo (2003), and Maruping (2005) identify some lessons from the EU's experience with respect to economic and monetary integration that are relevant to developing nations. These lessons are discussed below.

To begin with, Maruping (2005:145) notes that for macroeconomic convergence to work there must be key determinants in place, such as a consensus on the convergence criteria, the implementation modalities, as well as a commitment to agreed obligations. Presently, however, the main macroeconomic objectives of SADC countries differ due to a difference in the relative importance of each policy in the country. The poorer countries such as Malawi and Zambia focus on poverty reduction and macroeconomic reforms for stabilisation. While the richer countries such as Botswana, Mauritius, Namibia and South Africa are intent on building competitiveness for their external sector and attracting inward and outward investment. This influences each country's commitment towards achieving the macroeconomic convergence targets and harmonising policies (Kweka *et al*, 2006:253).

A more appropriate approach would be to allow for variable speed, geometry and depth of MEC in the countries (Maruping, 2005; and Drábek, 2005). Consideration needs to be given for instance, to the level of unemployment at which policy convergence would be acceptable on political grounds. McCarthy (2002:19) further points out that premature adherence to convergence targets in a group of countries, such as the SADC countries, that are exposed to asymmetric external shocks would be a bad policy. As long as the SADC countries do not have effective alternative mechanisms for adjustment, it would not be in the interest of macroeconomic stabilisation to expect convergence in interest rates and exchange rates.

In addition, Drábek (2005:163) points out that the countries may need to agree on rules that allow for more flexibility in the interpretation of the MEC targets should they find them to be unrealistic. Granted, changing the targets may damage the credibility of policy in the region. However, adhering to wrong targets may adversely affect macroeconomic stabilisation in the region. Thus, careful consideration needs to be given to the targets and their speed of implementation.

Another lesson drawn from the EU experience is that macroeconomic convergence requires that there be efficient product and factor markets in place. Convergence in inflation rates when some countries maintain restrictions on capital flows while others do not, will give rise to interest rate differentials maintained through restrictions on the movement of capital across borders. In turn, the differences in interest rates would lead to different incentives to investment and hence, different growth paths (Drábek, 2005:160).

Furthermore, the low interest rates and high-expected rates of return⁶⁵ could contribute to overly optimistic income expectations and a “wrong” incentive structure of investment in some of the countries. This may result in overheating economies and a loss of competitiveness. The affected economies may be forced to undergo a prolonged deflation to regain competitiveness (Tavlas, 2008:11).

The countries with high interest rates may on the other hand, experience higher inflation rates. Thus, according to Drábek (2005:161), product and factor markets need to function reasonably well in order to ensure sustainability of macroeconomic policies and to meet convergence targets. While it may be possible to harmonise *some* elements of macroeconomic performance, it would not be possible to harmonise *all* of them in countries whose markets are not integrated completely economically.

The SADC countries face challenges in achieving macroeconomic convergence given that a number of the member states continue to have serious debt problems as well as its management⁶⁶. According to Kweka *et al* (2006:242), member countries ought to adopt common targets towards reducing external debt and/or aid surges to a sustainable level in order to achieve macroeconomic convergence. They argue that a reduction in both the budget deficit and current account deficits would make it possible for countries to stabilise the external debt-to-GDP-ratio. The intuition is that an increase in the government budget deficit is associated with larger deficits of current international payments, implying a faster build-up of both government budget deficit and external debt. Thus, a reduction in the government deficit will lead to a reduction in the external debt-to-GDP-ratio.

⁶⁵ Due to the low area-wide inflation rate maintained by the regional central bank.

⁶⁶ Of the SADC countries, the Democratic Republic of Congo, Madagascar, Malawi, Mozambique, Tanzania and Zambia are listed as part of the world's 40 heavily indebted poor countries.

However, Drábek (2005:163) argues that the high fiscal deficits prevalent in some of the SADC countries are unsustainable in the absence of donor support. The solution to the debt problem thus requires not only domestic adjustment, but also an agreement with external donors. Until the latter is attained, it will be difficult for the SADC countries to achieve convergence.

4.6 AN ALTERNATIVE CONSIDERATION TO MONETARY INTEGRATION

There have been studies that have suggested extending the Common Monetary Area (CMA) to include all SADC countries and thus, have the South African Rand (ZAR) circulated as a common currency within the region⁶⁷. The US dollar is another currency that is a means of exchange in a number of SADC countries, namely the DRC, Zambia and presently in Zimbabwe⁶⁸ when their national currencies collapsed. The DRC and Zambia are partially dollarised, while Zimbabwe uses a system of multiple currencies, which includes both the ZAR and the US dollar.

This section considers the possibility of approaching monetary integration within the SADC region through either dollarisation (which may entail substituting the national currencies of the member states for either the USD or the ZAR) or a “Rand” monetary union (which may entail an extension of the CMA arrangement). A comparison between dollarisation within the SADC region and an extension of the CMA arrangement is therefore, carried out in this section.

To begin with, both monetary arrangements offer potential benefits of increasing credibility of monetary policy of the participating countries as well as instilling fiscal discipline. The non-CMA SADC countries could benefit from using either the USD or the ZAR, as these are strong currencies with reputations for fighting inflation. Thus, the member states could benefit from importing monetary policy credibility from the anchor country. Presently, only Lesotho, Namibia and Swaziland (the LNS countries) benefit from importing policy credibility from the SARB under the CMA arrangement.

⁶⁷ See Masson and Pattilo (2003), Buiguit and Valev (2006) and Aziakpono *et. al* (2007).

⁶⁸ Which uses multiple currencies, including the ZAR.

However, both arrangements entail the loss of autonomy over monetary policy. The anchor country will effectively determine monetary policy for the SADC region as a whole. Under a dollarisation system, the SADC countries will completely relinquish monetary policy autonomy and thus, have no say in the pace of national monetary policy; while on the other hand, there is a possibility of amending the CMA arrangement to allow monetary policy to be determined collectively by the member states. Under the current CMA arrangement, the SARB is the only central bank that engages actively in discretionary monetary policy, while policies in the LNS countries are managed along the line of the SARB policy. The SARB consults the governors of the central banks of the LNS countries before setting monetary policy but has no obligation to include the LNS countries in the monetary policy decision process (Aziakpono, 2008:191).

In addition, both arrangements entail the loss of seignorage revenue for the smaller SADC states. Under the current CMA arrangement, South Africa compensates the LNS countries for forgone seignorage based on a pre-determined formula (Wang *et al*, 2007:8). However, there is on-going dispute concerning the revenue sharing formula, which implies that such an arrangement may not be sustainable within a larger group of countries. Dollarisation, on the other hand, does not guarantee an agreement whereby the anchor country compensates the dollarised state for forgone seignorage. It is however, possible for the anchor country and the dollarised state to negotiate such an arrangement through a treaty (Calvo, 1999; Schmitt-Grohé and Uribe, 2000; Berg and Borensztein, 2000; Chang, 2000b; Araujo and Leon, 2003). However, given the current problems faced by the CMA countries concerning revenue sharing, South Africa may not be in a position to compensate *all* the SADC states for forgone seignorage revenue. Hence, both arrangements are undesirable in this aspect.

The SADC FTA presents further problems for the smaller SADC countries as the arrangement calls for the reduction and eventual removal of intra-regional tariff and non-tariff barriers on goods and services. This implies that the smaller SADC countries will incur a reduction in revenue in the form of customs duties currently charged on goods imported from other SADC member states. In addition, the SADC FTA is likely to result in polarised development. South Africa, which is predominantly industrialised, is endowed with more of every factor on a *per capita* basis than the smaller SADC countries. Thus, increased regional integration implies that production will relocate from the smaller SADC countries to least-cost producers in South Africa. This implies that the smaller countries will incur further

reductions in revenue in the form of export revenue; while on the other hand, their imports from South Africa will rise.

This in turn implies that there will be a widening in both the current account and budget deficits of the smaller SADC countries. In addition, the elimination of the source of productivity improvement in the smaller SADC countries is likely to widen the income gap between South Africa and its fellow SADC members, which counteracts the aim of regional integration.

An added disadvantage with both monetary arrangements is that the smaller SADC countries would be powerless to respond to external shocks that are asymmetric to the anchor country. Under the current CMA arrangement, monetary policy in the LNS countries is designed to ensure that the exchange rate peg within the CMA is maintained through sufficient foreign reserves and that interest rates are kept at levels that prevent any distortions to the fixed exchange rates. Hence, there is limited or no scope for discretionary monetary policy (Nielsen *et al*, 2005; Oosthuizen, 2006; Aziakpono, 2008). Table 4.3 indicates that South Africa trades extensively with the EU and the rest of the world, which implies that it is vulnerable to shocks from these countries. Similarly, the US is a large open economy that trades extensively with other economies. This in turn, implies that the smaller SADC countries are susceptible to economic contagion from the rest of the world. However, with no autonomy over national monetary policy, the smaller SADC countries are likely to endure economic recession.

In summary, an extension of the CMA arrangement is more favourable than dollarisation within the SADC region. However, a “Rand” monetary union has disadvantages that may not be acceptable to some of the SADC member states. An important matter is the issue of sovereignty; the non-CMA SADC members may not be willing to surrender monetary policy autonomy to the South African Reserve Bank. Hence, the member states may have to revise the CMA arrangement to allow all central banks to have a say in the conduct of monetary policy.

4.7 CONCLUSION

The aim of this chapter was to ascertain the implications of a monetary union within the SADC countries. The approach of the chapter was to first review available literature on the feasibility of monetary integration within the SADC countries before an assessment was carried out on the extent to which the SADC countries meet the OCA properties.

A common finding of the studies carried out on the SADC countries is that a region-wide monetary union is not feasible at present. However, a number of studies suggest an extension of the CMA arrangement as an alternative approach to monetary integration. There is however, no consensus on which countries should be allowed to join the CMA arrangement. Buiguit and Valev (2006) suggest that Botswana, Mozambique and Zambia could be the first countries to join the CMA, while Aziakpono *et. al* (2007) suggest that Botswana, the Seychelles and Zambia could be initial members, and Johns (2009) suggest that the CMA could include Botswana, Malawi and Zambia.

It is important to note that the studies considered different aspects of the economies, and in some studies, some countries were not included in the sample due to the lack of sufficient data. Furthermore, the assessment of the extent to which the SADC countries meet the traditional OCA properties led to the conclusion that Botswana, Malawi, Mozambique and Zambia are suitable candidates for an extension of the CMA.

However, Malawi and Zambia showed a high disparity in their inflation and exchange rates *vis-a-vis* the CMA countries. This implies that they could potentially destabilise the CMA if admitted prematurely. We may therefore conclude, based on previous studies and the assessments conducted in this chapter, that an extension of the CMA arrangement could include Botswana and Mozambique.

CHAPTER FIVE

THE RELEVANCE OF THE EUROPEAN UNION'S EXPERIENCE WITH MONETARY INTEGRATION

5.1 INTRODUCTION

Chapter 2 set out the theoretical framework of regional economic integration, which included a review of the textbook stages of the integration process. The discussion also outlined the different types of monetary integration arrangements available, ranging from regional payments agreements, which are the simplest form of monetary arrangements and require minimum commitment, to full economic and monetary unions, which entail giving up national currencies for a union currency with a common central bank.

Chapter 3 reviewed the theoretical frameworks related to monetary integration, which included an outline of the economic properties that should be present in member states prior to joining a monetary union. The present chapter reviews the experience of the European Union (EU) with regional economic integration, considering the path followed by the EU countries from the onset of economic integration until the implementation of an economic and monetary union (EMU) in Section 5.2. Thus, this section reviews how the European countries put the theory of regional economic integration into practice. The problems they faced during their quest for economic integration are considered and the subsequent steps taken to address them are reviewed. It is important for countries desiring to pursue regional economic integration to study and learn from the EU experience, paying particular attention to how they addressed the problems they faced during their quest for an EMU.

Section 5.3 reviews the experience of the EU peripheral countries with economic integration with the core countries. The former group comprises countries that generally have weaker fundamentals than the latter. Thus, their experience with monetary integration is particularly relevant to the SADC region, which is characterised by both strong and weak countries. The section also discusses the causes of the current sovereign debt crisis, drawing lessons from the factors that led to the crisis and the measures the EU has taken to address it.

The issues discussed in Sections 5.2 and 5.3 are taken into consideration in Section 5.4, in the application of the EU experience with monetary integration to the SADC countries. The

section also provides a preliminary road map that the SADC countries can follow towards monetary integration. Lastly, Section 5.5 concludes the chapter.

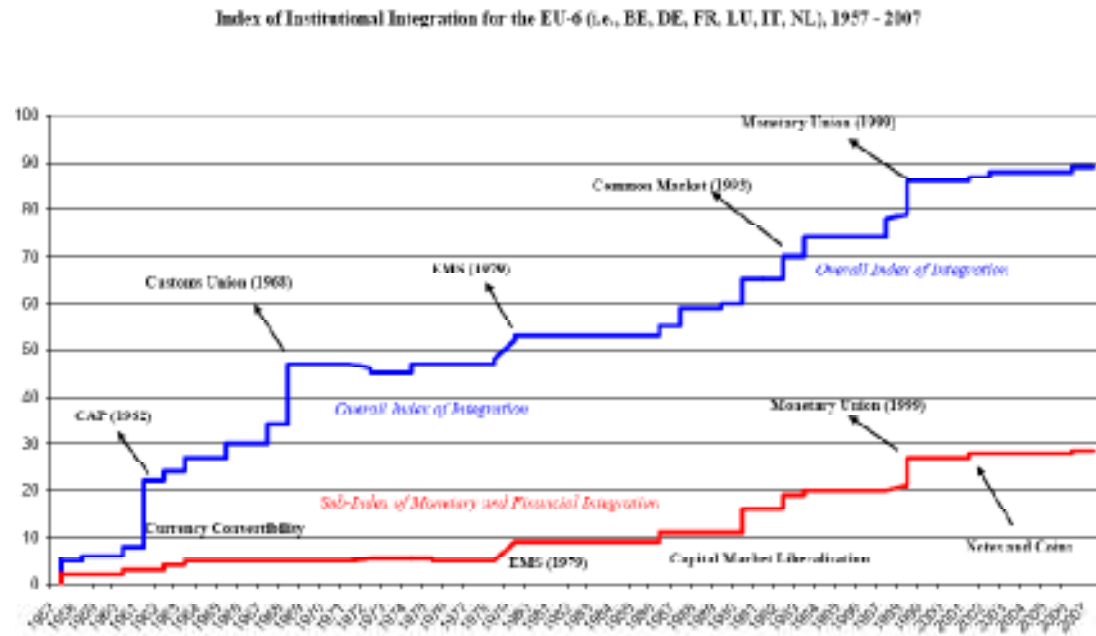
5.2 THE EU'S COMPREHENSIVE INTEGRATION PROCESS

The process of economic integration within the European countries took over 50 years, with the culmination of a full economic and monetary union. The EU integration process was characterised by a gradual deepening of economic and monetary co-operation, which began with the formation of the European Coal and Steel Community (ECSC) in 1952. The ECSC was a common market for a limited number of products, with France, Germany, Italy, Belgium, the Netherlands and Luxembourg as founding members.

Mongelli (2008:16) makes use of the Balassa (1961) index of institutional integration to trace the main stages of EU economic integration. The index was built by assigning scores (from the time a decision started being actually implemented) to the level of integration recorded at each stage of integration. Scores from 0 to 25 were assigned to the degree of regional integration achieved over time in the development of, respectively, a FTA/CU (considered jointly), a common market, an economic union, and an area with full economic integration. By summing up the scores achieved in each moment in time, an index of institutional regional integration was obtained, which ranges between 0 (no economic integration at all) and 100 (full economic integration, including monetary and financial integration).

Figure 5.1 below illustrates the evolution of the whole index as well as the evolution of the main steps toward monetary and financial integration. The index was applied to the original six EU members, i.e., Belgium (BE), Germany (DE), France (FR), Luxemburg (LU), Italy (IT) and the Netherlands (NL), for the period 1957-2007.

Figure 5.1: Index of Institutional Integration for the EU-6



Source: Mongelli, (2008:17)

From Figure 5.1 above, we can see that the EU FTA was formed over a number of years, with tariff reduction occurring progressively from 1957 to 1968, the onset of a customs union (CU). The common market was then formed in 1993, with the launch of the European single market, while the monetary union was formed in 1999. Presently, the Euro area, with a single monetary policy, can be classified somewhere between a monetary union and a full economic union.

It can also be observed that EU institutional integration went through several phases, ranging from rapid early growth from the late 1950s to the late 1960s driven mainly by real economic integration, to a period of modest increase during the 1970s and early 1980s. From the late 1980s to the late 1990s there was rapid growth driven mainly by monetary and financial integration, while the recent period has been a period of modest growth.

On the other hand, there has been gradual growth in the sub-index of monetary and financial integration, with the exception of the late 1970s until the launch of the EMS, where there was a setback due to the partial re-introduction of capital controls. There was a period of rapid growth from the early 1990s, which was driven by the liberalisation of capital markets, and a similar leap in 1999, at the launch of the EMU (Mongelli, 2008:17).

5.2.1 The “Snake” System and the resultant European Monetary System

A notable phase in the EU economic integration process was the implementation of the “*Snake in the dollar tunnel system*” in 1971, which was established following the monetary crises earlier in the year that resulted in the abandonment of the Bretton Woods system. Under the “snake” system, the United Kingdom, Japan, Germany, Italy, Canada and France agreed to allow their currencies to fluctuate within a 4.5% band *vis-à-vis* the United States dollar (USD), while the EC member states elected to prevent their currencies from fluctuating beyond a 2.5% band *vis-à-vis* other member currencies. The participating states agreed that if a member's currency fluctuated beyond the band, its central bank was responsible for sufficient intervention to move its rate back within the acceptable range. In addition, the member states agreed to provide one another with intervention support for their currencies, which would no longer be in USD (Salvatore, 2004; Mongelli, 2008).

The crises affected some countries more than it did others; as a result, Denmark, France, Ireland, Italy and the United Kingdom (UK) could not maintain such a narrow band and continually left the snake to re-join later. The lack of convergence of the economic and monetary policies of France and Germany, in particular, gave rise to diverging developments in inflation rates. This in turn fuelled pressures in the foreign exchange markets.

In 1973, the “snake” decoupled from the dollar. Continued foreign exchange unrest compelled the member states to work towards monetary co-operation. This resulted in the establishment of the European Monetary System (EMS) in March 1979 with the aim of gaining closer monetary cooperation, which was supposed to result in monetary stability within Europe. Box C.1 of Appendix C presents a case study of the EMS.

Notable features of the EMS include the fact that there were still some capital account restrictions remaining and that there was no agreement to eliminate national policy differences. As such, fiscal policies continued to diverge substantially in the 1980s. For example, Germany preferred a stability-oriented policy, while France pursued an expansionary policy. In addition, there were still significant inflation differentials in some countries. With fixed nominal exchange rates, this resulted in continued misalignments that required frequent adjustment of the official parities. Furthermore, full nominal convergence had not been achieved between participating countries as such; differentials in budget deficits and public debt were also substantial. Consequently, the EMS, like the snake, had to cope

with many adjustments of official parities in its early stages. The re-alignments often occurred in the wake of financial market turmoil, which periodically brought up questions about the sustainability of the ERM (Kondonassis and Malliaris, 1994; Salvatore, 2004).

5.2.2 The European Economic Monetary Union

The economic and monetary union (EMU) was implemented in three stages, which are discussed in this subsection. *Stage One of EMU* commenced in July 1990, with the goal to strengthen both monetary and non-monetary co-operation within the existing framework. At that time, all remaining capital account restrictions were removed in most of the member states except in Greece, Ireland, Portugal and Spain, who were allowed a transitional period until 1992. However, stage one of EMU was characterised by crises in the EMS, which influenced the economic integration process. Box C.2 in Appendix C presents a case study on the crises within the EMS.

The crises revealed a major weakness in the EMS in attempting to keep exchange rates among member nations within narrowly defined limits without at the same time integrating their monetary, fiscal and other policies. Following the crises, the Maastricht Treaty was ratified in 1992, which stipulated convergence criteria⁶⁹ that were designed to foster macroeconomic stability in the member states. In addition, the Stability and Growth Pact (SGP)⁷⁰ was implemented to ensure fiscal discipline on member nations. The EU countries also agreed to adjust value-added taxes and excise duties (Alberola *et al*, 2003; Salvatore, 2004).

Stage Two of EMU commenced in 1994 and had two main goals, preparation for the establishment of the European Central Bank (ECB) and the achievement of economic convergence. In preparation for the ECB, the European Monetary Institute (EMI) was established with two main objectives: (i) to strengthen central bank cooperation and monetary policy coordination (including the assessment of progress in the fields of economic and legal convergence) and (ii) to monitor the functioning of the EMS and to oversee and promote the development of the ECU. To achieve economic convergence, the EU member states

⁶⁹ See Section 3.4.6 in Chapter 3.

⁷⁰ See Box 3.3 in Chapter 3.

committed themselves to reducing excessive budget deficits and hence, fulfilling the convergence criteria by 1999, which would be the start of stage three.

Stage Three of EMU entailed the launch of the monetary union. The value of the Euro in terms of the currencies of the participating countries was decided at the end of 1998 and the exchange rates of the member currencies became irrevocably fixed. The Euro was a unit of account (i.e. it was traded in the financial markets, securities were issued in Euros and official statistics in the euro area were quoted in Euros) and not an actual physical circulating currency until 2002. From January 1999, the exchange rate of the Euro fluctuated in terms of other currencies but the value of each participating currency remained rigidly fixed in terms of Euros (Salvatore, 2004:720).

The EMS became the European Monetary Union at the beginning of 1999, with the introduction of the Euro and a common monetary policy by the ECB. An exchange rate mechanism II (ERMII) similar to the one under the EMS was set up to curb excessive volatility and possible misalignments among the currencies of the EU countries that were not part of the Euro. When the euro was first introduced in circulation, the currency circulated alongside national currencies for the first six months, thereafter, national currencies were phased out and the Euro became the sole legal tender in the participating countries (Kondonassis and Malliaris, 1994; Alberola *et al*, 2003; Salvatore, 2004; Mongelli, 2008).

5.3 THE EURO ZONE SOVEREIGN DEBT CRISIS

The subsection below reviews the economic activity in the EU peripheral countries⁷¹ prior to EU entry and highlights the factors that led to the current sovereign debt crisis. The economies of the peripheral countries are characterised traditionally by weak fundamentals. As such, their economic progress has been constrained by their propensity for economic instability (even after EU accession), which has periodically induced crises and reversals of their progress.

The factors that led to the EU sovereign debt crisis are especially relevant to the SADC region, which is characterised by both strong and weak countries. It is crucial that the SADC

⁷¹ The EU peripheral countries include Greece, Ireland, Portugal and Spain.

countries avoid forming an EMU with member states that have weak fundamentals lest they end up facing a similar crisis in future. The causes of the debt crisis are reviewed below.

5.3.1 Causes of the Sovereign Debt Crises

Harrison (2010a) notes that the causes of the EU sovereign debt crises date back to the formation of the EMS in 1979. At the time of the creation of the currency union, the core countries relaxed the fiscal requirement stipulated in the Maastricht Treaty (1992)⁷² to accommodate Belgium and Italy (which are part of the core countries) that had national debt exceeding 60% of GDP. Belgium had a huge amount of debt that was over 100% of GDP, while Italy had a history of political instability and changed governments almost every year. As such, they could not contain their spending, which resulted in their economies accumulating large fiscal deficits that weakened their national currencies.

The fiscal condition thus stipulated that countries that had national debt that was “60% of GDP or approaching that value” could join the currency area. This clause however implied that any other country that long suffered domestic instability, which prevented it from meeting the pre-requisites for EU entry, had to be included in the currency union⁷³. For example, of the peripheral countries, Greece, Spain and Portugal had fiscal, currency and monetary problems that emanated from political instabilities that ended in 1974, 1975 and 1976, respectively (Harrison, 2010a; 2010d).

Many of the EU peripheral countries joined the union at a time when the integration process was accelerating, particularly in the monetary sphere. Confidence in the economic performance of the peripheral countries surged when they joined the EU as it was expected that the stability and wealth of Europe’s northern members⁷⁴ would diffuse throughout its periphery. Similarly, it was expected that the stronger institutional and economic frameworks of the northern countries would prevail over those of the peripheral countries (Dadush and Stancil, 2010:1).

⁷² See Section 3.6 of Chapter 3.

⁷³ The Euro countries did however, attempt to prevent the “free-riders” (i.e., Italy, Greece, Spain and Portugal) from weakening the Euro with an inflationary economic policy by introducing the SGP (see Box 3.1 in Chapter 3).

⁷⁴ i.e., Austria, Belgium, France, Germany, and the Netherlands.

Prior to EU entry, some of the peripheral countries had a history of domestic instability. However, during the 1990s (in preparation for EU entry), the inflation and interest rates of the peripheral countries converged with those of the core countries. Similarly, long-term government bond yield spreads of the peripheral countries *vis-à-vis* the core countries (which indicate the perceived risk of lending to the peripheral countries instead of the core countries) fell from 550 basis points in 1980 to 1990 to just 10 in 1999 (Dadush and Stancil, 2010; (Harrison, 2010a).

Due to the low interest rates prevailing in the region, the peripheral countries (especially Greece, Ireland and Spain) experienced an increase in domestic spending partly financed by foreign lending. The increase in demand led to a rise in both prices and wages, particularly in service and non-tradable sectors, which in turn led to a rise in the price of non-tradables relative to tradables and attracted even more investment in the former. For example, from 1997 to 2007, the price of services in the peripheral countries rose by an average annual rate of 1.5% more than that of goods, compared to a difference of 0.5% in the core countries (Dadush and Stancil, 2010:1).

Similarly, wages increased by an average annual rate of 5.9% in the peripheral countries compared to 3.2% in the core countries. As such, the economies of the peripheral countries shifted from manufacturing and industrial sectors toward services and housing construction. During the period 1997 to 2007, 4% of the GDP of the peripheral countries shifted from industry to financial services, real estate and business in contrast to a 2% shift in the core countries (Dadush and Stancil, 2010:1-2).

However, these increases were not matched by improvements in productivity, where unit labour costs rose by 32% in the peripheral countries during this period, while the core countries incurred a 12% increase in costs. Consequently, countries such as Austria, Germany and the Netherlands were primary exporters, while Greece, Portugal and Spain were net importers. As a result, the latter group of countries ran large current account deficits, while Austria, Germany and the Netherlands were accumulating capital account deficits to match the current account deficits in Greece, Spain and Portugal. Banks in the former group of countries were lending to the latter group of countries and to countries in Eastern Europe. As such they became excessively exposed as they were under capitalised ((Dadush and Stancil, 2010; Harrison, 2010e).

The use of a common currency did not result in deeper economic integration and a harmonisation of the economies of the peripheral European countries with those of the core countries. Rather, it resulted in an unbalanced Eurozone with its members having divergent fiscal and economic policies. The lack of harmonisation in the member states led to wildly differing growth rates and economic outcomes. A single monetary policy designed to slow growth in the core European countries however exacerbated the problems in the peripheral countries (Harrison, 2010a).

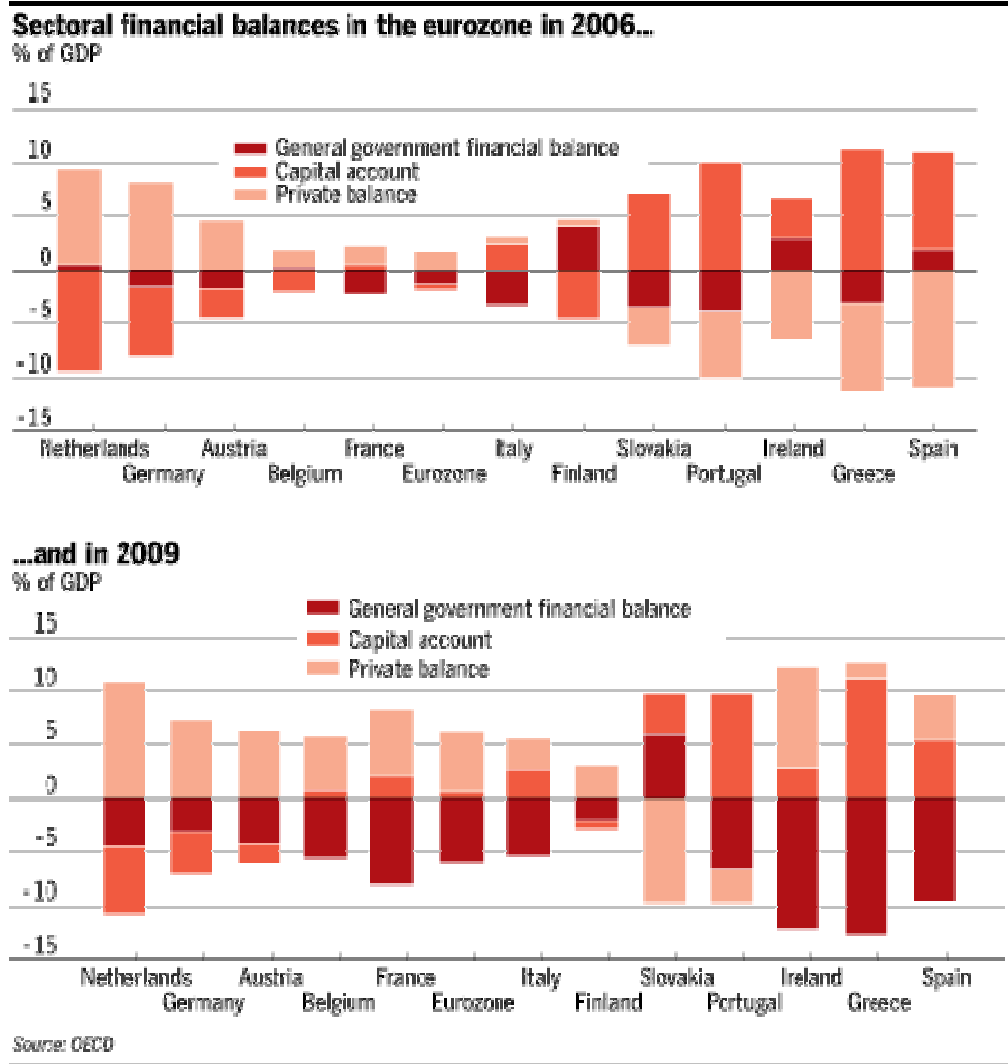
On the one hand, Greece (which saw the most dramatic decline in interest rate and inflation rates) enjoyed sustained growth over many years on the back of strong capital inflows. Net foreign assets fell from approximately -5% of GDP in 1995 to -100% in 2007. Similarly, housing and construction bubbles further fuelled strong GDP growth in Ireland and Spain. From 1997 to 2007, housing prices rose at an average annual rate of 12.5% in Ireland and 8% in Spain, compared to 4.6% in the USA during its bubble. Over the same period, construction as a share of gross output rose from 9.8% to 13.8% in Spain and from 7.9% to 10.4% in Ireland. In the USA, the ratio only increased from 4.6% to 4.9% (Dadush and Stancil, 2010:1).

On the other hand, output growth in Greece, Ireland, and Spain encouraged private debt to build up. From 1997 to 2007, domestic credit increased by an average of 155%, compared to an average increase of only 27% in the core countries. In Portugal and Italy, where export sectors were already suffering from declining productivity and labour market inflexibility, growth improved only briefly before reverting back to being the lowest in Europe. Nevertheless, these countries also saw private sector balance sheets weaken, with household savings rates dropping 4.7% in Portugal and 5.7% in Italy from 1997 to 2007 (Dadush and Stancil, 2010:2).

The single monetary policy in the Eurozone aggravated the situation for the crisis countries. Figure 5.1 below shows how the financial sector balances in the Eurozone changed between 2006 and 2009. The figure shows how Finland, the Netherlands, Ireland and Spain were the only countries in the Eurozone that had budget surpluses in 2006. However, the bursting of the property bubble at the onset of the global financial crises resulted in Spain and Ireland incurring very large budget deficits by 2009 (Harrison, 2010e).

With no autonomy over interest rates, Greece, Spain, and Ireland were limited in their ability to deal with the property bubbles. Similarly, Italy and Portugal, both fighting slowing economic growth, would have benefited from looser monetary policy. Dadush and Stancil (2010:3) notes that policy interest rates over 2001 to 2006 were approximately 50 basis points too high for Germany but between 300 and 400 basis points too low for Spain, Greece, and Ireland. These divergences added to the widening competitiveness gaps by stimulating economic growth and wages in the latter countries.

Figure 5.2: Sectoral Financial Balances in the Eurozone (2006, 2009)

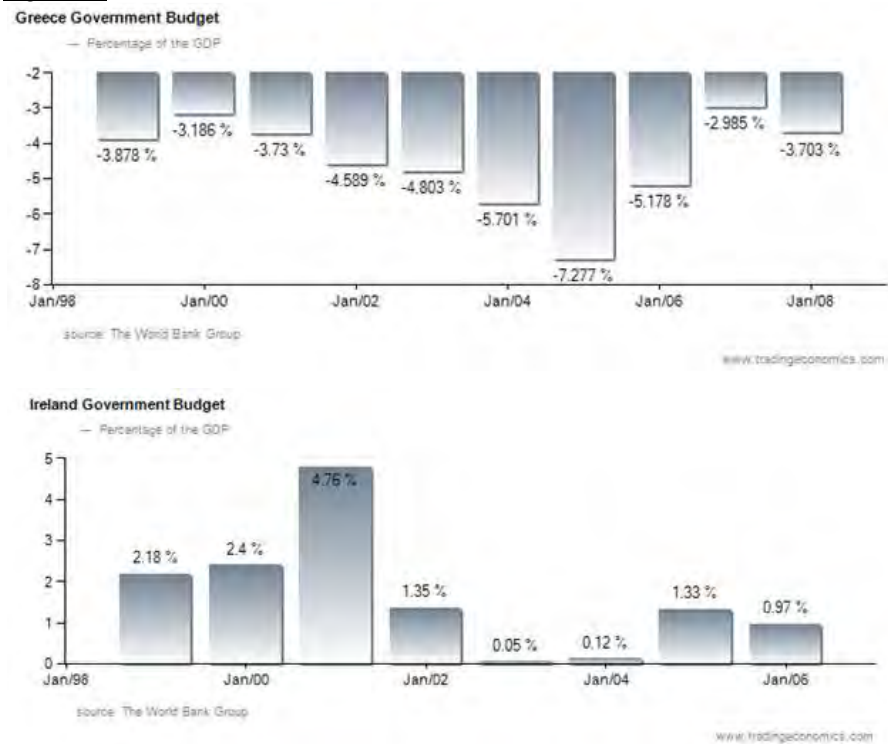


Source: Harrison (2010c)

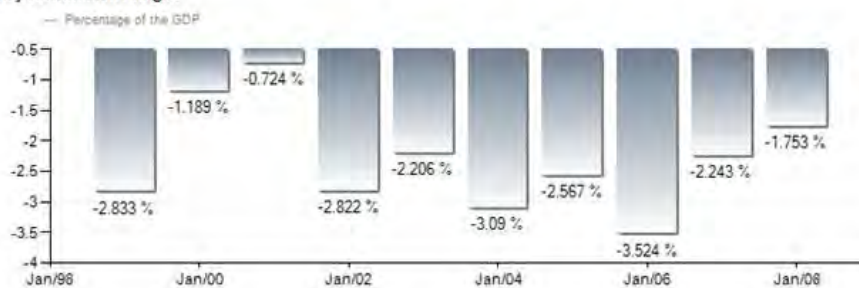
Furthermore, governments in the peripheral countries increased their spending in response to the lower borrowing costs and increases in domestic demand during this period. Per capita public spending rose by an average of 76% and government's contribution to GDP rose by 3.5% during this period. In contrast, average per capita spending in the core countries increased by 34%, while the government's contribution to GDP remained constant (Dadush and Stancil, 2010:3).

Figure 5.2 below shows the changes in government's contribution to GDP in Greece, Ireland, Italy, Portugal and Spain between 1998 and 2008. Once again, the figure highlights the fact that Spain and Ireland recorded surpluses in their government budget throughout most of the 2000s, prior to the onset of the global financial crises.

Figure 5.3: Fiscal Positions of the EU Crisis Countries



Italy Government Budget



source: The World Bank Group

www.tradingeconomics.com

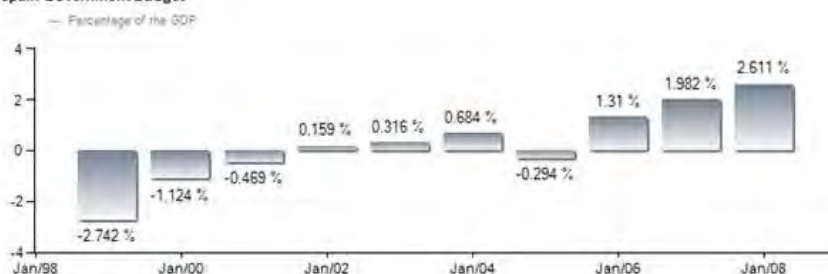
Portugal Government Budget



source: The World Bank Group

www.tradingeconomics.com

Spain Government Budget



source: The World Bank Group

www.tradingeconomics.com

Source: Harrison (2010e)

Given that countries such as Austria, Germany, the Netherlands, Italy, Greece, Spain and Portugal had most to gain from the low and stable inflation rates that the EMU offered, they had strong incentives to achieve and maintain nominal stability. Consequently, Greece, Italy, Portugal and Spain cheated in the annual reports on their economic performance in order to gain admission into the Eurozone. The dishonesty therefore, meant that these countries entered the EU when they were not ready for monetary union. As the global economic crisis took its toll, the lack of macroeconomic stability in these countries subsequently led to the sovereign debt crises as their economies could not sustain the strict monetary and exchange rate policy of the EMU (Harrison, 2010a).

The global financial crisis exposed the weaknesses in the post-union growth models of the peripheral countries. Tax revenues in these countries dropped drastically as output growth slowed, thus revealing that the expanded state sector was unaffordable. As the domestic recessions deepened, the loss of competitiveness in the peripheral countries made resorting to export markets extremely challenging. In addition, rising borrowing costs and ballooning public debt (which increased by an average of 20% of GDP from 2007 to 2009) further restricted public spending when it was needed most (Dadush and Stancil, 2010:3).

5.3.1.1 Lessons Drawn from the EU Sovereign Debt Crises

The discussion on the root causes of the EU crises brings out important lessons for integrating countries, which are discussed in this subsection. To begin with, the discussion in Section 2.3.2 of Chapter 2 pointed out that regional economic integration can result in polarised development in member states. In addition, the discussion above shows that the Eurozone also experienced polarised development⁷⁵ between the core and peripheral countries, which in turn destabilised the monetary union.

An important lesson drawn from the crises in the Eurozone is that countries that differ greatly in their economic performances should not integrate at the more advanced levels, such as monetary union. The larger and more industrialised economies are likely to benefit from increasing returns to scale and greater competition and investments, while the smaller and less developed countries experience economic decline. As noted in Chapter 2, the SADC region is likely to experience polarised development with most industries and investments relocating to South Africa while the smaller countries are marginalised (Lundahl and Peterson, 1991; McCarthy, 1999, 2003; McLeod, 2003). Sections 4.4.1 and 4.4.2 in Chapter 4 indicate that the SADC countries have divergent output levels and the respective growth rates. This trend is likely to continue as the region pursues deeper economic integration and hence, will result in polarised development. The assumption therefore, is that monetary integration between the SADC states when they have divergent economic performances is likely to destabilise the union.

⁷⁵ See Figure C.1 in Appendix C, which shows the differences in the sectoral imbalances in the EU countries, which were a direct result of a monetary policy that was geared to slow-growth core Europe and hence, foster harmonisation in the economies of the peripheral countries to the core countries. However, in the case of Spain and Ireland, for instance, the monetary policy resulted in a property bubble that turned previously large government budget surpluses in 2006 to huge deficits in 2009 (Harrison, 2010e).

As already mentioned in Chapter 2, a currency union requires the *ex ante* harmonisation of monetary policies of member countries, which in turn requires equally correct growth rate preconditions, the same (real) income elasticities of demand for money and constant real exchange rates (Williamson, 1980:24). However, the analyses in Sections 4.3.1 and 4.4 in Chapter 4 indicate that presently the SADC countries do not meet these requirements.

Of particular concern are the divergent macroeconomic performances and growth rates of the member states. It would be prudent of the member states not to form a currency union comprising of countries that lack harmonisation in their economic performances. The experience of the Eurozone has shown that a common currency may neither result in the *ex post* harmonisation of the economies of participating countries nor deeper economic integration. Rather, it resulted in an unbalanced Eurozone with its members having divergent fiscal and economic policies, which in turn led to wildly differing economic outcomes.

Another important lesson drawn from the EU financial crisis is that a currency union comprising countries that lack harmonisation in their fiscal and economic regimes requires a pre-funded fiscal transfer mechanism. The funds should be available to support member states as an automatic stabiliser against the divergent fiscal and economic regimes. However, the SADC countries are still faced with the debt problem, which makes it difficult for them to set aside funds for BoP support prior to monetary union. Hence, they are advised to ensure they meet the pre-conditions for monetary integration.

Lastly, it was noted in Chapter 4 that the DRC, Madagascar, Malawi, Mozambique, Tanzania and Zambia are included in the group of the world's 40 heavily indebted poor countries. Polarised development within the monetary union is likely to increase further their debt as they experience economic decline and their fiscal deficits rise. However, according to the principle of the Impossible Trilogy, countries cannot simultaneously pursue an independent monetary policy, free capital mobility and fixed exchange rates (Wyplosz, 1997; Frankel, 1999; van der Haegen and Viñals, 2003)⁷⁶. Hence, members of a currency area experiencing debt problems cannot devalue to regain competitiveness or manipulate monetary policy, as they do not have autonomy over it. Furthermore, if there were a fiscal policy framework in

⁷⁶ See Section 3.3 in Chapter 3.

place similar to the SGP of the Eurozone, the use of fiscal policy would have to conform to the set framework. The currency area may therefore need to either monetise the debt, allow sovereign default to occur, implement internal devaluation in the affected economies or break up.

Monetisation implies that the union central bank would have to exercise its role as lender of last resort to guarantee debt obligations with a potentially unlimited supply of liquidity. However, as noted in Section 3.2.2 of Chapter 3 monetisation of public debt is inflationary and thus, may jeopardise the anti-inflationary credibility of the central bank. The EU opted to bail out the member states facing debt problems rather than risk the credibility of the ECB. However, a bail out implies that the monetary union has funds available for BoP support. This may not be possible in the case of the SADC region given that a number of the member states are poor, highly indebted and depend on donor support. As such, they may not be able to contribute to the fund.

Internal devaluation, which refers to across the board wage and price cuts in the affected nations, is another option the currency area could take. The EU resorted to internal devaluation and austerity measures (i.e. policies of deficit cutting, lower spending, reduction in social benefits and at times, increased taxes) to mitigate the crisis. These measures were adopted in an effort to avoid the massive creditor losses associated with sovereign default. However, these measures have been criticised for being politically unstable as internal devaluation results in a long and difficult depression, while austerity measures are associated with short-term declines in standards of living (Harrison, 2010c).

A break up, on the other hand, entails the exit of the indebted countries from the union. However, such a move is likely to destabilise the union currency. The countries that exit from the union would have to revert to their national currencies, which would no longer be in circulation and that is very costly. In addition, the countries are likely to experience bank runs that would lead to a collapse of their new currencies, which in turn would feed into higher inflation. At the same time, the national banks and the sovereign states are likely to be considered high risk in the capital markets and would be avoided, thus pushing the domestic interest rates higher. This would exacerbate the debt problems and may have spill-over effects to the region. Thus, a break-up is the worst alternative for union members (Harrison, 2010c; Thin, 2011).

5.4 APPLICATION OF THE EU PROCESS OF ECONOMIC INTEGRATION TO THE SADC REGION

This section attempts to extract valuable lessons for the SADC countries from the experience of the EU countries with economic integration. It is important to note that EU integration was a gradual process initiated more than 50 years ago, whereas the SADC countries wish to reach the status of EMU within a much shorter period. In addition, there are differences in the sequence of integration followed by the two regions. The European countries pursued trade integration first, with the implementation of a common market. The pursuit of nominal convergence followed later and lastly, structural reforms were implemented. There were however, considerable instances of overlapping in the processes and each aspect of integration did not occur at a uniform pace.

The SADC countries, on the other hand, are attempting to accomplish all three at the same time. This presents some problems in following the EU model. However, the essential steps taken by the EU countries still provide valuable lessons for the SADC countries that are considered in this section.

5.4.1 Road Map to Monetary Integration for the SADC Countries

Section 5.2 above reviewed the steps to monetary union followed by the EU countries. Based on these steps, the subsection below thus makes recommendations on the path that the SADC countries could take to arrive at the status of EMU, drawing lessons from the EU experience.

5.4.1.1 Exchange Rate Coordination

To begin with, the SADC countries require a fixed exchange rate mechanism (ERM) that will enable them to gain stability in the exchange rates between the member currencies as well as to encourage convergence of economic and monetary policies⁷⁷. The adoption of an ERM implies that the SADC countries need to agree on the currency to which the national currencies would be tied to, as well as the central rate for each currency that would be used to monitor its fluctuations relative to other member currencies. The Community already has a subset of countries belonging to a similar arrangement within the CMA. Thus, the non-CMA countries could fix their currencies to the South African Rand.

⁷⁷ Presently, the member states have different exchange rate systems as shown in Table B.2 in Appendix B.

The member states also need to agree on the structure of and margins around the central rates as well as the intervention mechanism when exchange rates deviate from the margins. However, caution needs to be exercised on the choice of an appropriate band for exchange rate changes. The experience of the EU with the EMS showed that high capital mobility under a narrow-band exchange rate system could delay inflation convergence in member countries.

Arroyo (2003: 72) notes that a positive interest rate differential in some of the integrating countries could attract massive capital inflows, which would cause the authorities in the respective countries to cut their interest rates prematurely in an effort to keep their exchange rates within the prescribed band. However, in some cases the relatively higher interest rates would be a reflection of the higher inflation rates and unbalanced fiscal- monetary policy mixes in these economies. Thus, cutting the interest rates prematurely may at times delay, rather than foster the convergence of the inflation rates to other member countries⁷⁸.

It has also been noted that a narrow-band, adjustable exchange rate system is inappropriate for countries with divergent macroeconomic performances and without appropriate institutional commitments. An environment of high capital mobility exposes the systems to speculative attacks, even when reinforced by foreign exchange intervention agreements and short-term financial facilities between participating banks. Such speculative attacks have resulted in crises and the collapse of the narrow-band system in the past⁷⁹ (Cobham and Robson, 1992; Arroyo, 2003; Masson and Pattilo, 2003).

In addition, it has been noted that a pegged exchange rate system, even one with wider bands and timely realignments, requires a high degree of macroeconomic convergence and strong policy commitments to avoid speculative attacks on the peg. As seen in Sections 4.3.1 and 4.4 in Chapter 4, the SADC countries have divergent macroeconomic performances. In addition, most of the member central banks lack policy credibility. A combination of these

⁷⁸ This was the experience of Italy, Portugal and Spain with the core EMS countries during the period 1987 to 1992.

⁷⁹ This was the case with the EMS and emerging market economies in the 1990s and early 2000s.

factors could delay inflation convergence within the region as well as expose it to speculative attacks.

Integrating countries are also cautioned against implementing an exchange rate band that is too flexible as they may end up not benefitting from the disciplinary effects and possible positive impacts associated with exchange rate stability on intra-regional trade and financial integration (Arroyo, 2003: 74).

Drawing from the EU experience in choosing an appropriate exchange rate mechanism, the countries considered the recommendations made by the “*monetarists*” and “*economists*”. On the one hand, the “*monetarists*” believe that the best strategy for achieving exchange rate stability, and eventually monetary integration, is to subject the integrating economies to the nominal discipline of an exchange rate stabilisation scheme⁸⁰. Such a discipline enables a faster pace of macroeconomic convergence, in addition to stimulating commercial and financial integration, which would in turn increase the cyclical synchronisation of the economies and therefore, reduce the likelihood and size of asymmetric shocks (Cobham and Robson, 1992; Arroyo, 2003).

The “*economists*”, on the other hand, warn against the premature pegging of the currencies and advocate for achieving a higher degree of convergence and trade integration before implementing monetary integration⁸¹. However, there have been cases where the premature stabilisation of the exchange rate delayed convergence or even provoked exchange rate crises.

An appropriate balance between the two approaches may thus be an optimal solution. The EU took this hybrid approach when they eventually adopted a combination of the Maastricht Treaty of 1992 and the new European Monetary System (EMS) of 1993, with more flexible stipulations such as wider exchange rate bands and achieving deeper integration in the goods, services, capital and labour markets. Lastly, for exchange rate coordination to work, the member states also need to agree on the division of responsibility for the necessary

⁸⁰ The EU countries followed the monetarists’ recommendations in the early 1970s when they implemented the Monetary Snake, which preceded the EMS’ exchange rate system of 1979.

⁸¹ This is in contrast with the EU experience where in some periods the imposition of an exchange rate mechanism resulted in accelerated convergence.

adjustment between a country whose currency is at the ceiling and the one whose currency is on the floor should the exchange rate reach the limit of its range (Arroyo, 2003: 72).

5.4.1.2 Harmonisation of Policies

Exchange rate coordination implies that the SADC countries would require a degree of harmonisation in their monetary, fiscal and credit policies. Harmonisation in national monetary policies would ensure cooperative intervention in foreign exchange markets to keep the exchange rate from fluctuating, while harmonisation of national fiscal policies imposes fiscal discipline on member nations.

Lastly, coordination in credit policy is required in order to provide short- and medium-term balance-of-payments (BoP) support to deficit members. The provision of BoP support to deficit members requires that there be a mode of financing within the region. Such financing would require that the member states contribute a quota determined by the Community into the fund. However, a number of the SADC countries are highly indebted and depend on aid to support their fiscal deficits. As such, these countries may not be able to contribute to the fund. Hence, BoP support may not be available within the SADC region.

The African Union has set up the African Monetary Fund (AMF) in 2009 with the objective to provide BoP support at continental level to individual member states or RECs. It is yet to be determined whether it will have sufficient resources to bail out deficit nations. Although it is highly likely that the pooling of resources will be difficult at continental level given that most of the other African countries are faced with similar problems to the SADC countries.

5.4.1.3 Institutional Framework

The SADC countries require an adequate regional institutional framework to maintain policy discipline and to ensure the observance and endurance of market principles. It was established in Chapter 2 that exchange rate coordination works if and only when participating countries give up policy autonomy to a supra-national body that will determine policy for the region.

Presently, the SADC region does not have a regional central bank; however, there is a Committee of Central Bank Governors (CCBG) of member states. The CCBG is responsible for formulating, implementing and co-ordinating appropriate financial and monetary policies

that are transparent, consistent to the macroeconomic convergence (MEC) targets and minimise the spill over effects on other member countries (McCarthy, 2002; Kweka *et al*, 2006). In addition, the CCBG facilitates the interconnection of payments and clearing system, as well as harmonises banking and financial supervision practices in the SADC countries (Kweka *et al*, 2006:243). South Africa is responsible for finance and investment within the region, and as such, the Governor of the Reserve Bank of South Africa has the mandate to chair the CCBG (Rossouw, 2006:384).

Similarly, relevant institutions are required whose mandate is the design and monitoring of the implementation of policy objectives and strategies for macroeconomic objectives (Maruping, 2005:145). The SADC countries set up a Committee of Ministers for Finance and Investment (CMFI), which is responsible for establishing and reviewing procedures and targets with which to monitor the implementation of the MEC program and provide advice on corrective actions. It is the CFMI's responsibility to evaluate and monitor annual convergence programmes submitted by the member states, to make appropriate recommendations or amendments and to issue a communiqué to the member states explaining their assessments and recommendations (Kweka *et al*, 2006:243).

5.4.1.4 Parallel Currency Union

Once the SADC countries implement exchange rate coordination, they would need to undergo a series of stages whereby the allowable bands for exchange rate changes are narrowed progressively, until the final stage of irrevocably locked exchange rates is reached. Should they decide to fix their national currencies to the ZAR; the permissible bands would be reduced until the currencies of the non-CMA members are at par with the ZAR. Hence, by default the latter group of countries would join the CMA arrangement.

National central bank autonomy over monetary and credit policy is reduced within a currency union in favour of a union monetary authority, which is jointly exercised by the member states (Ogunkola, 2005:18). In the case of the CMA arrangement, the Reserve Bank of South Africa determines monetary policy for the CMA countries. However, the rest of the SADC countries may not be willing to surrender completely autonomy over their national policy to the SARB. Hence, the participating countries may have to establish a union authority in which all countries would have a say in the determination of policy.

5.4.1.5 Monetary Union

A currency union within the SADC region ought to be established if and only when the member states meet the preconditions for monetary integration discussed in Chapter 3. Should the member states ever get to that point, then they would have to decide when and how the ZAR would replace the national currencies of member states in their domestic roles. Williamson (1980:24) suggests that, when over 50% of the total regional money supply is converted voluntarily into the parallel currency, then the remaining currencies should be called in through a compulsory conversion operation. From then on, the ZAR would become the common currency in the SADC region.

5.5 CONCLUSION

The review of the steps followed by the European countries to an economic and monetary union indicate that it may not be feasible for the SADC countries to achieve the status of an EMU in the short time frame given. The discussion on the possible road map that the SADC countries could take indicates that the required changes in the economic structures of the member countries are gradual and hence, require a drawn period to effect.

Similarly, the discussions on the EMS crisis as well as the current EU crisis highlighted the importance of harmonisation in the policies of participating countries prior to monetary union. Based on the analyses of the economic performances of the SADC countries in Chapter 4, it is clear that the SADC countries are currently divergent. It is therefore, advised that the member countries do not rush into monetary integration when they lack harmonisation in their economies.

In addition, the discussion on the root causes of the European sovereign debt crises highlighted the dire effects that polarised development in a monetary union could have. The SADC states are highly likely to be polarised. To avoid the likelihood of experiencing problems similar to the sovereign debt crises in the EU, there is need for product diversification within the region, which may foster economic growth in all the member states and possibly encourage real economic convergence. A monetary union among countries with similar economic performances is likely not to experience sovereign debt problems.

CHAPTER SIX

METHODS, PROCEDURES AND TECHNIQUES

6.1 INTRODUCTION

This chapter begins with a review of the theoretical framework behind the methods, procedures and techniques used in the analyses. The analyses attempt to determine the relative effectiveness of independent monetary policy instruments in determining economic performance of the SADC states. The intuition is that prospective members of a monetary union weigh the advantages of maintaining monetary independence against the costs of surrendering autonomy to a regional authority.

If independent policy were found to be significant in determining macroeconomic performance in any country, the implication is that the respective country would not be willing to join the monetary union since it entails relinquishing monetary policy autonomy to a regional authority. If, on the other hand, independent monetary policies have not been effective in determining macroeconomic performance indicators, the implication is that they would be better off surrendering monetary policy autonomy to a regional authority (Guillaume and Stasavage, 1999; Masson and Patillo, 2003; Balogun, 2007; Corsetti, 2008).

Section 6.2 thus begins with a review of the theory of monetary policy and the transmission mechanisms through which it works. Section 6.3 discusses the different factors that affect the transmission of monetary policy. The section also includes a discussion on factors that are characteristic of developing countries, which make the transmission of monetary policy particularly difficult in these countries.

Section 6.4 outlines the model used in the analyses, while Section 6.5 provides a description of the techniques of data analyses used in the regressions. Lastly, Section 6.6 concludes the chapter.

6.2 MONETARY POLICY TRANSMISSION MECHANISMS

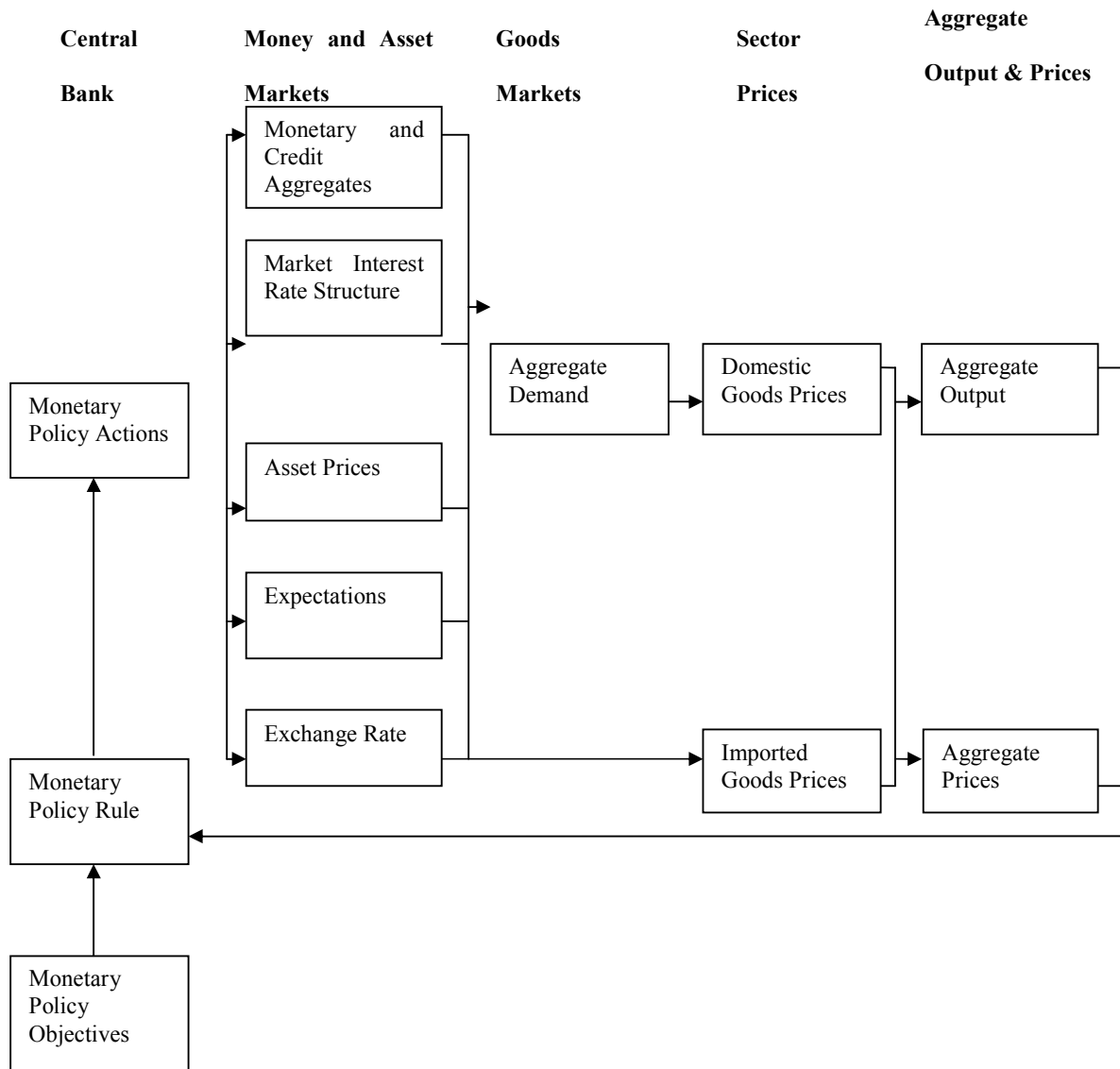
The goals of monetary policy include the achievement of price stability (which is the primary goal of most central banks), economic growth, a high level of employment, domestic financial stability, interest rate stability and foreign exchange market stability. Monetary

authorities do not have direct control over these goals but can act on certain policy instruments that are under their direct influence to achieve these goals. These instruments include open-market operations, reserve requirements, tax rates, government purchases, and the discount rate of the central bank.

Changes in monetary policy are usually in response to domestic and external shocks, which may hinder the attainment of policy goals. These changes are effected through the policy instruments, which do not however exert any direct influence on policy goals but rather, they work through various transmission mechanisms. There are five transmission mechanisms of monetary policy: The interest rate channel, the asset price channel, the exchange rate channel, the monetary and credit channel, and the expectations channel. These transmission mechanisms affect different variables and markets at various speeds and intensities (Loayza and Schmidt- Hebbel, 2002; Garcia, 2003, Buigit, 2006).

Figure 6:1 below illustrates the relationship between central bank monetary policy rules and the transmission mechanisms. Monetary policy actions (both current and expected) are determined by the monetary policy rule that the central bank has chosen to follow. These policy actions are channelled through one of the transmission mechanisms in the money and asset markets. Changes in the money and asset markets affect domestic demand and net exports and ultimately, aggregate demand. In turn, changes in aggregate demand affect prices of both domestic goods and imported goods and ultimately, aggregate output and prices. Finally, the resultant changes in current and projected output and prices feedback to monetary policy rules (Loayza and Schmidt- Hebbel, 2002; Garcia, 2003). The subsections below provide a description of each transmission mechanism.

Figure 6.1: Monetary Policy Rules and Transmission Mechanisms



Source: Loayza and Schmidt- Hebbel (2002:2)

6.2.1 The Interest Rate Channel

The interest rate channel is viewed traditionally as the main transmission mechanism for monetary policy. The transmission works through changes in the central bank policy rate, which in turn lead to changes in the bank lending and deposit interest rates. In turn, changes in the lending and deposit rates affect the consumption and investment decisions of households and firms, and ultimately aggregate output and prices. The transmission of interest rate policy depends on three macroeconomic theories: the relationship between

nominal and real interest rates⁸², short- and long-term real interest rates⁸³, or aggregate demand on the one hand, and output and prices on the other⁸⁴ (Loayza and Schmidt- Hebbel, 2002:4).

A change in the policy rate results in similar changes in other short-term interest rates. For example, a rise in the policy rate will lead to increases in other short-term interest rates (even if some are slow to adjust). However, the response of long-term interest rates to changes in the policy rate is ambiguous. In general, long-term interest rates are determined by an average of current and expected future short-term rates. As such, changes in long-term rates depend on the direction and extent of the impact of the official rate change on expectations of the future path of interest rates. If for example, an increase in the policy rate generates expectations of lower future interest rates, then there is a possibility that long-term rates will fall in response to the rise in the policy rate (BOE, 2010:3).

If the rise in interest rates is a reflection of higher inflation expectations, then the real interest rate will not change. Similarly, the perceived marginal cost of new borrowing will not change. However, the impact on existing loans depends on the terms of the contract. With floating rate contracts, average rates will change in line with marginal rates. With fixed rate contracts on the other hand, average rates change more slowly over time as old contracts come up for renegotiation. This changes the average interest rates and would therefore; alter the cash flow and balance sheet positions of borrowers. In turn, the changes in the cash flow and balance sheet positions of borrowers would lead to a reduction in investment and consumer expenditure and thus, reduce aggregate demand (BIS, 2008:10).

Lastly, the expectations augmented Phillips curve can be used to explain changes in aggregate demand, output and prices in response to changes in monetary policy. Assuming that initially unemployment, output and prices are at their natural levels, an expansionary policy would trigger portfolio adjustments by economic agents and in the short run, raise aggregate demand and prices. It is argued that employers would recognise an increase in their own product before they perceive the general price increase. Hence, they will interpret the

⁸² As explained by theories based on price and wage rigidities.

⁸³ As explained by the rational expectations hypothesis of term interest rates.

⁸⁴ As explained by the Phillips curve and temporary nominal price rigidities.

price rise as an increase in relative prices and therefore, increase production at the more favourable prices. They would also increase money wages to entice the required additional labour.

Similarly, employees would be slow to adjust their perception of the general price rise and would perceive the increase in money wages as an increase in real wages. As a result, they would increase labour supply. Thus, the expansionary policy would result in an increase in prices, output, money wages and employment. However, in the long run when economic agents adjust their price perceptions according to reality, unemployment and output will revert to their natural levels and only prices and other nominal variables will remain unaffected.

Economic literature states that it is the *real* rather than the nominal interest rate that affects consumer and business decisions (Mishkin, 1996; Brzoza-Brzezina, 2001). As such, it is possible for monetary policy to stimulate the economy, even when nominal interest rates are at a floor of zero. A monetary expansion will raise the expected price level as well as expected inflation, which in turn may lower real interest rates, even when the nominal interest rate is fixed. In turn, the fall in real interest rates will stimulate investment spending, thereby increasing aggregate demand and output (Mishkin, 1996:35).

6.2.2 The Asset Price Channel

The asset price mechanism works through changes in the market value of securities, such as bonds and equities. An increase in the money supply has portfolio balance effects on consumers, who may choose to spend their excess money holdings on bonds. An increase in the demand for bonds will lead to an increase in their prices, which in turn will lead to a fall in interest rates. If all other things remain equal (especially inflation expectations), a decrease in interest rates will also lead to an increase in the price of other securities, such as equities (BIS, 2008; BOE, 2010).

There are two channels through which higher equity prices can increase aggregate demand; through an increase in the wealth of consumers and through an increase in the net worth of firms (BIS, 2008; BOE, 2010). Tobin's q Theory of investment provides an explanation as to how the valuation of equities affects the transmission of monetary policy. The theory defines q as the market value of firms divided by the replacement cost of capital. If q is high, it

implies that the market value of firms is high relative to the replacement cost of capital, and that new plant and equipment capital is cheap relative to the market value of firms, and *vice versa* if q is low. As such, firms can issue equity and get a high price for it relative to the replacement cost of capital. Therefore, investment spending will increase, as firms will be able to buy a lot of plant and equipment with only a small issue of equity. In turn, the increase in investment will lead to an increase in aggregate demand and output. If, on the other hand, q is low and firms want to buy capital, it is cheaper to buy an existing firm at low cost and acquire old capital. However, investment spending and aggregate demand will not increase (Mishkin, 1996:36).

An alternative transmission channel is through changes in the wealth of consumers, which affects consumption. The wealth of consumers comprises human capital, real capital and financial wealth, which includes stocks. An increase in stock prices leads to an increase in the value of the financial wealth of consumers. If consumers perceive the rise in equity prices as permanent, then there will be an increase in consumption, which in turn leads to an increase in aggregate demand (Mishkin, 1996; Loayza and Schmidt- Hebbel, 2002; BIS, 2008).

6.2.3 The Exchange Rate Channel

The exchange rate channel works through changes in aggregate demand and supply. A monetary expansion induces a fall in domestic nominal interest interests. Assuming uncovered interest parity, if there is a subsequent fall in domestic real interest rates, then deposits in the local currency become relatively less attractive than deposits in foreign currency. This will lead to a fall in deposits in local currency relative to other currency deposits and hence, capital outflow. In turn, capital outflow will lead to a nominal depreciation in the local currency (Mishkin, 1996; BIS 2008).

Devereux and Engel (2003:766) note that a nominal depreciation in the exchange rate has negligible expenditure-switching effects in the short run. If domestic prices are pre-set in local currency terms, consumer prices would be unresponsive to exchange rate changes and as such, depreciation would have no effect on aggregate demand and output. On the other hand, if nominal prices are pre-set in the currency of the producer, a nominal depreciation in the exchange rate implies that the domestic price of imports will increase and hence, result in inflation.

In the long run and assuming sticky prices, a nominal depreciation will lead to a real depreciation in the exchange rate, which in turn will result in an increase in the price of tradables relative to non-tradables. Furthermore, the depreciation leads to an increase in net exports and ultimately, an increase in aggregate demand. On the other hand, a real depreciation raises the domestic price of imported finished goods and thus, leads to inflation. Similarly, the increase in the domestic price of imported inputs leads to a reduction in aggregate supply and output, resulting in an increase in domestic prices of goods (Loayza and Schmidt- Hebbel, 2002:5).

The BIS (2008:15) notes that the exchange rate channel is an important transmission mechanism in developing countries for several reasons. To begin with, the influence of the exchange rate channel in small open economies tends to be large due to the high dependency of these economies on primary production and the export of commodities. In addition, the exchange rate often constitutes a key variable for private sector expectations about inflation. Lastly, exchange rate changes produce large balance sheet effects in those economies where households and firms have foreign currency assets and liabilities.

6.2.4 The Monetary Aggregate and Bank Credit Channels

The classical monetarist view emphasises the role of narrow or broad monetary aggregates in determining asset, goods and factor prices, which influence inflation in the long-run. In general, an increase in the monetary aggregate will increase the cash holdings of consumers in their portfolios beyond their desired levels. To dispose of the excess money, consumers would increase their demand for goods and services, which leads to an increase in domestic aggregate demand. In turn, the increase in aggregate demand will stimulate output growth. However, if output does not increase to match the increase in aggregate demand, there would be higher inflation (Loayza and Schmidt- Hebbel, 2002; BIS, 2008).

Balogun (2008:18) notes that unrestrained increases in money supply would have a negative effect on output. Expansionary monetary policy either in response to an inability of the monetary authorities to adopt an appropriate monetary stabilisation framework in the face of deep internal economic distortions, a lack of fiscal discipline and / or autonomy to restrain fiscal authorities would have adverse effects on output.

Of late, the focus is on the role of credit rationing by financial institutions through non-pricing mechanisms, such that the terms on which credit is available include variables additional to the interest rate. The credit mechanism works through two channels: the bank-lending channel and the balance sheet channel. The mechanism focuses on the role of credit rationing⁸⁵ by financial institutions through non-pricing mechanisms, such that the terms on which credit is available include variables additional to the interest rate (Loayza and Schmidt- Hebbel, 2002; BIS, 2008).

The bank- lending channel emphasises the special role played by banks in the financial system in providing credit to certain borrowers that have no access to credit markets⁸⁶. It is believed that banks are especially capable of solving asymmetric information problems in the market and hence, are able to grant credit to seemingly risky borrowers. Increases in the money supply increase bank reserves and bank deposits, as well as the net worth of firms (through higher equity prices). This leads to a reduction in adverse selection and moral hazard, and in perceived loan risks (through lower real interest rates). This in turn increases the quality of bank loans available, which leads to a rise in investment and consumption expenditure, and ultimately, aggregate demand and output (Mishkin, 1996; Loayza and Schmidt- Hebbel, 2002).

The balance sheet channel, on the other hand, focuses on how the net worth of firms influences credit rationing. In general, there are severe adverse selection and moral hazard problems associated with lending to firms with low net worth because they have less collateral for their loans. The low net worth implies that these firms have less equity stake in their firms, which may encourage them to engage in risky investment projects. Hence, financial institutions would be averse to lending to such firms for risk of default. An expansionary monetary policy will have the effect on firms of increasing their net worth, improving their cash flow (through lower nominal interest rates), and decreasing the burden of nominal debt contracts (by raising inflation). This will lead to a reduction in adverse

⁸⁵ Credit rationing is a result of information asymmetries between financial institutions on the one hand, and the firms and consumers on the other, in determining price and output levels (Loayza and Schmidt- Hebbel, 2002; BIS, 2008).

⁸⁶ The extent to which bank lending behaviour affects the transmission of monetary policy largely hinges on whether bank loans and deposits are “special” (in terms of having no perfect substitutes) (Mishkin, 1996; ECB, 2008).

selection and moral hazard thus, making banks more willing to supply credit. The increase in lending will in turn lead to a rise in investment spending, aggregate demand and output (Mishkin, 1996; Loayza and Schmidt- Hebbel, 2002).

The balance sheet channel also works through changes in consumer spending on durable goods and housing. The mechanism depends on consumers' desire to spend rather than on lenders' desire to lend. Consumer durables and housing are very illiquid assets because of the asymmetric information about their quality. As such, if consumers experienced an income shock and had to sell their assets, they would expect a loss since they would not be able to get the full value of the assets in a distress sale. Hence, if there was a higher likelihood of finding themselves in financial distress, consumers will hold less illiquid durable and housing assets and more liquid financial assets (Mishkin, 1996:38).

The balance sheet of the consumer influences their estimate of the likelihood of suffering financial losses. According to Mishkin (1996:38), when consumers have a large amount of financial assets relative to their debts, their estimate of the probability of financial distress is low, and they will be more willing to purchase consumer durables or housing. Hence, an expansionary monetary policy that leads to an increase in stock prices will increase the value of the financial assets of consumers, which in turn will decrease the likelihood of financial distress and lead to a rise in consumer durable expenditure and ultimately, aggregate output.

There are instances where monetary policy is used to influence the amount of credit granted to government (especially monetary authorities) by borrowing from the public through the issue of public debt instruments. Such policy tends to “crowd-out” private sector borrowing and can have adverse effects on aggregate demand and output. For example, if monetary authorities aim to reduce the gap between actual consumption and its efficient level (which may vary with time depending on the state of the economy), then increasing credit issued to government, especially that which is financed through the issue of public debt instruments, can critically stifle credit issued to the private sector. However, this will lead to a reduction in aggregate demand and ultimately, output (Balogun, 2008:18).

6.2.5 The Expectations Channel

Lastly, the expectations channel is based on the anticipations of the private sector about the future stance of monetary policy. Although it is not a standalone channel, the expectations

channel has considerable significance for the effectiveness of all other transmission mechanisms. It works through all variables that have inter-temporal implications, i.e., the static interest rate, asset price, exchange rate, monetary and credit aggregates. Thus, all other transmission mechanisms are affected by economic agents' expectations about future shocks to the domestic economy and how the authorities would respond to them (Loayza and Schmidt- Hebbel, 2002; BIS, 2008).

For example, to the extent that private sector wage and price expectations are forward-looking, they can speed up the adjustment of nominal demand to a change in central bank policy and affect the transmission lag to inflation. Similarly, announcements of future central bank policy that are not supported by changes in current policy could exert real effects on the economy by modifying market expectations. In turn, changes in market expectations trigger current changes in money and asset markets and ultimately, in output and prices (Loayza and Schmidt- Hebbel, 2002:6).

The BIS (2008:20) notes that the perceptions of the private sector about central bank policy are crucial in determining the effectiveness of the expectations channel. High perceptions about the *credibility* and *predictability* of central bank policy lead to greater anticipated effects of monetary policy and *vice versa*. Similarly, a higher degree of *commitment* by the central bank to vary the policy rate consistently can enhance the role of the expectations channel

6.3 MONETARY POLICY TRANSMISSION IN DEVELOPING COUNTRIES

The transmission of monetary policy is difficult in most developing countries because the financial systems in these economies are under-developed. Given that most developing countries lack organised securities markets and that a typical financial structure has a limited portfolio of assets⁸⁷, open market purchases by the central bank are not very effective in changing aggregate demand. This leaves monetary authorities with four policy instruments; the required reserve ratio (which affects the money supply), the interest rate, the amount of credit extended by the central bank to the commercial system and the exchange rate.

⁸⁷ Individuals hold their wealth either in the form of domestic currency, demand and time deposits with the banking system, foreign currency, loans borrowed from commercial banks, or land and physical capital.

However, Montiel (1991:84) notes that foreign currency holdings tend to be limited by capital controls and restrictions on the holding of foreign exchange. In some cases, parallel markets for foreign exchange emerge in response to such regulations. Hence, the use of monetary policy may require intervention in the parallel market for foreign exchange. Similarly, these countries tend to impose official restrictions on the interest rates paid and charged by financial institutions. Thus, monetary policy in such cases would be in the form of administered interest rates.

6.4 INVESTIGATING THE EFFECTIVENESS OF INDEPENDENT MONETARY POLICY IN THE SADC COUNTRIES

Balogun (2007) argues that an alternative approach to considering the desirability of monetary integration among a group of countries is to weigh the advantages of maintaining monetary policy independence against the costs of surrendering autonomy to a regional authority. If independent monetary policy is effective in determining economic performance in any country, the implication is that monetary union would be costly for that country. This is because a union monetary policy would be set to meet the overall objectives of the region, which may not necessarily be in line with the national objectives of that country. If, on the other hand, national monetary policy is ineffective in determining economic performance, it is argued that the country could benefit from monetary integration, which entails having a union central bank determining monetary policy on its behalf.

However, Montiel (1991) and Buigut (2006) argue that a similar monetary policy action in countries with different transmission channels is likely to result in varying changes in output and prices across countries and possibly widen cyclical variation between these countries. Hence, when considering monetary integration, it is important to determine the relative importance of each transmission mechanism in potential union members. If the countries respond differently to a similar monetary policy shock, the implication is that they are not suitable for monetary integration. In this light, the present study made use of VAR analysis to determine the impact of monetary policy shocks on output and inflation in selected SADC countries. To our knowledge, there is no study that has been conducted along these lines.

The VAR approach has been criticised in literature as being devoid of any economic content. It is argued that the complete lack of *a-priori* information in the basic VAR model leads to losses in efficiency (Frohn, 1999; Enders, 2004). In addition, the structural VAR approach

addresses only the effects of unanticipated changes in monetary policy and does not consider the more important effects of the systematic portion of monetary policy or the choice of monetary policy rule (Bernanke *et. al*, 2003: 2).

Another issue is that the VAR approach uses a small amount of information in order to allow for intensive testing and estimation (Bernanke *et. al*, 2003; Frohn, 1999). However, the data used in the model is unlikely to incorporate all the information sets used by central banks, financial market participants, or other observers. This implies that, to the extent that central banks and the private sector have information not reflected in the VAR analysis, the measurement of policy innovations is likely to be contaminated. In addition, impulse responses can be observed only for the included variables, which generally constitute only a small subset of the variables that the researcher and policymakers are interested in (Bernanke *et. al*, 2003: 3).

However, the VAR approach is widely used in literature to measure the effects of monetary policy shocks on macroeconomic variables (cf. Bernanke *et. al*, 2003; van Aarle *et. al*, 2003; Haug *et. al*, 2005; Buigut, 2006; Hung, 2007). This is because the identification of monetary policy shocks requires only a credible identification of those shocks and does not require identification of the remainder of the macroeconomic model. In general, the models deliver empirically plausible assessments of the dynamic responses of the variables to policy innovations. The analytical framework behind the VAR approach is discussed in the next sub-section.

6.4.1 Model Specification

A basic bivariate first-order VAR model treats each variable, $\{y_t\}$ and $\{z_t\}$, as endogenous to the model. For example, given the following bivariate system:

$$y_t = b_{10} - b_{12}z_t + \gamma_{11}y_{t-1} + \gamma_{12}z_{t-1} + \varepsilon_{yt} \quad (6.1)$$

$$z_t = b_{20} - b_{21}y_t + \gamma_{21}y_{t-1} + \gamma_{22}z_{t-1} + \varepsilon_{zt} \quad (6.2)$$

Where: y_t and z_t are stationary variables; ε_{yt} and ε_{zt} are white noise disturbances with standard deviations of σ_y and σ_z , respectively; $\{\varepsilon_{yt}\}$ and $\{\varepsilon_{zt}\}$ are uncorrelated white noise processes; and the b 's and γ 's are coefficients.

Equations (6.1) and (6.2) constitute a structural VAR model, which incorporates feedback as the variables are allowed to affect each other, e.g., $-b_{12}$ is the contemporaneous effect of a unit change of z_t on y_t , while γ_{12} is the effect of a unit change in z_{t-1} on y_t . Similarly, if b_{21} is not equal to zero, then ε_{yt} has an indirect contemporaneous effect on z_t , and if b_{12} is not equal to zero, then ε_{zt} has an indirect contemporaneous effect on y_t .

Equations (6.1) and (6.2) can be expressed as reduced form equations using matrix algebra:

$$\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix} \begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix} \quad (6.3)$$

or

$$Bx_t = \Gamma_0 + \Gamma_1 x_{t-1} + \varepsilon_t \quad (6.4)$$

Where:

$$B = \begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix}, \quad x_t = \begin{bmatrix} y_t \\ z_t \end{bmatrix}, \quad \Gamma_0 = \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix}, \quad \Gamma_1 = \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix}, \quad \varepsilon_t = \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix}$$

Pre-multiplication of equation (6.4) by B^{-1} yields a VAR model in standard form:

$$x_t = A_0 + A_1 x_{t-1} + e_t \quad (6.5)$$

Where:

$$A_0 = B^{-1}\Gamma_0$$

$$A_1 = B^{-1}\Gamma_1$$

$$e_t = B^{-1}\varepsilon_t$$

Equation (6.5) can be re-written as:

$$y_t = a_{10} + a_{11}y_{t-1} + a_{12}z_{t-1} + e_{1t} \quad (6.6)$$

$$z_t = a_{20} + a_{21}y_{t-1} + a_{22}z_{t-1} + e_{2t} \quad (6.7)$$

Equations (6.6) and (6.7) constitute a VAR in standard form. The regression residuals can be expressed in terms of the pure shocks as:

$$e_{1t} = (\varepsilon_{yt} - b_{12}\varepsilon_{zt})/(1 - b_{12}b_{21}) \quad (6.8)$$

$$e_{2t} = (\varepsilon_{zt} - b_{21}\varepsilon_{yt})/(1 - b_{12}b_{21}) \quad (6.9)$$

(Enders, 2004: 265).

The present study is in line with the approaches used by Buiguit (2006) and Hung (2007). The former makes use of a VAR model to investigate the effectiveness of the interest rate channel in the EAC countries, while the latter uses a VAR model to investigate the effectiveness of all monetary transmission mechanisms in Vietnam. In line with Hung (2007), the present study makes use of a basic VAR model to analyse the impact of money supply

shocks to output and inflation in each of the SADC countries. The model is then extended to analyse alternatively, the impact of the interest rate channel, the credit channel and the exchange rate. The asset price channel is not considered because it was established that most of the capital markets in the SADC countries are under-developed⁸⁸, which implies that the asset price channel is not an important transmission mechanism in the member states, if at all it exists in some countries. Hence, for comparative purposes, it was excluded.

The present study makes use of the following basic VAR expressed in the reduced form:

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \dots + \Gamma_{p-1} \Delta Z_{t-p+1} + \varepsilon_t \quad (6.10)$$

Where:

- $Z_t^i = (Y_t^i, \pi_t^i, M_t^i)$, and is a vector of endogenous variables for each country, i , for each period, t . Y is defined as real output, π is the inflation rate, and M is defined as money supply (M_2). In the extended model, $Z_t^i = (Y_t^i, \pi_t^i, M_t^i, \text{and either } R_t^i, \text{Credit}_t^i, \text{ or } NER_t^i)$. Where: R is the interest rate, $Credit$ is defined as domestic credit to the private sector, and NER is the nominal exchange rate;

- Γ 's are $k \times k$ dimensional coefficient matrices; and
- Δ is a difference operator

The study considers the appropriateness of a vector error correction model (VECM) over a VAR model. Cointegration tests are performed between the variables and if they are cointegrated, then the following vector error correction model (VECM) is estimated:

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \dots + \Gamma_{p-1} \Delta Z_{t-p+1} + \Pi Z_{t-1} + \varepsilon_t \quad (6.11)$$

Where: $\Pi = \alpha\beta'$; α and β are $k \times r$ dimensional matrices. The α represents the speed of adjustment to disequilibrium, the β is the matrix of long-run coefficients, and the term $\beta'Z_{t-1}$ represents the r cointegrating relationships. If Z_t is a vector of $I(1)$ variables, then ΔZ_t are stationary and it follows that ΠZ_{t-1} must also be stationary for $\varepsilon_t \sim I(0)$ to be white noise (Buiguit, 2006:6). Hence, if the variables are not cointegrated, i.e., the rank of Π is zero, then it implies that the variables are not cointegrated. In this case, a VAR model is estimated. On the other hand, if there is a cointegration relationship between the variables, then a VECM is estimated.

⁸⁸ See Table B.3 in Appendix B.

6.4.1.1 Explanation of Variables

Economic literature stipulates that the interest rate channel is the most important transmission mechanism of monetary policy. Hence, the study investigates the relevance of this mechanism in the SADC countries in transmitting monetary policy actions. The credit channel was included to test the assertion that this transmission mechanism is likely to dominate in financially under-developed economies due to the moral hazard and adverse selection problems that are characteristic of shallow financial systems (Loayza and Schmidt-Hebbel, 2002:9). It was determined in Section 4.4.3 that the financial systems in the SADC countries are generally shallow and under-developed. As such, it is worth investigating if the assertion holds for the SADC countries. Thus, the effectiveness of the bank-lending channel in transmitting monetary policy is also investigated.

Lastly, the exchange rate channel is included in the analyses to test the hypothesis that the channel is an important transmission mechanism in small open economies due to the high dependency of these economies on primary production and the export of commodities (BIS, 2008:15). However, Loayza and Schmidt-Hebbel (2002: 9) argue that the exchange rate channel tends to be irrelevant in financially under-developed economies because such economies tend to impose exchange controls on foreign transactions. It was determined in Section 4.3 that most SADC countries have open economies that rely on primary production and the export of commodities, while in Section 4.4.3 it was ascertained that the financial systems in the SADC countries are generally shallow and under-developed. It is therefore worth investigating the importance of this mechanism in the member states.

Theoretically, an expansionary monetary policy stimulates consumption and investment expenditure, resulting in an increase in aggregate demand and output. Therefore, *ceteris paribus*, an increase in the monetary aggregate and/ or a reduction in the policy rate should stimulate output in each country. However, increases in money supply are inflationary and therefore are expected to lead to a rise in prices.

Increases in credit to the private sector, on the other hand, is expected to stimulate output but result in a rise in prices. This is because increases in the money supply lead to a reduction in the adverse selection and moral hazard problems associated with the credit market, which in turn will make banks more willing to supply credit. The increase in lending will in turn lead to a rise in investment spending, aggregate demand and output (Mishkin, 1996; Loayza and

Schmidt- Hebbel, 2002). However, monetary expansion is inflationary, hence the negative relationship with prices.

Lastly, in theory a nominal depreciation in the exchange rate would have no effect on aggregate demand, output and inflation in the short run if domestic prices are pre-set in local currency terms. On the other hand, if nominal prices are pre-set in the currency of the producer, a nominal depreciation in the exchange rate implies that the domestic price of imports will increase and hence, result in inflation (Devereux and Engel, 2003:766). In the long-run however, a nominal depreciation will lead to a real depreciation in the exchange rate, which in turn will result in inflation and a reduction in output (due to the fall in aggregate supply in response to an increase in the price of imports) (Loayza and Schmidt-Hebbel, 2002:5).

6.5 METHODS OF DATA ANALYSES

This sub-section discusses the techniques of data analyses employed in the study, giving reasons for the choice of techniques used. An important starting point in data analyses is to determine the order of integration of the variables hence, the discussion begins with a review of the theory of stationarity in variables and the tests employed to detect the presence of unit root processes in the data. This is followed by a review of the theory of cointegration between variables as the study considers the appropriateness of a VECM over a VAR model in the analyses. In analysing the data using the VAR model, the study makes use of variance decomposition analysis, impulse response functions and Granger causality tests. These techniques are also reviewed below.

6.5.1 Univariate Unit Root Tests

Econometric theory asserts that running estimations with non-stationary variables can produce spurious regressions with no important economic meaning. If two variables are trending overtime, a regression of one on the other could have a high R^2 even if the two are totally unrelated. For example, given a simple regression equation of the form:

$$y_t = a_0 + a_1 z_t + e_t \quad (6.12)$$

Where: $\{y_t\}$ and $\{z_t\}$ are two series, a_0 and a_1 are regression coefficients and $\{e_t\}$ is an error term.

If the intercept term, a_0 is removed from the expression, and equation (6.12) is expressed in terms of the error term, such that:

$$e_t = y_t - a_1 z_t \quad (6.13)$$

Assuming $\{y_t\}$ and $\{z_t\}$ are *independent* random walk models of the form:

$$y_t = y_{t-1} + \varepsilon_{yt} \quad (6.14)$$

$$z_t = z_{t-1} + \varepsilon_{zt} \quad (6.15)$$

Granger and Newbold (1974) impose the initial conditions $y_0 = z_0 = 0$ so that:

$$e_t = \sum_{i=1}^t \varepsilon_{yi} - a_1 \sum_{i=1}^t \varepsilon_{zi} \quad (6.16)$$

And

$$E_t e_{t+i} = e_t \text{ for all } i \geq 0 \quad (6.17)$$

Equations (6.16) and (6.17) are a violation of the assumptions of the classical linear regression model of zero mean of the error terms and a finite variance. This is because the variance in equation (6.16) becomes infinitely large as t increases, while the mean of the error term is e_t . As such, any t -statistics, F -statistics, or R^2 values are unreliable. Therefore, hypothesis tests about the regression parameters will not be valid. Granger and Newbold (1974), therefore note that the regression equation (6.12) is meaningless as the model is embedded with permanent errors. No important economic meaning can be attached to results with errors.

The stationarity or otherwise of a series can strongly influence its behaviour and properties. Granger and Newbold (1974), note that if the underlying residual series has a stochastic (permanent) trend, then any error in period t will not decay hence, any deviation from the model will be permanent. This implies that the persistence of shocks will be infinite for non-stationary series.

When considering monetary integration, stationarity in the variables included in the study is particularly important because the persistence of shocks in some of the countries implies that the union will be prone to asymmetric shocks. The discussion on the OCA theory in Section 3.4 of Chapter 3 highlighted the need for union members to be either exposed to similar shocks or possess mechanisms for the absorption of asymmetric shocks in order to minimise the costs associated with giving up the exchange rate as an adjustment mechanism. Therefore,

if the union members do not have alternative adjustment mechanisms in place, then asymmetric shocks will persist and possibly de-stabilise the union.

Thus, it is essential that prior to running regressions, the order of integration of the variables has to be determined and if the variables are found to be non-stationary, they should be differenced accordingly⁸⁹. However, Sims (1980) and Sims *et. al* (1990) suggest that variables in a VAR model should not be differenced even if they contain a unit root. They argue that differencing “throws away” information concerning the co-movements in the data, yet the goal of VAR analysis is to determine the interrelationships between variables, and not to determine the parameter estimates. This is particularly true when the variables are cointegrated. In addition, the authors recommend that it is not necessary to de-trend data in a VAR because the form of the variables ought to mimic the true data generating process, particularly when estimating a structural VAR. They argue that a trending variable can be approximated by a unit root with drift.

However, Enders (2004:358) points out that it is preferable to difference the variables if they are not cointegrated. The author argues that all the tests lose power when one extra lag of each variable is included in each equation because n^2 more parameters will be estimated. In addition, tests for Granger causality conducted on $I(1)$ variables do not have the standard F-distribution when the VAR is in levels. However, the F-distribution can be used to test for Granger causality when first differences are used. Lastly, if the VAR has $I(1)$ variables, the impulse responses at long forecast horizons will be inconsistent estimates of true responses because they do not decay. On the other hand, if the VAR is estimated in first differences, the estimates will be consistent because the impulse responses will decay to zero.

In addition, Enders (2004:167) notes that it is important to determine the components of a trend because they have important implications for the appropriate transformation necessary to attain a stationary series. This is because a non-stationary series that contains a trend with a stochastic component will not be made stationary by de-trending since the stochastic portion

⁸⁹ However, this depends on whether the series is trend or difference stationary. A trend stationary series can be transformed into a stationary series by removing the deterministic trend (i.e., de-trending), while a series with a unit root (i.e., a difference stationary series) requires differencing. A trend can have a deterministic component only or, both a deterministic and a stochastic (permanent) component.

will not be eliminated. Similarly, differencing a trend stationary series can introduce a non-invertible unit root process into the moving-average (MA) component of the model.

The sub-sections below review the Phillips-Perron (1988) and the Dickey-Fuller test with generalised least squares de-trending (DF-GLS) unit root tests, which are the models used in the study to test the presence of unit roots in the variables. The use of unit root tests was chosen over stationarity tests based on the finding by Nelson and Plosser (1982) that important macroeconomic variables tend to be difference stationary rather than trend stationary. Autoregressive unit root tests are based on testing the null hypothesis that $\phi = 1$ (i.e., difference stationary) against the alternative hypothesis that $\phi < 1$ (i.e., trend stationary). The tests are called unit root tests because under the null hypothesis, the autoregressive polynomial of z_t has a root equal to zero, i.e., $\phi(z) = (1 - \phi z) = 0$. On the other hand, stationarity tests are based on testing the null hypothesis that y_t is trend stationary against the alternative that it contains a unit root.

6.5.1.1 The Phillips-Perron Test

The Phillips-Perron (PP, 1988) tests control for serial correlation when testing for a unit root such that it does not affect the asymptotic distribution of the test statistic. The PP tests were chosen over the Augmented Dickey-Fuller (ADF, 1981) tests because they tend to be more powerful than the ADF tests and are robust to general forms of heteroskedasticity in the error term. In addition, the user need not specify a lag length for the test regression. On the other hand, caution has to be exercised in the specification of the lag length, p , in the ADF test because if p is too small, then traces of serial correlation will remain in the error terms, which will bias the test. If p is too large, then the power of the test will suffer.

The PP test is based on the statistic:

$$\tilde{t}_\alpha = t_\alpha \left(\frac{\gamma_0}{f_0} \right)^{1/2} - \frac{T(f_0 - \gamma_0)(se(\hat{\alpha}))}{2f_0^{1/2}s} \quad (6.18)$$

Where: $\hat{\alpha}$ is the estimate of α , t_α is the t -ratio of α , $se(\hat{\alpha})$ is the standard error of the coefficient, $\hat{\alpha}$, f_0 is an estimator of the residual spectrum at frequency zero, γ_0 is a consistent estimate of the error variance in a non-Augmented DF test equation, and s is the standard error of the test regression.

However, both the PP and ADF tests have been criticised for their low power in making a distinction between highly persistent stationary processes and non-stationary processes. In other words, the tests have very low power against stationary, i.e., $I(0)$ alternatives that are close to being non-stationary, i.e., $I(1)$ processes. For example, the tests are poor at deciding if $\phi = 1$ or $\phi = 0.95$ and may declare such a time series stationary (Gujarati, 2003; Enders, 2004). In addition, the power of the tests depends on the time span of the data, more than the mere size of the sample. For example, the power of the tests is greater when the sample size is $n=30$ over a span of 30years than when $n=100$ over a span of 100days (Gujarati, 2003).

Lastly, the tests have been criticised for their severe size distortion (in the direction of over-rejecting the null). This can occur when the series has a large negative moving average root or when the model is specified to include, for example, a drift and trend when the true model is a random walk. A conclusion that the time series is stationary at the 5% level of significance may be wrong because the true level of significance is larger in this case (Gujarati, 2003).

Lastly, the power of the tests diminish as deterministic terms are added to the test regressions, i.e., tests that include a constant and trend in the test regression have less power than tests that only include a constant in the test regression. Elliot, Rothenberg and Stock (ERS, 1996) propose the use of alternative tests that have substantially higher power especially when ϕ is close to unity. The present study makes use of the (ERS, 1996) test known as the Dickey-Fuller test with Generalised Least Squares De-Trending (DF-GLS). This test is described in the next sub-section.

6.5.1.2 The Dickey-Fuller Test with Generalised Least Squares De-Trending (DF-GLS)

The DF-GLS test de-trends the data using a procedure known as GLS de-trending before the ADF test regression is estimated. The test then omits the deterministic trend in its specification. The hypotheses are evaluated using the same t -ratio as in the ADF test:

$$t_{\alpha} = \hat{\alpha} / (se(\hat{\alpha})) \quad (6.19)$$

Where: $\hat{\alpha}$ is the estimate of α , and $se(\hat{\alpha})$ is the standard error of the coefficient, $\hat{\alpha}$.

The DF-GLS t -ratio follows a Dickey-Fuller distribution in the constant only case. However, the asymptotic distribution differs when you include both a constant and trend. Hence, the critical values differ in the latter case (Eviews Help, 2010).

6.5.2 Cointegration Tests

The essence of cointegration is that if there exists a linear combination of non-stationary variables that is stationary, then the variables are said to be cointegrated.

For example, given a set of economic variables in the long run:

$$\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_{nt} = 0 \quad (6.20)$$

If β and x denote the vectors $(\beta_1, \beta_2, \dots, \beta_n)$ and $(x_1, x_2, \dots, x_n)'$, then the components of the vector x_t are said to be integrated of order d , b , denoted $x_t \sim CI(d, b)$, if:

- All components of x_t are integrated of order d ; and
- There exists a vector $\beta = (\beta_1, \beta_2, \dots, \beta_n)$ such that the linear combination $\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_{nt}$ is integrated of order $(d - b)$, where $b > 0$. This vector is called the cointegrating vector.

Cointegration implies that a long-run relationship exists between the $\{y_t\}$ and $\{z_t\}$ sequences, however, this relationship need not be generated by market forces or the behavioural rules of individuals. The long run relationship may be causal, behavioural, or simply a reduced-form relationship among similarly trending variables (Enders, 2004:322). The presence of a long run relationship between the $\{y_t\}$ and $\{z_t\}$ sequences implies that the variables do not drift too far apart from each other over time (Maddala and Kim, 1998:26).

This is particularly important when considering the transmission of monetary policy within a currency union. When macroeconomic variables are cointegrated, it implies that the effects of shocks are temporary and will therefore dissipate over time. Hence, on condition that there is economic convergence among union members, a union monetary policy action is likely to have similar effects on the economies of member states. Thus, their business cycles are likely to be synchronised in the long run. Monetary integration will be beneficial for such a group of countries.

On the other hand, if the variables are not cointegrated, it implies that they will drift apart over time. Hence, the effects of shocks will be permanent. This in turn implies that the countries are likely not to achieve economic convergence; hence, their business cycles will be asymmetrical. In addition, a common monetary policy action is likely to have asymmetrical effects on member states and therefore widen the cyclical variations. For such a group of countries, monetary integration would be costly.

The present study makes use of the Johansen (1988)'s maximum likelihood approach to test for the presence and number of cointegration relationships in the models. The maximum likelihood is given by: $-2\log L_{max} \propto T \sum_{i=1}^n \ln(1 - \lambda_i)$

Where:

- $\hat{\lambda}_i$ represents the estimated values of the eigenvalues (characteristic roots) obtained from the Π matrix, and
- T is the number of usable observations.

The trace statistic, λ_{trace} , tests the null hypothesis that the number of distinct cointegrating vectors is less than or equal to r against a general alternative (Maddala and Kim, 1998). The trace statistic is equal to zero when all $\lambda_i = 0$. The further away the estimated roots (eigenvalues) are from zero, the more negative is the $\ln(1 - \hat{\lambda}_i)$ value, and the larger the trace statistic. The trace statistic is specified as:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i) \quad (6.21)$$

Cointegration can also be determined using the maximum eigenvalue test statistic, λ_{max} , which tests the null hypothesis that the number of cointegrating vectors is r against the alternative of $r+1$ cointegrating vectors (Maddala and Kim, 1998). The maximum eigenvalue test statistic is specified as:

$$\lambda_{max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1}) \quad (6.22)$$

Maddala and Kim (1998:21-2) note that caution needs to be exercised in specification of the deterministic trends to be included in the VECM. This is because the asymptotic distributions of test statistics vary according to the different specifications of the deterministic trends in the VAR model. For example, when there are deterministic cointegration relationships among variables, deterministic trend terms in the VAR model, will not be present in the VECM. On

the other hand, if there are stochastic cointegration relationships, deterministic trend terms appear in the VECM.

There are a number of criticisms in the literature on the Johansen (1988) procedure for testing for cointegration. To begin with, Ho and Sorenson (1996) note that the Johansen procedure is sensitive to misspecification of the lag length and size distortions in the tests for the second and subsequent cointegrating vectors when the ratio of data point to the number of parameters is small.

Cointegration tests based on unit root tests with low power have also been criticised for their tendency to find spurious cointegration with probability approaching one asymptotically (Gonzalo and Lee, 1995; Elliot, 1998). However, this limitation applies to all cointegration tests and is not unique to the Johansen procedure. Campbell and Perron (1991) note that this limitation inherent in the cointegration tests implies that it may be difficult to distinguish processes that exhibit cointegration from those that do not. Furthermore, it may be difficult to estimate precisely the exact number of cointegrating relationships. However, Maddala and Kim (1998:184) argue that for the purposes of VAR analysis, cointegration relationships need not have any economic interpretations since they are only applied to determine the restrictions of the VAR system.

6.5.3 Variance Decomposition

Enders (2004: 280) notes that the structural form of a VAR model is over-parameterised and is therefore, not useful for short-term forecasts. However, it is possible to decompose the forecast errors in terms of the $\{\varepsilon_t\}$ sequence to obtain the inter-relationships among the variables in the system. The forecast error variance decomposition shows the proportion of the movements in a sequence due to its “own” shocks as opposed to shocks to other variables in the system. Using the structural VAR in equations (6.1) and (6.2), if the ε_{zt} shocks explain none of the forecast error variance of $\{y_t\}$ at all forecast error horizons, it is said that the $\{y_t\}$ sequence is exogenous. Hence, $\{y_t\}$ evolves independently of the ε_{zt} shocks and of the $\{z_t\}$ sequence. On the other hand, if ε_{zt} shocks explain all forecast error variance in the $\{y_t\}$ sequence, at all forecast horizons, then $\{y_t\}$ is entirely endogenous.

When evaluating the importance of monetary transmission mechanisms, variance decomposition analysis shows how much of the innovations in output and inflation is due to their “own” shocks and how much can be attributed to monetary policy shocks. Enders (2004: 280) notes that it is typical for a variable to explain almost all of its forecast error variance at short horizons and smaller proportions at longer horizons. This occurs when ε_{zt} shocks have little contemporaneous effect on y_t , but affect the $\{y_t\}$ sequence with a lag. Hence, in the present study, if a great proportion of the forecast error variances in output and inflation are due to their “own” shocks even at longer horizons, the implication is that the relevant channel is not an important transmission mechanism in the particular country.

As noted above, the structural VAR is over-parameterised, which implies that it is under-identified and cannot be estimated. For example, equations (6.1) and (6.2) contain ten parameters (i.e., $b_{10}, b_{12}, b_{20}, b_{21}, \gamma_{11}, \gamma_{12}, \gamma_{21}, \gamma_{22}$ and two standard deviations (σ_y) and (σ_z)). On the other hand, the VAR model in standard form in equations (6.6) and (6.7) produces only nine parameters (i.e., $a_{10}, a_{11}, a_{12}, a_{20}, a_{21}, a_{22}$ and the calculated values $\text{var}(e_{1t}), \text{var}(e_{2t}),$ and $\text{cov}(e_{1t}, e_{2t})$). Thus, it is not possible to identify the structural system. Sims (1980) proposes the use of a recursive system to restrict the structural system such that one of the parameters, e.g., $b_{21} = 0$. The system then becomes:

$$y_t = b_{10} - b_{12}z_t + \gamma_{11}y_{t-1} + \gamma_{12}z_{t-1} + \varepsilon_{yt} \quad (6.23)$$

$$z_t = b_{20} + \gamma_{21}y_{t-1} + \gamma_{22}z_{t-1} + \varepsilon_{zt} \quad (6.24)$$

B^{-1} becomes:

$$B^{-1} = \begin{bmatrix} 1 & -b_{12} \\ 0 & 1 \end{bmatrix}$$

Pre-multiplication of equations (6.23) and (6.24) yields:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} 1 & -b_{12} \\ 0 & 1 \end{bmatrix} \begin{bmatrix} b_{10} \\ b_{20} \end{bmatrix} + \begin{bmatrix} 1 & -b_{12} \\ 0 & 1 \end{bmatrix} \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} 1 & -b_{12} \\ 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix} \quad (6.25),$$

which is simplified to:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} b_{10} & -b_{12}b_{20} \\ & b_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} - b_{12}\gamma_{21} & \gamma_{12} - b_{12}\gamma_{22} \\ \gamma_{21} & \gamma_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{yt} & -b_{12}\varepsilon_{zt} \\ & \varepsilon_{zt} \end{bmatrix} \quad (6.26)$$

Estimating the system using OLS yields the following:

$$y_t = a_{10} + a_{11}y_{t-1} + a_{12}z_{t-1} + e_{1t} \quad (6.27)$$

$$z_t = a_{20} + a_{21}y_{t-1} + a_{22}z_{t-1} + e_{2t} \quad (6.28)$$

Where: $a_{10} = b_{10} - b_{12}b_{20}$

$$a_{11} = \gamma_{11} - b_{12}\gamma_{21}$$

$$a_{12} = \gamma_{12} - b_{12}\gamma_{22}$$

$$a_{20} = b_{20}$$

$$a_{21} = \gamma_{21}$$

$$a_{22} = \gamma_{22}$$

The relationship between the residuals and the pure shocks becomes:

$$e_{1t} = \varepsilon_{yt} - b_{12}\varepsilon_{zt} \quad (6.29)$$

$$e_{2t} = \varepsilon_{zt} \quad (6.30)$$

Since $b_{21} = 0$, the system has nine parameter estimates, i.e. a_{10} , a_{11} , a_{12} , a_{20} , a_{21} , a_{22} , $\text{var}(e_{1t})$, $\text{var}(e_{2t})$, and $\text{cov}(e_{1t}, e_{2t})$ that can be substituted into the nine equations above to simultaneously solve for b_{10} , b_{12} , b_{20} , γ_{11} , γ_{12} , γ_{21} , γ_{22} , (σ_y) and (σ_z) . From equations (6.29) and (6.30), it is observed that both ε_{yt} and ε_{zt} shocks have a contemporaneous effect on y_t , while only ε_{zt} shocks have a contemporaneous effect on z_t . In other words, z_t has a contemporaneous effect on y_t , while y_t affects the $\{z_t\}$ sequence with a one-period lag. This triangular form of decomposing residuals is known as the Choleski decomposition. The approach is used to orthogonalise the underlying shocks to the VAR model before impulse responses (discussed in the following sub-section) and forecast error variance decompositions are computed (Enders, 2004: 275).

However, the Choleski method of analysing impulse responses has been criticised for being sensitive to the ordering of the variables in the VAR (Pesaran and Shin, 1997; Enders, 2004). For example, the method used in equations (6.29) and (6.30) necessitates that all of the one-period forecast error variance of z_t is due to ε_{zt} . However, if the ordering were reversed, all of the one-period forecast error variance of y_t will be due to ε_{yt} .

Pesaran and Shin (1997) propose the use of a generalised impulse response analysis, which is invariant to the order of the variables in the VAR. They show that the size and magnitude of responses are more accurate using the generalised method, although the approach produces similar results to the Choleski decomposition approach when the ordering is the same. On the

other hand, Enders (2004: 280) notes that the effects of alternative ordering in the Choleski method are reduced at longer forecasting horizons. In addition, if the correlations among the various variables are small, alternative orderings should yield similar variance decompositions.

Other methods of variance decomposition include the Blanchard and Quah (1989) approach, which was a reconsideration of the Beveridge and Nelson (1981) approach, the Sims-Bernanke (1986) decomposition approach, and the Hodrick-Prescott (1997). The Sims-Bernanke (1986) has the advantage of being invariant to the ordering of the variables in the model, which eliminates the process of trying to figure out the most appropriate ordering. On the other hand, the Hodrick-Prescott (1997) has the advantage of using the same method to extract the trend from a set of variables hence; the variables will have the same stochastic trend. This is in contrast to the Beveridge and Nelson (1981) approach, which when applied separately to the same variable yields different trends.

The Blanchard and Quah (1989) approach first estimates a bivariate VAR model with the underlying identifying assumption that one of the shocks has no long run effects (the demand shock), while the other does (the supply shock) (Garrat *et al.*, 2006:18). However, this approach has been criticised for assuming that demand shocks are always temporary, which is not always the case. In practice, these shocks can sometimes have long lasting effects. The approach also assumes that any difference-stationary variable can be decomposed into permanent and temporary components. However, this assumption requires that at least one of the variables in the analysis be non-stationary, which is not always the case (Tavlas, 2008:18).

In addition, when the VAR model has three or more variables, there is a possibility of the presence of more than one permanent or temporary shock in the system. This poses further identification problems since a combination of stationary shocks will themselves be stationary (Garrat *et al.*, 2006:18). Furthermore, the approach is limited by its ability to identify *at most* only as many types of distinct shocks as there are variables in the model (Enders, 2004:310). Lastly, the model assumes that the relationships among variables are constant with respect to time, which is unrealistic given that most relationships among variables are likely to be time-varying so that the coefficients are not constant over time (Tavlas, 2008:18).

The present study makes use of the Choleski decomposition approach, which is the approach used in VAR models run in Eviews. The forecast errors in terms of the $\{\varepsilon_t\}$ sequence are decomposed in order to obtain the inter-relationships among the variables, with the ordering: inflation, output, and money supply for the basic model and for the extended model, the respective transmission mechanism. The ordering allows the transmission mechanism to be interpreted as a monetary policy reaction function. Given that the procedure uses residuals to obtain the impulses, they can be interpreted as responses of output and inflation to an unanticipated monetary policy action (Haug *et al.*, 2005; Buigut, 2006).

6.5.4 Impulse Response Functions

The present study also makes use of impulse response functions to observe the behaviour of inflation and output in response to monetary policy shocks. According to Enders (2004: 274), impulse response analysis allows one to trace out the time path of the various shocks on the variables contained in the VAR system. For example, if we expressed equations (6.6) and (6.7) in matrix form as:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} a_{10} \\ a_{20} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} \quad (6.31)$$

Alternatively, assuming the stability condition holds, the system can be written as:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \bar{y}_t \\ \bar{z}_t \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}^i \begin{bmatrix} e_{1t-i} \\ e_{2t-i} \end{bmatrix} \quad (6.32)$$

Equation (6.32) expresses y_t and z_t in terms of the $\{e_{1t}\}$ and $\{e_{2t}\}$ sequences, which can be expressed in terms of ε_{yt} and ε_{zt} . Equations (6.8) and (6.9) can be expressed in matrix format as:

$$\begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} = \frac{1}{1-b_{12}b_{21}} \begin{bmatrix} 1 & b_{12} \\ -b_{21} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix} \quad (6.33)$$

Combining equations (6.32) and (6.33) yields:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \bar{y}_t \\ \bar{z}_t \end{bmatrix} + \frac{1}{1-b_{12}b_{21}} \sum_{i=0}^{\infty} \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}^i \begin{bmatrix} 1 & b_{12} \\ -b_{21} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix} \quad (6.34)$$

This can be simplified to:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \bar{y}_t \\ \bar{z}_t \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} \phi_{11}(i) & \phi_{12}(i) \\ \phi_{21}(i) & \phi_{22}(i) \end{bmatrix} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix} \quad (6.35)$$

Where:

$$\phi_i = \frac{A_1^i}{1-b_{12}b_{21}} \begin{bmatrix} 1 & b_{12} \\ -b_{21} & 1 \end{bmatrix}$$

In compact form, equation (6.35) becomes:

$$x_t = \mu + \sum_{i=0}^{\infty} \phi_i \varepsilon_{t-i} \quad (6.36)$$

The coefficients of ϕ_i in equation (6.35) are used to generate the effects of ε_{yt} and ε_{zt} shocks on the entire time path of the $\{y_t\}$ and $\{z_t\}$ sequences. The coefficients are called impulse response functions and they show the impact of a unit change in the disturbances on the variables in the system at different time periods, i . For example, $\phi_{12}(0)$ gives the instantaneous impact of a unit change in ε_{zt} on y_t , while $\phi_{12}(1)$ shows the effects of a unit change in ε_{zt} on y_{t+1} . A summation of the coefficients of the impulse response functions gives the accumulated effects of unit impulses in ε_{yt} and/ or ε_{zt} . Enders (2004: 274) notes that plotting these impulses gives a practical way of visually representing the behaviour of the $\{y_t\}$ and $\{z_t\}$ sequences in response to various shocks.

6.5.5 Granger Causality

The Granger causality test tests whether the lags of one variable enter into the equation for another variable, i.e., whether the one variable improves the forecasting performance of the other variable. This is achieved by measuring whether the current and past values of, for instance, $\{y_t\}$ help to forecast future values of $\{z_t\}$. If $\{y_t\}$ does not improve the forecasting performance of $\{z_t\}$, then it is said that $\{y_t\}$ does not Granger cause $\{z_t\}$. For example, given a vector moving average (VMA) model of z_t :

$$z_t = \bar{z} + \phi_{21}(0)\varepsilon_{yt} + \sum_{i=0}^{\infty} \phi_{22}(i)\varepsilon_{zt-i} \quad (6.37)$$

If z_{t+1} is forecast conditional on the value of z_t , the following forecast error is obtained:

$$\phi_{21}(0)\varepsilon_{yt+1} + \phi_{22}(0)\varepsilon_{zt+1} \quad (6.38)$$

Since the value of z_t is known, information concerning y_t does not help reduce the forecasting error of z_{t+1} . The only additional information contained in y_t is the current and past values of ε_{yt} , which do not affect z_t and hence, cannot improve its forecasting performance.

6.6 DATA ISSUES

The study makes use of quarterly data from January 1980 to December 2009 from the International Financial Statistic (IFS) database of the IMF. A lack of sufficient data in some of the SADC states presented difficulties in making conclusive comparisons as to the feasibility of monetary integration within the SADC region. Particularly, very few of the member states report fully on the amount of credit granted to the private sector and government, which as a result, provided an incomplete picture on the impact of the credit channel on domestic macroeconomic stabilisation efforts.

Allen and Ndikumana (2000:139) note that for most developing countries, macroeconomic time series data is sparse and when available, it is usually recorded annually. This limits the number of observations to include in a study. In addition, data tends to be reported from the time the countries attained independence, which makes comparisons for countries, such as the SADC states, difficult as the period from which data is available differs from country to country.

6.7 CONCLUSION

The underlying theoretical framework for the analyses is the theory of monetary transmission mechanisms. Economic literature asserts that the interest rate channel is the most important transmission mechanism in most countries. However, for developing countries, the interest rate channel tends not to be because their financial systems are usually shallow and poorly diversified. This limits the transmission of monetary policy. In such environments, the credit channel is expected to dominate due to the moral hazard and adverse selection problems that are characteristic of shallow financial systems.

The study makes use of VAR analysis to investigate the importance of various monetary transmission mechanisms in the SADC countries. The intuition is that a similar policy action in a monetary union comprising countries with different transmission mechanisms due to divergent financial systems is likely to result in varying changes in output and prices across countries and possibly widen cyclical variation between countries. In turn, the member states will be prone to asymmetric shocks, which increase the costs of giving up the exchange rate as an adjustment mechanism. Hence, VAR analysis is used to analyse and compare the impact of monetary policy shocks through various transmission mechanisms in the SADC countries.

Chapter 7 presents and discusses the results obtained from the analyses. It is expected that the interest rate channel in the SADC countries with the least developed financial systems will not be an important transmission mechanism, while the credit channel dominates. On the other hand, the interest rate channel is likely to dominate in the CMA countries as the SARB makes use of the interest rate as the main instrument in pursuing its inflation targeting policy. It is expected that the SADC countries will exhibit asymmetry in monetary policy shocks, which would be an indication that the region as a whole is not suitable for monetary integration.

CHAPTER SEVEN

RESULTS AND DISCUSSION

7.1 INTRODUCTION

The results from the analyses are discussed in this chapter, together with the implications drawn from the estimations. The models outlined in the previous chapter were estimated using the Eviews 7 econometric package. Section 7.2 discusses the results from the preliminary tests performed on the data, which include unit root tests and cointegration analyses. The detailed results of the univariate stationarity tests are presented in Table D.1 of Appendix D, while the results of the VAR lag-length selection criteria are presented in Appendix E.

Section 7.3 presents and discusses the results from the estimations using VAR analyses for each transmission mechanism and per country. The study made use of impulse response functions, variance decomposition analyses and Granger causality tests in the interpretation of the results. The detailed results of the Granger causality tests are presented in Appendix F, while the results for the variance decomposition analyses are presented in Appendix G. Appendix H presents the impulse response functions for each country, while Appendix I gives a summary of the descriptions of the conduct of monetary policy in the SADC countries. Lastly, Section 7.4 concludes the chapter.

7.2 PRELIMINARY ANALYSES

The results of the unit root tests are discussed in Section 7.2.1 below. This is followed by a discussion on the results from the cointegration analyses in Section 7.2.2. The descriptive statistics discussed in Chapter 4 are made reference to in the discussion of the results.

7.2.1 Unit Root Tests

The Dickey-Fuller test with generalised least squares de-trending (DF-GLS) and the Phillips-Perron (PP) univariate tests were carried out with an intercept only and an intercept and time trend for each country. Table 7.1 below provides a summary of the results obtained from the unit root tests. The detailed results of the univariate stationarity tests are presented in Table D.1 of Appendix D.

Table 7.1: Summary of Unit Root Tests

	GDP	Inflation	Interest Rate	Money Supply	Exchange Rate	Credit
Angola	I(0)	I(1)	-	-	I(0)	I(0)
Botswana	-	I(0)	I(1)	-	I(1)	I(1)
DRC	I(1)	I(1)	Insufficient data	I(1)	I(1)	-
Lesotho	I(1)	I(2)	I(1)	I(1)	I(1)	I(1)
Madagascar	I(1)	I(1)	I(0)	I(0)	I(1)	I(1)
Malawi	I(2)	I(0)	I(0)	I(0)	I(1)	I(2)
Mauritius	I(1)	I(0)	I(0)	I(2)	I(1)	I(1)
Mozambique	I(1)	I(1)	I(0)	I(2)	I(1)	I(1)
Namibia	I(0)	I(1)	I(1)	I(1)	I(0)	Insufficient data
South Africa	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
Swaziland	I(1)	I(1)	I(1)	I(1)	I(1)	I(2)
Tanzania	I(1)	I(2)	I(2)	I(1)	I(1)	Insufficient data
Zambia	I(2)	I(1)	I(0)	I(1)	I(1)	Insufficient data

Source: Derived from Regression Data

The results of the analyses indicated that most of the variables were integrated of the first order, i.e., $I(1)$ processes. Some variables, such as inflation for Lesotho and Tanzania, GDP for Malawi and Zambia, interest rate for Tanzania, the money supply for Mauritius and Mozambique, and credit for Malawi and Swaziland were integrated of the second order, i.e., $I(2)$ processes. On the other hand, GDP for Angola and Namibia, inflation for Botswana, Malawi and Mauritius, interest rate for Madagascar, Malawi, Mauritius, Mozambique and Zambia, the money supply for Madagascar and Malawi, the exchange rate for Angola and Namibia, and credit for Angola were stationary at level. Lastly, GDP for Botswana, interest rate for Angola, money supply for Angola and Botswana, and credit for the DRC were non-stationary at second difference.

$I(1)$ and $I(2)$ series tend to wander a long way from their mean value and cross this mean value rarely. $I(0)$ series, on the other hand, tend to cross the mean frequently. Table D.1 of Appendix D shows that a number of variables are either $I(1)$ or $I(2)$ series and they contain a stochastic trend component, as is the nature of most macroeconomic variables. This implies that the variables do not grow at a smooth long run rate because some of the shocks experienced are of a permanent nature. Hence, the effects of such shocks are never eliminated. On the other hand, shocks to $I(0)$ series are temporary; their effects will dissipate over time and the series revert to their long run levels (Nelson and Plosser, 1982; Enders, 2004).

For the SADC countries, this implies that the monetary union is likely to suffer from asymmetric monetary policy shocks, depending on the relative importance of each transmission mechanism. The discussion in Chapter 4 indicated that the member states are at different stages of financial development and lack diversified production structures, which make them prone to asymmetric shocks. The OCA theory stipulates that countries wishing to form a currency union should exhibit a similarity in shocks in order to minimise the costs of giving up the exchange rate as an adjustment mechanism. Thus, asymmetric responses to monetary policy shocks would be an additional indication that the SADC region is not suitable for monetary integration as there are high costs to individual countries associated with such integration. This is explored further in Section 7.3.

7.2.2 Cointegration Analysis

The appropriate lag length for the VAR models was first determined before cointegration tests were performed. Enders (2004: 281) notes that a lag length that is too large consumes degrees of freedom, while lag length that is too small leads to model misspecification. Hence, caution should be exercised in the selection of the appropriate lag length to use. Since the study makes use of quarterly data, as a precaution, the maximum lag length was initially set at twelve, then it was reduced progressively until it was determined that the maximum lag length was four. The choice of the lag length was based on the standard guideline used by most researchers that the lag length should be approximately $T^{1/3}$, where T is the number of usable observations (Enders, 2004:359). Table 7.2 below, presents a summary of the appropriate lag length used in each estimation. Detailed results of the VAR lag-length selection criteria are presented in Appendix E.

Table 7.2: Summary of Lag Length Selection Criteria

	Monetary Aggregate Channel	Interest Rate Channel	Exchange Rate Channel	Credit Channel
Angola	4	4	4	4
Botswana	4	2	2	4
DRC	4	-	4	4
Lesotho	4	4	4	4
Madagascar	4	2	2	3
Malawi	3	3	3	3
Mauritius	4	4	4	4
Mozambique	3	3	3	3
Namibia	4	3	3	-
South Africa	4	4	4	4
Swaziland	4	4	4	1
Tanzania	4	4	4	-
Zambia	4	4	4	-

Source: Derived from Regression Data

Econometric theory asserts that cointegration analysis cannot be conducted on variables that are not integrated of the same order. In addition, theory asserts that variables that are stationary at level cannot have a cointegration relationship with any other variables. However, Enders (2004:323) argues that it is possible to find equilibrium relationships among a group of variables that are integrated of different orders. Hence, cointegration tests were performed to determine whether such a relationship existed between the variables included in the present study. Table 7.3 below provides a summary of the results from the cointegration tests. Detailed results of the univariate stationarity tests are presented in Table D.2 of Appendix D.

Table 7.3: Summary of Cointegration Tests

	Monetary Aggregate Channel	Interest Rate Channel	Exchange Rate Channel	Credit Channel
DRC	$r \leq 1$	Insufficient data	$r \leq 1$	-
Lesotho	$r \leq 2$	$r \leq 3$	$r = 0$	$r = 0$
Mozambique	$r \leq 1$	-	$r = 0$	-
South Africa	$r \leq 2$	$r \leq 1$	$r \leq 3$	$r \leq 1$
Swaziland	$r \leq 2$	$r \leq 1$	$r = 0$	$r \leq 3$
Tanzania	$r = 0$	$r \leq 1$	$r \leq 1$	Insufficient data
Zambia	$r = 0$	$r = 0$	-	Insufficient data

Source: Derived from Regression Data

Of the SADC countries, Angola, Botswana, Madagascar, Malawi, Mauritius, Mozambique, Namibia and Zambia had stationary variables hence, cointegration analyses could not be carried out on the VAR models that had stationary variables. On the other hand, GDP for Botswana, interest rate for Angola, money supply for Angola and Botswana, and credit for

the DRC were non-stationary even at second difference. This implies that no equilibrium relationships can exist with these variables, as they are explosive. Any shocks to the economy will not dissipate and the variables do not return to their long run levels. Thus, cointegration tests were carried out only for the DRC (excluding the credit channel), Lesotho, Mozambique, South Africa, Swaziland, Tanzania and Zambia and VECMs were subsequently estimated where cointegration relationships existed. For the rest of the countries, VAR models were estimated.

7.3 RESULTS FROM ESTIMATIONS

Section 7.3.1 discusses the impact of un-anticipated changes in the monetary aggregate, while Section 7.3.2 discusses the effects of un-anticipated changes in the interest rate on output and inflation in each of the SADC countries. Section 7.3.3 is a discussion of the impact of un-anticipated changes in the interest rate and lastly, Section 7.3.4 discusses the effects of unanticipated changes in domestic credit issued to the private sector on the economic performance of the member states.

It was noted that is typical for a variable to explain almost all of its forecast error variance at short horizons and smaller proportions at longer horizons. This occurs particularly when ε_{zt} shocks have little contemporaneous effect on y_t , but affect the $\{y_t\}$ sequence with a lag (Enders, 2004: 280). Hence, the study pays particular attention to the variance decomposition analysis in the twelfth period, with the assumption that if a great proportion of the forecast error variances in output and inflation are due to their “own” shocks even at longer horizons, the implication is that the relevant channel is not an important transmission mechanism in the particular country.

7.3.1 The Monetary Aggregate Channel

The responses of changes in output (as measured by the GDP) and inflation (as measured by changes in the CPI) to an exogenous monetary policy shock (in the form of changes in the monetary aggregate) are presented below. The transmission mechanism is based on the quantity theory of money, which asserts that price levels vary in direct proportion to money supply. When money supply increases, consumers are expected to dispose of their excess money holdings by spending on consumer goods, hence stimulating aggregate demand. In turn, increases in the money supply are expected to exert an upward pressure on prices. The

responses of each SADC country to un-anticipated changes in the monetary aggregate are discussed in the sub-sections below.

7.3.1.1 Angola

The impulse response functions in Figure H.1.1 of Appendix H show that a positive shock to the monetary aggregate led to an increase in output, while prices declined initially then increased towards the fourth period. The results conform to economic theory, which stipulates that increases in money supply result in increases in both output and inflation. The Granger causality tests in Table F.1 of Appendix F indicate that there is a significant causal relationship between money supply and output, money supply and inflation, and output and inflation at the 5% level of significance. The implication drawn from the results is that increases in the money supply stimulate output production.

This is supported by the variance decomposition analysis in Table G.1.1 of Appendix G, which indicate that increases in money supply accounted for over 40% of fluctuations in GDP on average, while own output fluctuations accounted for 30% of the variations in the twelfth period as compared to over 50% in the first period. On the other hand, shocks to the money supply accounted for 32% of the fluctuations in prices by the twelfth period in comparison to merely approximately 3% in the first period. In contrast, own price fluctuations accounted for approximately 60% of the variations in prices by the twelfth period as compared to over 90% in the first period.

However, the magnitudes of the impulse responses are small, suggesting that the monetary aggregate channel is not very important in Angola. Table 4.8 in Chapter 4 indicates that Angola depends primarily on oil exports, which implies that expansionary monetary policy has an insignificant effect on stimulating output production as the demand for Angola's exports are determined by activity in the oil market. Similarly, Table 4.5 indicates that inflation in Angola has been declining over the years, while Table 4.12 indicates that the budget deficit has been increasing. This implies that seignorage revenue (which is inflationary) has not been used to finance the deficit.

Table I.1 in Appendix I indicates that the monetary aggregate is an important monetary policy tool in Angola. However, the results of the analyses suggest that the monetary aggregate channel is inefficient in the economy. The data in Tables 4.15 and 4.16 imply that

the economy experienced financial crises, which may have hindered the effective transmission of monetary policy. Lastly, the impulse response functions show that shocks to output and inflation tend to dissipate towards the twelfth period, suggesting that any negative monetary policy shocks to the union will have a temporary effect on inflation in Angola and will not permanently increase cyclical variations between the member states.

7.3.1.2 Botswana

The impulse response functions in Figure H.1.2 of Appendix H indicated that there was an insignificant response of output to a positive monetary policy shock. This was confirmed by the variance decomposition analysis in Table G.1.2 of Appendix G that indicated that approximately 90% of the fluctuations in output in the twelfth period were due to own output shocks, while changes in money supply accounted for merely 5% of the fluctuations in GDP. This can be explained by the high dependency of the economy on diamond exports, which account for approximately 77% of its exports as shown in Table 4.12 in Chapter 4. Hence, fluctuations in output are determined primarily by activity in the market for diamonds. In addition, Table I.1 in Appendix I indicates that the Bank of Botswana does not actively monitor monetary aggregates in formulating monetary policy. Thus, it was expected that the monetary aggregate would be a weak transmission mechanism for monetary policy in Botswana.

In addition, the impulse response functions showed that shocks to the monetary aggregate affect prices with a lag, thereafter prices decline in response to a positive monetary policy shock (which is a violation of economic theory) before rising by the eighth period. The magnitude of the response is very small, suggesting that increases in the money supply were insignificant in explaining inflation in Botswana. The variance decomposition analysis indicates that more than 76% of fluctuations in prices in the twelfth period were due to own price shocks rather than changes in money supply, which accounted for only 10% of the price variations. This could be explained by the high dependency of the economy on imports from South Africa (over 80% of the domestic goods)⁹⁰, which implies that inflation in Botswana is mainly imported inflation and not due to monetary expansion.

⁹⁰ See Table 4.3 in Chapter 4.

In addition, the Granger causality tests in Table F.2 of Appendix F found no significant causal relationship between money supply, inflation and output, confirming the insignificance of the monetary aggregate channel. Lastly, the impulse response for inflation does not decay, implying that any shocks to the monetary aggregate will result in a divergence of the level of inflation in Botswana from the union average. On the other hand, the impulse response for output tends to dissipate towards the twelfth period, suggesting that shocks to the monetary aggregate have a temporary effect on output and will not result in a widening of cyclical variations between Botswana and the other union member states.

7.3.1.3 The Democratic Republic of Congo

The impulse response function for inflation in Figure H.1.3 of Appendix H showed that a positive monetary shock led to an initial increase in prices in the DRC, which fell sharply between the sixth and ninth periods before rising again. In addition, the impulse does not decay, suggesting that any shocks to the monetary aggregate have permanent effects on prices and could potentially lead to a divergence of inflation rates in the DRC from the SADC levels. The Granger causality tests in Table F.3 of Appendix F suggest that money supply Granger causes inflation although only at the 10% level of significance.

This suggests that increases in the monetary aggregate are not the leading cause of inflation in the DRC, which may be attributed to the civil wars that have been going on for decades. This assertion is supported by the variance decomposition analysis in Table G.1.3 of Appendix G, which indicate that shocks to the monetary aggregate accounted for approximately 20% of the fluctuations in prices, while own price shocks accounted for approximately 50% of the variations in the twelfth period.

On the other hand, the impulse response function for output shows that a positive monetary policy shock leads to an initial decline in output, thereafter output fluctuates but the impulse does not decay. This suggests that shocks to the monetary aggregate could potentially widen cyclical variations between the DRC and the rest of the SADC member states. However, the Granger causality tests indicate that money supply does not Granger cause output, implying that increases in money supply have negligible effects on stimulating output growth.

Furthermore, the variance decomposition analysis indicate that increases in output accounted for less than 5% of the fluctuations in output, while own output shocks accounted for

approximately 85% of the variations in the twelfth period. The results suggest that the monetary aggregate channel is not an important transmission mechanism in the DRC. This is to be expected given that the economy depends mainly on the export of diamonds and oil as shown in Table 4.2 in Chapter 4, which implies that changes in output are determined primarily by changes in the demand for its commodities in their respective markets and monetary policy has limited scope in stimulating the economy.

The insignificance of the monetary aggregate in determining economic activity in the DRC is further explained by the under-development of its financial system. Money and banking are mostly limited to Kinshasa the country's capital, and dollarisation remains substantial in the economy, with over 85% of all bank deposits in foreign currency. This limits the efficiency of domestic monetary policy in determining output and inflation in the economy.

7.3.1.4 Lesotho

The impulse response function for output in Figure H.1.4 of Appendix H shows that a positive money supply shock is insignificant in stimulating output in Lesotho. There is a marginal increase in output in the first two quarters, output fluctuates thereafter and the effects of the shock do not dissipate. This implies that any shocks to the monetary aggregate have a permanent effect on output. However, the magnitudes of the responses are very small, suggesting that the cyclical variations between union members would be small.

In addition, the Granger causality tests in Table F.4 of Appendix F indicate that money supply Granger causes output in Lesotho. However, the variance decomposition analysis in Table G.1.4 of Appendix G indicates that shocks to the monetary aggregate accounted for a small proportion of the fluctuations in output (approximately 11% in the twelfth period), while own output shocks account for approximately 89% of the variations in output. This implies that changes in the monetary aggregate are ineffective in stimulating output in Lesotho. The insignificance of the monetary aggregate in determining output in Lesotho is to be expected, given that the smaller CMA countries have limited scope to exercise independent policy as the SARB sets the pace of monetary policy for the CMA⁹¹.

⁹¹ See Table I.1 in Appendix I.

On the other hand, the impulse response functions indicate that there is an initial decrease in inflation in the first two quarters, in response to a positive monetary policy shock, which is a contradiction of economic theory. Prices fluctuate thereafter and the impulse does not dissipate, implying that shocks to the monetary aggregate have a permanent effect on inflation and are likely to result in a divergence of inflation in Lesotho from the union levels.

However, the magnitudes of the responses are very small, suggesting that the monetary aggregate channel is weak. This is confirmed by the variance decomposition analysis, which indicates that shocks to the money supply accounted for approximately 12% of the variations in prices in the twelfth, while own price shocks accounted for approximately 30% of the fluctuations in prices. On the other hand, changes in GDP accounted for approximately 57% of the price variations, implying that a fall in output leads to a significant rise in inflation. Lastly, Table 4.2 in Chapter 4 indicates that Lesotho imports more than 82% of its goods from within the SADC region, particularly from South Africa. This implies that a significant proportion of inflation in Lesotho is imported inflation from South Africa.

7.3.1.5 Madagascar

The impulse response function for output in Figure H.1.5 of Appendix H showed that there was a sharp decline in output in the first four quarters, in response to a positive shock to the monetary aggregate. Thereafter, output increases but the effects of the shock do not decay. This implies that shocks to the monetary aggregate have permanent effects on output and could result in a widening of cyclical variation between union member states.

The fairly-large magnitude of the impulse response suggests that the monetary aggregate channel is significant in stimulating output growth in Madagascar. This is supported by the Granger causality tests in Table F.5 of Appendix F, which indicate that money supply Granger causes output. In addition, the variance decomposition analysis indicate that shocks to the money supply accounted for approximately 60% of the variations, while own output shocks accounted for approximately 37% of the fluctuations in output in the twelfth period.

Similarly, the impulse response functions show that there is an initial decrease in prices, in response to a positive shock to the monetary aggregate, which is in contradiction to economic theory. Prices begin to rise after the fifth period; however, the effect of the shock does not dissipate, implying that shocks to the monetary aggregate have permanent effects on inflation

in Madagascar. This is a cause for concern as it further implies that any shocks to the monetary aggregate could lead to a divergence of the level of inflation in Madagascar from the union levels.

The Granger causality tests in Table F.5 of Appendix F indicate that money supply Granger causes inflation. In addition, the variance decomposition analysis in Table G.1.5 of Appendix G show that shocks to the monetary aggregate accounted for approximately 34% of the fluctuations in prices, while own shocks accounted for merely 6% of the variations in prices in the twelfth period. On the other hand, shocks to output accounted for approximately 60% of the variations in prices, implying that decreases in the previous period's output exerted inflationary pressure on prices in the current period. This confirms the findings of Nassar (2005), who noted that inflation in Madagascar was driven largely by past events and hence, monetary policy was ineffective and lacked credibility.

7.3.1.6 Malawi

The impulse response functions in Figure H.1.6 of Appendix H show that the responses of output and inflation to a positive monetary policy shock in Malawi are negligible. There is an initial decrease in output, thereafter output fluctuates around its long run mean and the effects of the shock dissipate towards the twelfth period. This implies that shocks to the monetary aggregate have temporary effects on output and will not widen cyclical variations in a monetary union. On the other hand, prices increase in response to a positive shock to the monetary aggregate and the effect of the shock does not decay, implying that any unanticipated changes in the monetary aggregate will have permanent effects on inflation in Malawi. However, the effects are likely to be small given the small size of the impulse responses.

The Granger causality tests in Table F.6 of Appendix F found no significant causal relationship between money supply, output and inflation, suggesting that the monetary aggregate channel is an ineffective transmission mechanism in Malawi. This is supported by the variance decomposition analysis in Table G.1.6 of Appendix G, which indicate that fluctuations in output were largely due to own output fluctuations (more than 97%), and not in response to changes in the monetary aggregate (which accounted for less than 2% of the variations in output). Similarly, own price changes accounted for approximately 77% of the

fluctuations in prices, while changes in the monetary aggregate accounted for approximately 5% of the changes in prices.

In summary, the information in Table I.1 in Appendix I indicates that the monetary aggregate plays a significant role in monetary policy in Malawi. However, the results of the analysis suggest that the monetary aggregate channel is weak and is not efficient in determining economic performance in Malawi.

7.3.1.7 Mauritius

The Granger causality tests in Table F.7 of Appendix F found no significant causal relationship between money supply, output and inflation, suggesting that positive shocks to the money supply were insignificant in determining economic performance in Mauritius. The impulse response function for output in Figure H.1.7 of Appendix H shows that a positive money supply shock led to an initial fall in output in the first two quarters before output increased. However, the magnitude of the response is very small, implying that changes in the monetary aggregate do not affect output. This is supported by the variance decomposition analysis in Table G.1.7 of Appendix G, which indicate that shocks to the money supply accounted for approximately 8% of fluctuations, while own output shocks accounted for approximately 82% of the variations in output in the twelfth period.

On the other hand, the impulse response function for inflation shows that prices increase initially when there is a positive shock to the monetary aggregate. Prices then fall between the fourth and eighth period before rising again. However, the magnitudes of the responses are very small, suggesting that increases in the money supply are not the leading cause of inflation in Mauritius. This is supported by the variance decomposition analysis, which indicate that shocks to the money supply accounted for approximately 5% of fluctuations, while own price shocks accounted for approximately 85% of the variations in prices in the twelfth period.

Mauritius is likely to suffer from imported inflation, given its close trade linkages with the EU and the rest of the world. Table 4.3 in Chapter 4 shows that the country imports approximately 35% of its goods from the EU and 43% from the rest of the world, which implies that the economy is prone to imported inflation and economic contagion from its trade partners. A cause for concern is that the effects of the shocks do not decay in both

output and inflation, implying that any shocks encountered within the monetary union will result in a permanent divergence in the Mauritian inflation rates and output growth from the union levels. However, the divergence is likely to be minimal given the small size of the impulse responses. Overall, the results suggest that the monetary aggregate is not an important transmission mechanism in Mauritius. These results are in line with the findings of Tsangarides (2010), who found the monetary aggregate channel to be weak in Mauritius.

7.3.1.8 Mozambique

The impulse response function for output in Figure H.1.8 of Appendix H shows that there is a decrease initially in output in response to a positive monetary policy shock, before rising towards the fifth period. The initial response of output is contrary to economic theory, which asserts that an increase in the money supply leads to an increase in output. However, the magnitude of the response is very small, implying that the monetary aggregate is ineffective in stimulating economic growth in Mozambique.

The variance decomposition analysis in Table G.1.8 of Appendix G confirm this finding, indicating that own output shocks accounted for 44% of the variations in output in the twelfth period, while shock to the money supply and prices accounted for approximately 21% and 34% of the variations, respectively. In addition, the Granger causality tests in Table F.8 of Appendix F indicated that money supply did not Granger cause output. Lastly, the impulse response functions show that the effects of a monetary policy shock do not dissipate, which implies that any shocks to the monetary aggregate have permanent effects on output. However, the effects are likely to be minimal given the small size of the impulse responses.

On the other hand, prices increase sharply in the first four periods, in response to a monetary policy shock, thereafter there is a sharp fall in prices between the fifth and sixth period before rising again. However, the impulse decays by the twelfth period, implying that shocks to the monetary aggregate have temporary effects on prices in Mozambique and will not lead to a divergence from union levels.

7.3.1.9 Namibia

The impulse response function for output in Figure H.1.9 of Appendix H shows that output falls, in response to a positive money supply shock, which is contrary to an expectation that increases in money supply lead to increases in aggregate demand. However, the magnitude of

the response of output to money supply shocks is very small and dissipates around the eleventh period; implying that any shocks to the monetary aggregate have temporary effects on output.

The Granger causality tests in Table F.9 of Appendix F show that money supply does not Granger cause output. This is supported by the variance decomposition analysis in Table G.1.9 of Appendix G, which shows that monetary policy shocks accounted for less than 4% of the variations in output, while own output shocks accounted for 55% of the fluctuations in the twelfth period. The results suggest that the monetary aggregate channel is weak in Namibia.

Similarly, the Granger causality tests show that money supply does not Granger cause inflation in Namibia. The impulse response function for inflation shows that there is an initial decrease in prices in response to a positive monetary policy shock, thereafter prices fluctuate but the effect of the shock does not dissipate. This implies that any shocks to the monetary aggregate are likely to result in a divergence in the level of inflation in Namibia from the SADC average rates of inflation. The variance decomposition analysis indicate that own price shocks account for approximately 55% of fluctuations in prices in the twelfth period, while shocks to the money supply and output account for approximately 20% and 25% of the shocks, respectively.

Table 4.3 in Chapter 4, indicates that Namibia imports approximately 84% of its goods from within the SADC region, particularly from South Africa. This implies that the economy is mostly prone to imported inflation. In addition, Table I.1 in Appendix I, shows that the primary goal of monetary policy in Namibia is the maintenance of the fixed exchange rate between the Namibian dollar and the South African rand. This implies that the monetary aggregate is not used as a tool to determine economic performance but rather, as an intervention mechanism to maintain the currency peg (SADC Bankers, 2011).

7.3.1.10 South Africa

The impulse response functions for both output and inflation in Figure H.1.10 of Appendix H show that these variables increase in response to a positive monetary policy shock. In addition, the impulses do not decay, implying that any shocks to the monetary aggregate will have permanent effects on the economy. However, the magnitudes of these responses are

very small, suggesting that the monetary aggregate channel is weak in South Africa. Hence, any monetary policy shocks will have negligible effects on union average performances.

The Granger causality tests in Table F.10 of Appendix F indicate that money supply Granger causes output but not inflation. This result is supported by the variance decomposition analyses in Table G.1.10 of Appendix G that show that monetary policy shocks accounted for approximately 50% of the variations in output, while own output shocks accounted for 49% of the variations. The magnitude of the impulse response however indicates that positive shocks to the money supply are ineffective in stimulating output growth in South Africa.

On the other hand, approximately 84% of the fluctuations in prices were due to own price shocks, while monetary policy shocks accounted for 14% of the price fluctuations. This implies that inflation in South Africa is not a monetary phenomenon. Table I.1 in Appendix I, shows that the monetary aggregate is not the main instrument of monetary policy for the SARB. The Bank allows market forces to determine the amount of liquidity in the money market (SADC Bankers, 2011). In addition, the SARB maintains a policy of inflation targeting. Hence, an expansionary monetary policy action would contradict the SARB's main objective of price stability because it is inflationary.

The results are in line with that of Moll (1999), who found no close and reliable relationship between money supply, and nominal and real variables in South Africa. The study by Akinboade *et. al* (2001) support this finding, suggesting that inflation in South Africa is structural in nature. In conclusion, the monetary aggregate channel is not an important transmission mechanism in South Africa.

7.3.1.11 Swaziland

The impulse response function for output in Figure H.1.11 of Appendix H shows that output falls initially, in response to a positive money supply shock and then increases between the third and sixth period before returning to its base trajectory. However, the magnitude of the impulse response is very small, suggesting that monetary policy shocks have negligible effects on output. This is supported by the variance decomposition analysis in Table G.1.11 of Appendix G, which indicate that own output shocks accounted for more than 80% of the variations, while money supply shocks accounted for approximately 10% of the fluctuations

in output in the twelfth period. Thus, the monetary aggregate channel is insignificant in stimulating the economy.

The Granger causality tests in Table F.11 of Appendix F found a significant causal relationship between money supply, inflation and output in Swaziland. The impulse response function for inflation shows that prices increase, in response to a positive money supply shock. However, the variance decomposition analysis indicates that shocks to the money supply accounted for approximately 22% of the changes in prices in the twelfth period, while own price shocks accounted for approximately 55% of the variations. The rest of the fluctuations were due to output shocks.

Table 4.3 in Chapter 4, indicates that Swaziland imports approximately 96% of its goods from within the SADC region, particularly from South Africa. This implies that the economy is mostly prone to imported inflation and not inflation arising from seignorage. In addition, the Central Bank of Swaziland does not actively determine domestic monetary policy as it follows policy set by the SARB as per CMA arrangement. Hence, the monetary aggregate channel is weak in controlling domestic inflation. Furthermore, Table I.1 in Appendix I, shows that money supply aggregates are under-estimated in the economy due to the unknown volumes of South African rands in circulation. As such, the use of money supply aggregates for monetary policy purposes are inadequate, as the proportion of South African rands in circulation is significant (SADC Bankers, 2011).

7.3.1.12 Tanzania

The Granger causality tests in Table F.12 of Appendix F found no significant causal relationship between the variables, implying that a positive money supply shock had no significant impact on output or inflation in Tanzania. The impulse response function for output in Figure H.1.12 of Appendix H shows that there is an initial fall in output, in response to a monetary expansion, before rising in the third quarter. Thereafter output fluctuates but the effects of the shock do not decay. The variance decomposition analysis in Table G.1.2 of Appendix G indicates that more than 80% of the variations in output were due to own output shocks, while monetary policy shocks accounted for 13% of the fluctuations in the twelfth period.

On the other hand, the impulse response function for inflation shows that prices increase sharply in response to a positive monetary shock between the first two periods. Thereafter prices fluctuate but the impulse does not decay. This implies that any shocks to the monetary aggregate will have permanent effects on prices. However, the magnitude of the response is very small; indicating that shocks to the monetary aggregate will have minimal effects on union average rates. Lastly, the variance decomposition analysis indicate that monetary policy shocks accounted for 43% of the fluctuations in prices, while own price shocks accounted for 46% of the changes in the twelfth period.

7.3.1.13 Zambia

The Granger causality tests in Table F.13 of Appendix F found that money supply Granger caused inflation and output in Zambia. The impulse response function for output in Figure H.1.13 of Appendix H shows that there is an initial fall in output, in response to a monetary expansion, before rising in the third quarter. Thereafter output fluctuates but the effects of the shock do not decay. The variance decomposition analysis in Table G.1.13 of Appendix G indicates that approximately 51% of the variations in output were due to own output shocks, while monetary policy shocks accounted for 43% of the fluctuations in the twelfth period. However, the magnitude of the impulse response is very small; suggesting that the monetary aggregate channel is insignificant in stimulating output.

In addition, Table 4.2 in Chapter 4 shows that output comprises mainly of the production of copper for exports. This implies that output performance is primarily determined by the demand for copper in the commodity market and not domestic monetary policy actions. Thus, changes in the money supply are ineffective in determining economic performance in Zambia.

On the other hand, the impulse response function for inflation shows that prices increase sharply in response to a positive monetary shock between the first two periods. Thereafter prices fluctuate and the impulse dissipates in the twelfth period. This implies that any shocks to the monetary aggregate will have temporary effects on prices.

The variance decomposition analysis indicate that monetary policy shocks accounted for approximately 13% of the fluctuations in prices, while own price shocks accounted for approximately 36% of the changes in the twelfth period. The rest of the price fluctuations

were due to output shocks. The results are in line with those of Bova (1999), who noted that food inflation in Zambia is not sensitive to changes in the money supply but rather, it is associated with changes in supply conditions such as weather and production costs.

7.3.1.14 Summary

The results from the analyses suggest that the monetary aggregate channel is weak in most of the SADC member states, with the exception of Madagascar. In addition, the SADC countries display asymmetry in their responses to shocks to the monetary aggregate. There is an initial fall in output in response to a positive shock to the monetary aggregate for the DRC, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Swaziland, Tanzania and Zambia, while prices fall initially for Angola, Lesotho, Madagascar and Namibia, which is contrary to economic expectations. Lastly, for most of the SADC countries, shocks to the monetary aggregate do not dissipate, which implies that they are likely to lead to a divergence in economic performances of the member states within the monetary union.

7.3.2 The Interest Rate Channel

The responses of output and inflation to an exogenous monetary policy shock (in the form of changes in the policy rate) are presented below. *Ceteris paribus*, a reduction in the policy rate should result in reductions in other short-term interest rates. In turn, the fall in the interest rates is expected to stimulate investment and aggregate demand, and lead to a rise in prices. The subsections below discuss the impact of changes in the policy rate on each of the SADC countries. The interest rate channel could not be analysed for the DRC due to insufficient data.

7.3.2.1 Angola

The impulse response function in Figure H.2.1 of Appendix H for inflation shows that prices respond with a lag of two periods to a positive shock to the policy rate. There is a slight increase in prices from period three but the effect of the shock does not dissipate. This implies that any shocks to the interest rate are permanent, and therefore will result in a divergence of inflation in Angola from the union levels. The variance decomposition analysis in Table G.2.1 of Appendix G indicates that shocks to the interest rate accounted for 40% of the fluctuations in prices, while own shocks accounted for approximately 34% of the variations in the twelfth period. On the other hand, shocks to the monetary aggregate account for approximately 13% of the fluctuations in prices in the twelfth period.

On the other hand, the impulse response function for output shows that output increases in the first four periods, response to a positive shock to the interest rate. Thereafter, output fluctuates but the effects of the shock do not decay, implying that any shocks to the interest rate are permanent and could potentially widen cyclical variations between Angola and the rest of the SADC member states.

The Granger causality tests in Table F.1 of Appendix F found a significant causal relationship between output and the interest rate. The variance decomposition analysis supports this finding, indicating that shocks to the interest rate accounted for approximately 53% of the fluctuations in output, while own output shocks accounted for only 20% of the variations in the twelfth period. Shocks to the money supply and prices accounted for less than 9% and 17% of the fluctuations, respectively. However, the magnitudes of the responses are very small, suggesting that the interest rate channel is weak.

The results suggest that the interest rate channel plays an important role in monetary policy in Angola. This is supported by the data in Table 4.16 in Chapter 4, which shows that in the past decade, banks in Angola have improved on their efficiency in mobilising deposit money relative to the size of the economy. However, Table 4.15 indicates that the financial system in Angola is still under-developed; hence, there is limited scope for monetary transmission through the interest rate channel. This is seen in the very small size of the impulse response, which indicates that the interest rate channel is weak in controlling inflation.

7.3.2.2 Botswana

The results from the impulse response function for inflation in Figure H.2.2 of Appendix H shows that there is an initial increase in prices before falling towards the third quarter, in response to a positive shock to the interest rate. Prices begin to rise again after the eighth period but the impulse does not decay implying that shocks to the interest rate have permanent effects on prices. The Granger causality test in Table F.2 of Appendix F indicates that the interest rate does not Granger cause neither output nor inflation.

The variance decomposition analysis in Table G.2.2 of Appendix G indicates that 20% of the fluctuations in prices can be attributed to shocks to the interest rate, while own price shocks account for approximately 71% of the changes in the twelfth period. This suggests that the interest rate channel is insignificant in controlling inflation in Botswana. This is to be

expected given the high dependency of the economy on imports from South Africa, which implies that inflation in the economy is mainly imported inflation and is independent of domestic monetary policy actions.

On the other hand, the impulse response function for output show that there is an initial decline in output before increasing towards the fourth quarter, in response to a positive shock to the interest rate. However, the magnitude of the response is small, suggesting that a reduction in the policy rate has little effect on stimulating output in Botswana. The variance decomposition analysis supports this finding, indicating that shocks to the interest rate accounted for approximately 28% of the fluctuations in output, while own output shock accounted for 69% of the variations in the twelfth period.

The information in Table I.1 of Appendix I, shows that the Bank rate is used to affect other market rates in the control of inflation. However, the data in Tables 4.15 and 4.16 indicate that there is minimal development in the financial system in Botswana. Moreover, Table 4.18 shows that banking sector concentration is high. This implies that the banking sector exercises monopolistic power in the determination of market rates and prices independent of central bank actions, which in turn hinders the transmission of monetary policy.

7.3.2.3 Lesotho

The Granger causality test in Table F.4 of Appendix F found a significant causal relationship between the interest rate and output in Lesotho. Similarly, the variance decomposition analysis in Table G.2.3 of Appendix G indicates that shocks to the interest rate accounted for 28% of the fluctuations in output, while own output shocks and, shocks to the money supply each accounted for approximately 33% of the variations in the twelfth period.

The impulse response function in Figure H.2.3 of Appendix H shows that output increases initially in response to a positive shock to the interest rate; thereafter it fluctuates and never reverts to its long run mean. This implies that any shocks to the interest rate have permanent effects on output, and will possibly widen cyclical variations within the monetary union. However, the magnitude of the response is very small, suggesting that the impact of the interest rate on output is minimal.

On the other hand, the impulse response function for inflation shows that there is a slight decrease in prices in the first two periods in response to a positive monetary policy shock. Thereafter prices fluctuate and never revert to their long run mean. This implies that any shocks to the interest rate will have permanent effects on prices and may lead to a divergence of inflation in Lesotho from union average rates.

The variance decomposition analysis indicates that shocks to the interest rate accounted for approximately 14% of the fluctuations in prices, while own price shocks and output shocks accounted for approximately 31% and 45%, respectively, of the variations in the twelfth period. The results suggest that the interest rate channel is weak in controlling inflation in Lesotho. The very small magnitude of the impulse response supports this assertion.

The inefficiency of domestic interest rate policy in determining economic performance in Lesotho is expected. Given the country's membership in the CMA arrangement, the South African Reserve Bank determines the interest rate policy for the region. However, the SARB sets monetary policy in response to changes in the South African market, which may not be in line with the required policy in the smaller countries. Hence, monetary policy is generally ineffective in these countries. Furthermore, as seen in Table 4.18, the banking sector concentration in Lesotho is high. This implies that the banking sector exercises monopolistic power in the determination of market rates and prices independent of central bank actions, which in turn hinders the transmission of monetary policy.

7.3.2.4 Madagascar

The impulse response function for output in Figure H.2.4 of Appendix H shows that there is an initial fall in output in the first three periods before it rises, in response to a positive shock to the interest rate. On the other hand, the impulse response function for inflation shows that prices increase in response to a positive interest rate shock. However, the impulses dissipate in both variables by the twelfth period, suggesting that the interest rate has temporary effects on the economy. In addition, the Granger causality tests in Table F.5 of Appendix F found no significant causal relationship between the variables.

The variance decomposition analyses in Table G.2.4 of Appendix G support this finding, indicating that shocks to the interest rate accounted for approximately 5% of the variations in output and inflation in the twelfth period, while own shocks accounted for 28% and less than

1% of the variations, respectively. On the other hand, shocks to the money supply accounted for 65% of the variations in output, while output shocks accounted for approximately 61% of the fluctuations in prices in the twelfth period. The results support earlier findings that the monetary aggregate channel is significant in stimulating output growth, while inflation in Madagascar was driven largely by past events and hence, monetary policy was ineffective.

In addition, Table 4.18 shows that there is high bank concentration in the financial sector, which implies that competition in the sector is relatively low. As such, the three banks exercise monopolistic power in the determination of market rates and prices independent of central bank actions, which further hinders the transmission of monetary policy.

7.3.2.5 Malawi

The impulse response function for inflation in Figure H.2.5 of Appendix H shows that prices increase in response to a positive interest rate shock. The impulse response dissipates by the twelfth period, suggesting that shocks to the interest rate have temporary effects on prices. In addition, the Granger causality tests in Table F.6 of Appendix F suggest that there is a weak causal relationship between the interest rate and prices. This is supported by the variance decomposition analysis in Table G.2.5 of Appendix G, which indicates that approximately 71% of the fluctuations in prices were due to its own shocks, while interest rate shocks accounted for 5% of the variations in the twelfth period. Output and money supply shocks accounted for 18% and less than 5% of the fluctuations, respectively.

On the other hand, the impulse response function for output shows that output falls initially in response to a positive interest rate shock. Thereafter, it fluctuates around its long run mean but the effects of the shock do not decay. This implies that shocks to the interest rate have permanent effects on output. However, the variance decomposition analysis indicates that shocks to the interest rate account for approximately 3% of the fluctuations in output, while own output shocks account for close to 94% of the variations in the twelfth period. Thus, suggesting that the impact of the interest rate channel on output is limited.

The data in Tables 4.16 and 4.17 in Chapter 4 shows that Malawi has experienced a decline in the efficiency of its financial system over the years. In addition the data in Table 4.18 indicates that the bank concentration in Malawi is high, which implies that the banking sector exercises monopolistic power in the determination of market rates and prices independent of

the policy rate. These factors have led to the interest rate channel being inefficient in the transmission of monetary policy.

7.3.2.6 Mauritius

The Granger causality tests in Table F.7 of Appendix F found no significant causal relationship between the interest rate, inflation and output in Mauritius. The impulse response function for inflation in Figure H.2.6 of Appendix H shows that prices rise in response to a positive monetary policy shock. In addition, the impulse does not decay, which implies that any shocks to the interest rate have a permanent effect on prices. The variance decomposition analysis in Table G.2.6 of Appendix G indicates that shocks to the interest rate account for approximately 36% of the fluctuations in prices, while own price shocks account for approximately 51% of price variations in the twelfth period. The results suggest that the interest rate channel plays an important role in controlling inflation in Mauritius but is not the main transmission mechanism.

On the other hand, the impulse response function for output shows that output falls in response to a positive monetary policy shock. However, the impulse response decays after twelve periods, suggesting that shocks to the interest rate have temporary effects on output. In addition, the magnitude of the response is very small, implying that the interest rate channel is weak in stimulating output. This is supported by the variance decomposition analysis, which indicates that shocks to the interest rate account for less than 10% of the fluctuations in output, while own shocks account for approximately 74% of output variations in the twelfth period.

The data in Tables 4.16 and 4.17 indicates that Mauritius has shown a consistent improvement in the efficiency of its financial system. This suggests that the financial system is growing, which explains the relevance of the interest rate channel in controlling inflation. However, the central bank is still unable to stimulate investment through a reduction in the policy rate. This could be attributed to the fact that the central bank lacks independence⁹² and thus, lacks credibility, which deters investors.

⁹² See Table I.1 of Appendix I.

7.3.2.7 Mozambique

The impulse response analysis in Figure H.2.7 of Appendix H shows that prices increase in the first three periods in response to a positive interest rate shock. Prices then fall between the third and seventh period, before rising again. The effects of the shock dissipate by the twelfth period, indicating that shocks to the interest rate have temporary effects on prices and will not lead to a divergence of inflation level in Mozambique from union average rates.

The variance decomposition analysis in Table G.2.7 of Appendix G indicates that shocks to the interest rate accounted for approximately 25% of the fluctuations in prices in the twelfth period, while own price shocks accounted for approximately 35% of the price variations and money supply shocks, 28%. This implies that monetary policy is significant in controlling inflation in Mozambique.

On the other hand, the impulse response function for output shows that there is an initial decrease in output in response to a positive interest rate shock before rising from the fourth quarter. In addition, the impulse response decays by the tenth period, indicating that shocks to the interest rate have temporary effects on output and will not lead to a widening of cyclical variations within the union.

The variance decomposition analysis indicates that shocks to the interest rate accounted for approximately 55% of the fluctuations in output in the twelfth period, while own output shocks accounted for approximately 23% of the variations and money supply shocks, approximately 21%. The results suggest that monetary policy is significant in stimulating output in Mozambique. However, the magnitudes of the impulses are very small, implying that the interest rate has limited scope in stimulating output.

Although the data in Tables 4.15 and 4.16 indicates that Mozambique experienced a financial crisis in the past, the data in Table 4.17 shows that there has been an improvement in efficiency of its financial system. This explains the significant role the interest rate channel plays in the economy. However, the high bank concentration, as shown in Table 4.18 hinders the transmission of monetary policy.

7.3.2.8 Namibia

The impulse response functions in Figure H.2.8 of Appendix H shows that both output and inflation fall in response to a positive shock to the policy rate, which is contrary to economic expectations. The impulses do not decay, which suggests that any shocks to the interest rate will have permanent effects on output and inflation and hence, are likely to result in a divergence in its economic performance from those of the rest of the SADC states. However, the magnitudes of the responses are small, suggesting that the effects of the shocks are minimal.

The Granger causality tests in Table F.9 of Appendix F show that the interest rate is insignificant in stimulating economic performance in Namibia. This is supported by the variance decomposition analyses in Table G.2.8 of Appendix G, which indicate that shocks to the interest rate accounted for approximately 11% of the variations in both output and inflation, while own shocks accounted for 88% and 16% of the variations in the twelfth period, respectively. Most of the price changes were due to output shocks, which suggest that inflation is driven by past events to a certain extent. As suggested by the data in Table 4.3 in Chapter 4, Namibia is prone to imported inflation from South Africa given that more than 80% of its imports originate from there.

The data in Tables 4.16 and 4.17 in Chapter 4 shows that Namibia has consistently shown an improvement over the years in the efficiency of its financial system. This implies that the interest rate channel ought to play a significant role in the transmission of monetary policy. However, the high bank concentration in Namibia as seen in Table 4.18 implies that competition in the financial sector is relatively low; as such, the three largest banks exercise monopolistic power in the determination of market rates and prices independent of central bank actions. This in turn, hinders the transmission of monetary policy.

7.3.2.9 South Africa

The Granger causality tests in Table F.10 of Appendix F found a significant causal relationship between interest rate, output and inflation in South Africa. However, the magnitude of the impact of the interest rate on output and inflation remained small as shown by the impulse responses in Figure H.2.9 of Appendix H. The variance decomposition analyses in Table G.2.9 of Appendix G support this finding, indicating that shocks to the interest rate accounted for 17% of output variations and less than 5% of price fluctuations in

the twelfth period. Own output shocks accounted for approximately 44% of the variations in output in the twelfth period, while money supply shocks accounted for 38% of the changes. On the other hand, own price shocks accounted for 81% of the price fluctuations, while money supply shocks accounted for approximately 12% of the changes in the twelfth period.

The results suggest that the interest rate channel is insignificant in controlling inflation in South Africa. This is because, as seen in Table 4.3 in Chapter 4, South Africa trades extensively with Europe and the rest of the world, which makes it prone to imported inflation as well as economic contagion from its trading partners. This is in line with the findings Nell (2000), whose study concluded that South Africa was prone to imported inflation. In addition, Akinboade *et. al* (2001), note that labour costs are a leading cause of inflation in South Africa and that the interest rate has no direct influence on them. Hence, the interest rate channel has limited scope in determining economic performance in South Africa.

7.3.2.10 Swaziland

The Granger causality tests in Table F.11 of Appendix F show that the interest rate does not Granger cause output or inflation in Swaziland. The impulse response function in Figure H.2.10 of Appendix H for output shows that output falls sharply in the first three quarters then rises for the next two periods, before falling again. The impulse response does not decay, suggesting that shocks to the interest rate have permanent effects on output. However, the magnitude of the response is very small, implying that shocks to the interest rate have negligible effects on output. The variance decomposition analysis in Table G.2.10 of Appendix G supports this finding, indicating that shocks to the interest rate accounted for less than 4% of the variations in output, while own output shocks accounted for approximately 84% of fluctuations in output in the twelfth period.

On the other hand, the impulse response function for inflation shows that prices rise in the first three quarters in response to a positive interest rate shock. Thereafter, prices fluctuate around the mean but the impulse does not decay, suggesting that shocks to the interest rate have permanent effects on prices. The variance decomposition analysis indicates that shocks to the interest rate accounted for approximately 9% of the variations in prices, while own price shocks accounted for approximately 47% of the fluctuations in the twelfth period. Output and money supply shocks accounted for approximately 23% and 20% of the price variations in the twelfth period, respectively.

The results suggest that the interest rate channel is weak in Swaziland. The data in Tables 4.15 and 4.16 in Chapter 4 suggests that Swaziland is financially under-developed although it has improved in the efficiency of its financial system (as seen in Table 4.17). The inefficiency of the interest rate channel may therefore, be attributed to the high bank concentration in the financial sector, which makes it possible for the few banks in the market to exercise monopolistic power in the determination of market rates and prices, which in turn hinders the transmission of monetary policy. Similar conclusions were reached by Dlamini *et. al* (2001), who found that the interest rate played no significant role in the determination of inflation in Swaziland.

7.3.2.11 Tanzania

The impulse response function for inflation in Figure H.2.11 of Appendix H shows that a positive interest rate shock led to an initial rise in prices in the first two quarters in Tanzania. Prices fluctuate around the mean from the third period and the impulse decays by the eleventh period. The variance decomposition analysis in Table G.2.11 of Appendix G indicates that shocks to the interest rate contributed to approximately 21% of the fluctuations in prices, while own price shocks accounted for approximately 47% of the changes and money supply shocks, 27% in the twelfth period. The results suggest that monetary policy plays an important role in controlling inflation in Tanzania.

On the other hand, the impulse response function for output shows that output falls in response to a positive interest rate shock, which is contrary to economic expectations. The variance decomposition analysis indicates that shocks to the interest rate accounted for approximately 7% of the fluctuations in output, while own output shocks accounted for approximately 79% of the variations and money supply shocks, only 7% in the twelfth period. The results suggest that the interest rate channel is ineffective in stimulating output in Tanzania.

The data in Tables 4.16 and 4.17 in Chapter 4 shows that there has been a small improvement over the years in the efficiency of the financial system in Tanzania. In addition, Table 4.18 shows that there has been a reduction in bank concentration, hence, a reduction in the monopolistic power exercised by banks in the determination of market rates and prices. The insignificance of the interest rate channel in stimulating investment therefore implies that the central banks lacks credibility in its policies.

7.3.2.12 Zambia

The impulse response function for output in Figure H.2.12 of Appendix H shows a slight initial decrease in output in response to a positive interest rate shock. Thereafter output fluctuates but the impulse response does not decay, implying that shocks to the interest rate have permanent effects on output. However, the magnitudes of the responses are small thus, suggesting that shocks to the interest rate have minimal effects on output and therefore will not lead to a widening of cyclical variations within the union.

The variance decomposition analyses in Table G.2.12 of Appendix G indicate that shocks to the interest rate accounted for about 17% of the fluctuations in output, while own output shocks accounted for 25% of the variations in the twelfth period. Money supply and price shocks on the other hand, accounted for approximately 30% and 27% of the fluctuations in output, respectively. This implies that changes in the money supply as well as past trends in the price level played a role in determining the level of output produced in the current period.

On the other hand, the impulse response function for inflation shows that prices increase in response to a positive interest rate shock. There is a sharp fall in prices between the third and fourth period before rising again. The effect of the shock does not decay, implying that any shocks to the interest rate will have permanent effects on prices. The variance decomposition analyses indicate that shocks to the interest rate accounted for less than 9% of the fluctuations in prices, while own price shocks accounted for approximately 63% of the variations in the twelfth period. Money supply and output shocks on the other hand, accounted for approximately 15% and 13% of the fluctuations in prices, respectively. The results suggest that the interest rate channel is weak in controlling inflation in Zambia. The data in Tables 4.16 and 4.17 in Chapter 4 shows that Zambia is still financially under-developed, which hinders the transmission of monetary policy through the interest rate channel.

7.3.2.13 Summary

The results from the analyses suggest that the interest rate channel is weak in most of the SADC member states, with the exception of Angola, Mauritius and Mozambique. However, for the latter group of countries, the interest rate channel is not the dominant monetary policy transmission mechanism. The results conform to economic expectations that for developing countries, the interest rate channel tends not to be the most important transmission mechanism because their financial systems are usually shallow and poorly diversified.

In addition, the SADC countries display asymmetry in their responses to shocks to the monetary aggregate. There is an initial decrease in output, in response to a positive interest rate shock for Botswana, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia, while prices fall initially for Lesotho, Madagascar and Namibia. Lastly, for most of the SADC countries, shocks to the interest rate do not dissipate, which implies that they are likely to lead to a divergence in economic performances of the member states within the monetary union.

7.3.3 The Exchange Rate Channel

The responses of output and inflation to an exogenous monetary policy shock (in the form of changes in the exchange rate) are presented below. Economic theory states that increases in the money supply lead to depreciation of the exchange rate, which in turn stimulate net exports and result in an increase in aggregate demand. On the other hand, exchange rate depreciation leads to a rise in the price level. The sub-sections below discuss the responses of the SADC countries to changes in the exchange rate.

7.3.3.1 Angola

The Granger causality tests in Table F.1 of Appendix F found a significant causal relationship between the exchange rate, output and inflation in Angola. The impulse response function for output in Figure H.2.1 of Appendix H shows that there is a slight increase in output in the first two periods, in response to a positive shock to the exchange rate. Output fluctuates from the third period, but with a downward trend. In addition, the impulse response does not decay thus, suggesting that any shocks to the exchange rate have permanent effects on the economy. However, the magnitude of the response is very small, suggesting that any shocks to the exchange rate have minimal effects on output and hence, would not result in a divergence of growth rates from the prevailing union levels.

The variance decomposition analysis in Table G.3.1 of Appendix G support this finding, indicating that shocks to the exchange rate accounted for 6% of the fluctuations in output, while own output shocks accounted for approximately 20% of the variations in the twelfth period. Price shocks had the most influence on output, accounting for approximately 64% of the fluctuations in the twelfth period, while money supply shocks accounted for fewer than 10% of the variations. This is because, as seen in Table 4.2 in Chapter 4, 98% of exports from

Angola comprise oil products and market prices for oil are pre-determined by the Organisation of Petroleum Exporting Countries (OPEC) in USD terms. As such, exchange rate depreciation would not stimulate output but price levels from the previous period would have a significant influence on output.

The impulse response function for inflation shows that shocks to the exchange rate affect prices with a lag of two periods. There is a sharp increase in the third period, prices fall sharply between the third and fourth period before rising again. The impulse response dissipates by the twelfth period. This implies that any shocks to the exchange rate are likely not to result in a divergence in the inflation rates of Angola from the prevailing union levels.

The variance decomposition analysis indicates that shocks to the exchange rate accounted for approximately 4% of the fluctuations in prices in the twelfth period, while on price shocks accounted for 83% of the variations. On the other hand, shocks to the money supply and output accounted for approximately 9% and 4% of the variations in prices, respectively. The results suggest that nominal exchange rate depreciation is not the leading cause of inflation in Angola but rather it is largely driven by past events, which could be attributed to the civil wars the country faced.

7.3.3.2 Botswana

The Granger causality tests in Table F.2 of Appendix F did not find a significant causal relationship between the exchange rate, output and inflation in Botswana. The impulse response analysis for output in Figure H.2.2 of Appendix H shows that shocks to the exchange rate are insignificant in stimulating output in Botswana. There is a slight decrease in output in the second period then output increases in the next two periods before declining again. However, the impulse responses are very small and the effects of the shock start to decay by the eighth period.

The variance decomposition analysis in Table G.3.2 of Appendix G indicates that shocks to the exchange rate accounted for 26% of the fluctuations in output, while own output shocks accounted for approximately 67% of the variations in the twelfth period. Price and money supply shocks each accounted for approximately 3% of the fluctuations in output in the twelfth period. Theoretically, depreciation of the exchange would improve the competitiveness of the diamond exports and hence, improve output performance, while at the

same time increasing the price of imported inputs and finished goods. However, Botswana maintains a crawling peg exchange rate regime in which its currency is pegged to a weighted basket of currencies that comprises SDR currencies and the South African Rand (ZAR), with the ZAR having most weight in the basket⁹³. This implies that the Bank of Botswana actively intervenes in the market to maintain the currency peg and as such, does not use the exchange rate to improve export competitiveness. Thus, the exchange rate channel is weak in Botswana.

On the other hand, the impulse response function for inflation shows that prices rise gradually in response to a shock to the exchange rate but decline from the fifth period, before rising again in the ninth period. In addition, the impulse does not decay, implying that any shocks to the exchange rate will have permanent effects on prices and may derail Botswana inflation from the average rates prevailing in the union. However, the magnitude of the response is very small, suggesting that shocks to the exchange rate have minimum impact on prices.

The variance decomposition analysis indicates that shocks to the exchange rate accounted for approximately 5% of the fluctuations in prices in the twelfth period, while on price shocks accounted for 87% of the variations. On the other hand, shocks to the money supply and output accounted for approximately 3% and 4% of the variations in prices, respectively. The results suggest that exchange rate depreciation is not the leading cause of inflation in Botswana. As already mentioned, inflation in Botswana is mainly imported inflation from South Africa given the high dependency of the economy on exports from the latter.

7.3.3.3 The Democratic Republic of Congo

The impulse response function for output in Figure H.2.3 of Appendix H shows that output falls in response to an exchange rate shock, which is contrary to economic theory. Output fluctuates around its long run mean but the effects of the shock do not decay, suggesting that shocks to the exchange rate have permanent effects on output. The variance decomposition analysis in Table G.3.3 of Appendix G indicates that shocks to the exchange rate accounted for 12% of the variations in output in the twelfth period, while own output shocks accounted for approximately 76% of the changes. Shocks to the money supply and price accounted for

⁹³ See Table I.1 of Appendix I.

approximately 6% and 7% of the variations in output, respectively. The results suggest that the exchange rate is insignificant in stimulating output in the DRC.

On the other hand, the impulse response function for inflation shows that prices rise in response to an exchange rate shock, which conforms to economic theory. In addition, the impulse response does not decay, implying that any shocks to the exchange rate have permanent effects on prices and could potentially lead to a divergence of inflation in the DRC from prevailing union levels.

The variance decomposition analysis indicates that shocks to the exchange rate accounted for approximately 33% of the variations in output in the twelfth period, while own price shocks accounted for approximately 39% of the changes. Shocks to the money supply and output accounted for approximately 16% and 12% of the variations in prices, respectively. The Granger causality tests in Table F.3 of Appendix F indicated that inflation and money supply Granger caused the exchange rate, while inflation Granger caused the exchange rate. This may be an indication of the presence of the vicious cycle of hyperinflation, where budget deficit financing led to rapid increases in the money supply, which in turn led to depreciation of the exchange rate and increases in prices.

Aghveli and Khan, (1977), and Burdekin and Burkett (1996) note that nominal government expenditure rises concurrently with price increases, while nominal revenues are generally fixed in the short run. This in turn implies that the budget deficit increases in the face of inflation, which necessitates further monetary expansion; leading to a vicious cycle of depreciation-inflation spiral. The variance decomposition analysis of the money supply suggest the presence of the vicious cycle of hyperinflation, indicating that shocks to the exchange rate accounted for approximately 21% of the fluctuations in money supply in the twelfth period.

The results are in line with the findings of Nachega (2005), who however notes that the vicious cycle stopped in the early 2000s when the authorities reoriented their fiscal, monetary, and exchange rate policies. This led to a fall in domestic inflation and a resumption of economic growth. It was highlighted that high fiscal deficits were the leading cause of inflation in the DRC. Thus, it is imperative that the country meets the fiscal restrictions

prescribed in the SADC macroeconomic convergence targets prior to joining the union in order to avoid de-stabilising the union with uncontrolled debt problems in future.

7.3.3.4 Lesotho

The Granger causality tests in Table F.4 of Appendix F indicate that the exchange rate Granger caused inflation but not output in Lesotho. The impulse response function for inflation in Figure H.2.4 of Appendix H shows that prices fall initially in response to a positive shock to the exchange rate then fluctuates from the second period. The effects of the shock do not however decay, suggesting that changes in the exchange rate have permanent effects on prices and are likely to result in a permanent divergence of the inflation rates in Lesotho from the union levels. However, the magnitude of the response is very small, implying that changes in the exchange rate will have minimal effects on prices.

In addition, the Granger causality tests indicated that inflation Granger caused money supply and the exchange rate. This implies that increases in prices lead to a real appreciation of the exchange rate. In order to prevent the exchange rate from appreciating and hence, maintain the currency at par to the ZAR, the central bank increases the money supply in circulation. The variance decomposition analysis in Table G.3.4 of Appendix G indicates that shocks to the exchange rate accounted for approximately 38% of the variations in output in the twelfth period, while own price shocks accounted for approximately 21% of the changes. Shocks to the money supply and output accounted for approximately 17% and 23% of the variations in prices, respectively. The contribution of imported inflation to changes in prices falls with the introduction of the exchange rate, implying that changes in the exchange rate have an impact on domestic prices.

On the other hand, the impulse response function for output shows that output increases initially in response to a depreciation in the exchange rate. In addition, the effects of the shock do not decay, implying that changes in the exchange rate will lead to a widening of cyclical variations between Lesotho and the rest of the SADC member states. However, the magnitude of the impulse is very small, that changes in the exchange rate will have minimal effects on output.

The variance decomposition analysis indicates that shocks to the exchange rate and money supply each accounted for 7% of the variations in output in the twelfth period, while own

output shocks accounted for approximately 84% of the changes. The implication drawn is that the exchange rate is insignificant in stimulating output growth in Lesotho. This is expected given that the local currency is pegged at par to the ZAR, as per CMA arrangement. As such, there is no scope for manipulating the exchange rate for domestic stabilisation processes.

7.3.3.5 Madagascar

The Granger causality tests in Table F.5 of Appendix F found no significant causal relationship between the exchange rate and output in Madagascar. The variance decomposition analyses and impulse response functions in Figure H.2.5 of Appendix H confirm this finding, indicating that the impact of exchange rate shocks on output are insignificant in determining economic performance. Moreover, the impulses decay by the fifth period, suggesting that shocks to the exchange rate have temporary effects on the economy and will not result in a widening of cyclical variations between Madagascar and the rest of the SADC member states.

The variance decomposition analysis for output in Table G.3.5 of Appendix G supports this finding, indicating that shocks to the exchange rate accounted for 28% of the variations in output, while on output shocks accounted for approximately 1% of its variations in the twelfth period. Price and money supply shocks accounted for approximately 1% and 67% of the fluctuations in output in the twelfth period, respectively. This suggests that the exchange rate channel is weak in stimulating output in Madagascar. The monetary aggregate however, plays a significant role in monetary policy.

On the other hand, the variance decomposition analysis shows that shocks to the exchange rate accounted for approximately 57% of the variations in prices, while on price shocks accounted for less than 1% of the fluctuations in the twelfth period. Shocks to the money supply and output accounted for approximately 34% and 8% of the variations in prices, respectively. The results suggest that both the monetary aggregate and exchange rate channels are significant in controlling inflation in Madagascar.

7.3.3.6 Malawi

The impulse response function for inflation in Figure H.2.6 of Appendix H shows that prices fall in response to a depreciation of the exchange rate, which is contrary to economic

expectations. In addition, the impulse does not decay, indicating that shocks to the exchange rate have permanent effects on prices and are likely to result in a divergence of the level of inflation in Malawi from prevailing union rates. The variance decomposition analysis in Table G.3.6 of Appendix G indicates that shocks to the exchange rate accounted for approximately 9% of the fluctuations in prices in the twelfth period, while own price shocks accounted for 55% of the variations. Output and money supply shocks accounted for 25% and 10% of the fluctuations, respectively. The results suggest that the exchange rate is weak in controlling inflation in Malawi.

On the other hand, the variance decomposition analysis indicates that shocks to the exchange rate accounted for approximately 93% of the variations in output, while own output shocks accounted for only 2% of the fluctuations in the twelfth period. The results suggest that the exchange rate plays a major role in stimulating output. Depreciation of the exchange improves the competitiveness of exports in Malawi and hence, improves output performance. However, the magnitude of the impulse response is very small, suggesting that the effects of the exchange rate on stimulating output are minimal. This may be explained by the dependence of the economy on the export of primary and “first-stop processing” goods whose performance is determined by the demand for the goods in their respective export markets.

7.3.3.7 Mauritius

The Granger causality tests in Table F.7 of Appendix F found a causal relationship between money supply and the exchange rate and, inflation and the exchange rate. The impulse response function for inflation in Figure H.2.7 of Appendix H shows that prices initially fall in response to a depreciation in the exchange rate before rising from the fifth period. The impulse response does not decay, suggesting that shocks to the exchange rate have permanent effects on prices and may result in a divergence of inflation in Mauritius from prevailing union rates. The variance decomposition analysis in Table G.3.7 of Appendix G indicates that shocks to the exchange rate accounted for approximately 24% of the fluctuations in prices in the twelfth period, while own price shocks accounted for approximately 65% of the fluctuations. The results suggest that the exchange rate channel plays a role in the control of inflation.

On the other hand, the impulse response function for output show that output falls in response to a depreciation in the exchange rate, which is contrary to economic expectations. However, the impulses were small suggesting that the exchange rate is weak in stimulating output in Mauritius. The variance decomposition analysis indicate that shocks to the exchange rate accounted for approximately 20% of the fluctuations in output in the twelfth period, while own output shocks accounted for approximately 64% of the variations.

7.3.3.8 Mozambique

The response of prices to a depreciation in the exchange rate as shown by the impulse response function in Figure H.2.8 of Appendix H conforms to economic theory that depreciation leads to an increase in the price of imports, which in turn leads to an increase in domestic prices. Of great concern is that the effects of the impulses do not decay, which implies that any shocks to the exchange rate will result in a permanent divergence of inflation from the union levels. However, the variance decomposition analysis in Table G.3.8 of Appendix G indicated that shocks to the exchange rate accounted for approximately 4% of the variations in prices in the twelfth period, while own price shocks account for approximately 67% of the fluctuations. Output and money supply shocks accounted for 17% and 11% of the fluctuations, respectively. In addition, the Granger causality tests in F.8 of Appendix F indicate that the exchange rate did not Granger cause inflation. The results suggest that the exchange rate is weak in controlling inflation in Mozambique.

The Granger causality tests found no significant causal relationship between the exchange rate and output in Mozambique. The impulse response function shows that output increases slightly in the first period before falling in the next three periods. Output fluctuates from then on but the effects of the shock do not dissipate, suggesting that shocks to the exchange rate may result in a widening of cyclical variations between Mozambique and the rest of the SADC member states.

However, the magnitude of the impulse is very small, implying that the exchange rate channel is weak in stimulating output. The variance decomposition analysis indicate that shocks to the exchange rate accounted for approximately 5% of the fluctuations in output in the twelfth period, while own output shocks accounted for approximately 81% of the variations.

7.3.3.9 Namibia

The impulse response function for output in Figure H.2.9 of Appendix H shows that output responds with a lag of two periods to a positive shock to the exchange rate. Thereafter output falls, which is contrary to economic expectations that exchange rate depreciation stimulates exports and hence, leads to an increase in output. The Granger causality tests in Table F.9 of Appendix F found a weak causal relationship between output and the exchange rate that is supported by the variance decomposition analysis in Table G.3.9 of Appendix G, which indicates that shocks to the exchange rate accounted for fewer than 7% of the variations in output. On the other hand, own output shocks accounted for approximately 25% of the variations in output in the twelfth period, while shocks to the monetary aggregate accounted for 54% of the changes in output. The results suggest that increases in the monetary aggregate are significant in stimulating output in Namibia, while the exchange rate channel is weak.

The impulse response function for inflation shows that prices increase in the first two periods, in response to a positive shock to the exchange rate. Thereafter prices fluctuate around the long run mean and the effects of the shock do not decay. This implies that any shocks to the exchange rate will result in a permanent divergence of inflation in Namibia from the prevailing rates in the union. The variance decomposition analysis indicated that shocks to the exchange rate accounted for approximately 45% of the variations in prices in the twelfth period, while own price shocks account for approximately 13% of the fluctuations. Output and money supply shocks accounted for 25% and 16% of the fluctuations, respectively.

In addition, the Granger causality tests found a significant causal relationship between the exchange rate, and money supply. This implies that a real appreciation of the exchange rate leads to an increase in the money supply in circulation in an effort to prevent the exchange rate from appreciating. This is because the Namibian dollar is pegged at par to the ZAR as per CMA arrangement hence; the central bank actively intervenes in the market to maintain the peg.

7.3.3.10 South Africa

The Granger causality tests in Table F.10 of Appendix F found no evidence of a significant causal relationship between the exchange rate, inflation and output in South Africa. The impulse response function for inflation in Figure H.2.10 of Appendix H shows that prices rise in response to a depreciation in the exchange rate. There is a sharp decline in prices between

the fifth and sixth period before rising again. However, the magnitude of the impulse response is small, suggesting that changes in the exchange rate were not the leading cause of inflation. The variance decomposition analysis supports in Table G.3.10 of Appendix G this finding, indicating that shocks to the exchange rate accounted for approximately 18% of the fluctuations in prices in the twelfth period, while own price shocks accounted for 69% of the fluctuations. Output and money supply shocks accounted for 10% and 4% of the fluctuations, respectively. The results suggest that the exchange rate is insignificant in controlling inflation in South Africa.

The results support earlier findings that South Africa is susceptible to imported inflation given its strong trade linkages with Europe and the rest of the world as seen in Table 4.3 in Chapter 4. In addition, the results support the findings of Akinboade *et. al* (2001) that labour costs are a leading cause of inflation in South Africa.

On the other hand, the impulse response function for output shows that output falls in response to a positive shock to the exchange rate, which is contrary to economic expectations. The impulse response does not decay, indicating that shocks to the exchange rate have permanent effects on output. However, the magnitude of the response is very small, suggesting that changes in the exchange rate have negligible effects on output and thus, are likely not to result in a widening of cyclical variations between South Africa and the rest of the SADC member states.

The variance decomposition analysis indicated that shocks to the exchange rate accounted for approximately 23% of the variations in output in the twelfth period, while own output shocks accounted for 49% of the variations. On the other hand, shocks to the monetary aggregate accounted for approximately 27% of the changes in output. The results suggest that changes in the exchange rate and monetary aggregate contribute to stimulating output in South Africa. However, a majority of the changes in output are due to own output shocks.

7.3.3.11 Swaziland

The Granger causality tests in Table F.11 of Appendix F found no significant causal relationship between money supply, the exchange rate, inflation and output in Swaziland. The impulse response function for inflation in Figure H.2.11 of Appendix H shows that prices rise in response to a depreciation in the exchange rate. In addition, the impulse response does not

decay, suggesting that shocks to the exchange rate have permanent effects on prices. However, the magnitude of the response is very small, suggesting that changes in the exchange rate have minimal effects on output and will not result in a widening of cyclical variations between Swaziland and the rest of the SADC countries.

The variance decomposition analysis in Table G.3.11 of Appendix G shows that shocks to the exchange rate accounted for 7% of the fluctuations in prices in the twelfth period, while own price shocks accounted for 50% of the price changes. Output and money supply shocks on the other hand, accounted for 27% and 15% of the fluctuations, respectively. The results suggest that the exchange rate is weak in controlling inflation in Swaziland. This is to be expected given the CMA arrangement, which requires Swaziland to maintain the value of its currency at par with the ZAR. Hence, there is limited scope for the central bank to use independent exchange rate policy to control inflation.

On the other hand, the variance decomposition analysis for output shows that output falls initially, in response to a positive shock to the exchange rate. Thereafter, output fluctuates but the effects of the shock do not dissipate, suggesting that shocks to the exchange rate have permanent effects on output. However, the magnitude of the response is very small, indicating that changes in the exchange rate were unlikely to result in a widening in cyclical variation of Swaziland from the rest of the union members.

The variance decomposition analysis indicated that shocks to the exchange rate accounted for less than 1% of the variations in output in the twelfth period, while own output shocks accounted for 91% of the variations. Money supply and price shocks each accounted for approximately 4% of the variations. The results suggest that the exchange rate is insignificant in stimulating output in Swaziland.

7.3.3.12 Tanzania

The Granger causality tests in Table F.12 of Appendix F show that the exchange rate Granger caused both output and inflation in Tanzania. The impulse response function for output in Figure H.2.12 of Appendix H shows that output responded to shocks in the exchange rate with a lag before falling sharply. Thereafter output fluctuates but the effects of the shock do not dissipate. The variance decomposition analysis in Table G.3.12 of Appendix G indicates that shocks to the exchange rate accounted for approximately 57% of the variations in output

in the twelfth period, while own output shocks accounted for 27% of the variations. Money supply and price shocks accounted for approximately 14% and less than 2% of the variations, respectively. The results suggest that changes in the exchange rate are significant in stimulating output in Tanzania. From Table 4.3 in Chapter 4, it is observed that Tanzania exports a substantial amount of its goods to Europe and the rest of the world. Depreciation of the exchange rate stimulates aggregate demand and hence, output.

On the other hand, the impulse response function for inflation shows that prices rise initially, in response to a positive shock in the exchange rate. Thereafter prices fluctuate but the effects of the shock do not dissipate. However, the magnitude of the response is small, suggesting that shocks to the exchange rate are likely to have minimal effects on prices and would not lead to a divergence of inflation in Tanzania from prevailing rates.

The variance decomposition analysis shows that shocks to the exchange rate accounted for 5% of the fluctuations in prices in the twelfth period, while own price shocks accounted for approximately 31% of the price changes. Output and money supply shocks on the other hand, accounted for approximately 43% and 31% of the fluctuations, respectively. The results suggest that the exchange rate channel is weak in controlling inflation in Tanzania, while on the other hand, changes in the monetary aggregate channel play a significant role in controlling inflation. The results also suggest that inflation in Tanzania is driven partly by past events as well as imported inflation given its strong trade linkages with Europe and the rest of the world.

7.3.3.13 Zambia

The impulse response function in Figure H.2.13 of Appendix H for output shows that output responded to a shock in the exchange rate with a lag of two periods before rising sharply. Thereafter output fluctuates but the effects of the shock do not dissipate. The variance decomposition analysis in Table G.3.13 of Appendix G indicates that shocks to the exchange rate accounted for approximately 7% of the variations in output in the twelfth period, while own output shocks accounted for 38% of the variations. Money supply and price shocks accounted for approximately 58% and 4% of the variations, respectively. The results suggest that the monetary aggregate channel plays a significant role in stimulating output, while the exchange rate channel is weak.

On the other hand, the impulse response function shows that a positive shock to the exchange rate led to a slight increase in prices before falling in the second period. Prices rise again between the sixth and ninth period, before falling again. Furthermore, the impulse does not decay, implying that any shocks to the exchange rate will have permanent effects on inflation. Thus, shocks to the exchange rate could result in a divergence of inflation in Zambia from union levels. However, the magnitude of the impulse is small, suggesting that the exchange rate channel is weak.

The variance decomposition analysis indicate that shocks to the exchange rate accounted for 17% of the fluctuations in prices, while own price shocks account for approximately 27% of the variations. Output and money supply shocks on the other hand, accounted for approximately 38% and 17% of the fluctuations, respectively. The results suggest that inflation in Zambia is driven largely by past events rather than changes in the exchange rate.

7.3.3.14 Summary

The results from the analyses suggest that the exchange rate channel is weak in most of the SADC member states, with the exception of the DRC, Madagascar, Namibia, Swaziland and Tanzania. Of the latter group of countries, depreciation of the exchange rate was found to be significant in stimulating output in Tanzania only, while it led to a substantial rise in prices in the other countries. Once again, the SADC countries display asymmetry in their responses to shocks to the exchange rate. There is an initial fall in output in Botswana, the DRC, Malawi, Mauritius, Mozambique, South Africa and Swaziland, while prices fall initially for Lesotho, Malawi and Mauritius. Lastly, shocks to the exchange rate do not decay in most of the SADC countries. This implies that any shocks to the exchange rate are likely to lead to a divergence in economic performances of the member states within the monetary union.

7.3.4 The Credit Channel

The responses of output and inflation to an exogenous monetary policy shock (in the form of changes in the amount of banking sector credit issued to the private sector) are presented below. Economic theory states that an increase in the money supply would lead to an increase in credit and eventually to an increase in aggregate demand, output and price. The subsections below discuss the responses of each SADC country to un-anticipated changes in private sector credit issued. The exchange rate channel could not be analysed in Madagascar, Malawi, Namibia, Tanzania and Zambia due to insufficient data.

7.3.4.1 Angola

The Granger causality tests in Table F.1 of Appendix F found that banking sector credit Granger caused inflation, money supply and output in Angola. The impulse response function for output in Figure H.4.1 in Appendix H indicates that the credit channel is significant in stimulating output in Angola. Output increases in response to a positive shock to banking sector credit but the effects of the shock do not decay. This suggests that any shocks to the exchange rate will have permanent effects on output and are likely to result in a widening of cyclical variations between Angola and the rest of the SADC member states.

The variance decomposition analysis in Table G.4.1 in Appendix G indicates that shocks to domestic credit accounted for approximately 85% of the variations in output in the twelfth period, while own output shocks accounted for approximately 17% of the fluctuations. Money supply and price shocks on the other hand, accounted for approximately 3% and 5% of the variations, respectively.

The results suggest that the credit channel plays an important role in stimulating output in Angola. The information in Tables 4.15-4.17 in Chapter 4 indicates that the financial sector in Angola is under-developed. The results thus conform to economic theory, which states that increases in the money supply in financially under-developed economies lead to a reduction in adverse selection and moral hazard, which in turn leads to an increase in the supply of credit. The increase in credit leads to increases in aggregate demand and inflation (Loayza and Schmidt- Hebbel, 2002:5).

On the other hand, the impulse response function for inflation shows that prices rise initially before falling, in response to a positive shock to credit. In addition, the impulse response does not decay, suggesting that shocks to credit have permanent effects on prices and are likely to lead to a divergence of the inflation rate in Angola from the prevailing SADC rates. The variance decomposition analysis supports this finding, indicating that shocks to banking sector credit accounted for approximately 81% of the variations in prices, while own price shocks accounted for approximately 11% of the price fluctuations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 3% and 5% of the variations in prices, respectively. The results suggest that increases in domestic credit were inflationary and thus, the credit channel is significant in controlling inflation in Angola.

7.3.4.2 Botswana

The Granger causality tests in Table F.2 of Appendix F found that banking sector credit Granger caused money supply but not inflation or output in Botswana. The impulse response function for output in Figure H.4.2 in Appendix H shows that output responds with a lag of three periods to a positive shock in banking sector credit. Thereafter output rises sharply and then fluctuates but never returns to its long run mean. This suggests that any shocks to the exchange rate will have permanent effects on output and are likely to result in a widening of cyclical variations between Botswana and the rest of the SADC member states.

The variance decomposition analysis in Table G.4.2 in Appendix G indicates that shocks to domestic credit accounted for approximately 26% of the variations in output in the twelfth period, while own output shocks accounted for approximately 64% of the fluctuations. Money supply and price shocks on the other hand, accounted for approximately 10% and less than 1% of the variations, respectively. The results suggest that the credit channel does not play a significant role in stimulating output in Botswana. This may be attributed to the fact that there is excess liquidity in the financial sector, as indicated in Table I.1 of Appendix I. This implies that monetary policy shocks transmitted through the bank-lending channel will not play an active role in determining economic performance in Botswana.

On the other hand, the impulse response function for inflation shows that prices rise initially, in response to a positive shock to credit, before falling towards the fourth period. In addition, the impulse response does not decay, suggesting that shocks to credit have permanent effects on prices and are likely to lead to a divergence of the inflation rate in Botswana from the prevailing SADC rates.

The variance decomposition analysis indicates that shocks to banking sector credit accounted for approximately 19% of the variations in prices, while own price shocks accounted for approximately 40% of the price fluctuations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 5% and 35% of the variations in prices, respectively. The results suggest that the credit channel does not play a major role in controlling inflation in Botswana, which may be attributed to the fact that the central bank does not actively control the amount of credit in circulation.

7.3.4.3 The Democratic Republic of Congo

The Granger causality tests in Table F.3 of Appendix F found no evidence of a significant causality relationship between credit and inflation. The impulse response function for inflation in Figure H.4.3 in Appendix H shows that prices respond with a lag of two periods to a positive shock to banking sector credit before rising. Thereafter prices fluctuate and the effect of the shock dissipates around the twelfth period. The variance decomposition analysis in Table G.4.3 in Appendix G indicates that shocks to banking sector credit accounted for approximately 13% of the variations in prices, while own price shocks accounted for approximately 22% of the price fluctuations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 51% and 14% of the variations in prices, respectively. The results suggest that the monetary aggregate channel plays a significant role in the control of inflation in the DRC; while on the other hand, the credit channel is weak.

On the other hand, the Granger causality tests found evidence of weak feedback causality between credit and output. The impulse response function for output shows that output rises initially in response to a positive shock to banking sector credit. Output then fluctuates from the fourth period but the effects of the shock do not decay, suggesting that any shocks to banking sector credit will have a permanent effect on output and are likely to result in a divergence in the growth rates of the DRC from the rest of the SADC member states.

The variance decomposition analysis indicates that shocks to domestic credit accounted for approximately 47% of the variations in output in the twelfth period, while own output shocks accounted for approximately 25% of the fluctuations. Money supply and price shocks on the other hand, accounted for approximately 23% and 4% of the variations, respectively. The results suggest that the credit channel plays a significant role in stimulating output in the DRC, which is to be expected in financially under-developed economies (as seen in Tables 4.15-4.17 in Chapter 4). However, its impact on economic performance is reduced by the fact that money and banking are mostly limited to Kinshasa and, dollarisation remains substantial in the economy, with over 85% of all bank deposits in foreign currency.

7.3.4.4 Lesotho

The Granger causality tests in Table F.4 of Appendix F indicate that banking sector credit did not Granger cause inflation. The impulse response function for inflation in Figure H.4.4 in

Appendix H shows that prices increase in the first three periods, in response to a positive shock to banking sector credit. Thereafter, prices fluctuate but the impulse does not decay, which implies that shocks to banking sector credit have a permanent effect on prices and could potentially lead to a divergence of the inflation rates in Lesotho from union levels. However, the magnitudes of the impulses are small; suggesting that any shocks to the credit channel will have minimal effects on prices.

The variance decomposition analysis in Table G.4.4 in Appendix G indicates that shocks to banking sector credit accounted for 7% of the fluctuations in prices, while own price shocks accounted for approximately 48% of the variations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 31% and 12% of the variations in prices, respectively. The results support earlier findings that inflation in Lesotho is mainly imported inflation from South Africa. Furthermore, the results suggest that inflation is partly due to monetary expansion. The credit channel is however, weak in controlling inflation.

On the other hand, the impulse response function for output shows that there is an initial increase in output before it fluctuates but the impulse does not decay. This implies that shocks to domestic credit could widen the cyclical variations in the business cycles of Lesotho and the rest of the SADC member states. However, the magnitudes of the impulses are very small, implying that the cyclical variations would be negligible.

The Granger causality tests found that banking sector credit did not Granger cause output in Lesotho. The variance decomposition analysis support this finding, indicating that shocks to banking sector credit accounted for 2% of the fluctuations in output, while own output shocks accounted for approximately 90% of the variations in the twelfth period. Money supply and price shocks on the other hand, accounted for approximately 6% and 1% of the variations, respectively. The results imply that the credit channel is weak in Lesotho.

Table 4.15 in Chapter 4 indicates that the average ratios of banking sector credit to GDP in Lesotho are low, while Table 4.17 indicates that banks are inefficient in channelling credit to the private sector. This implies that financial inter-mediation is low in Lesotho. However, contrary to economic expectations that the credit channel is important in financially under-developed economies, the credit channel is insignificant in stimulating output in Lesotho.

7.3.4.5 Mauritius

The Granger causality tests in Table F.7 of Appendix F found evidence of feedback causality between credit and inflation in Mauritius. The impulse response function for inflation in Figure H.4.5 in Appendix H shows that prices respond with a two period lag to a positive shock to banking sector credit. Thereafter, prices rise for two periods before falling for about four periods and then rising again. However, the effects of the shock do not dissipate, implying that shocks to banking sector credit are likely to result in a divergence of inflation in Mauritius from prevailing union rates.

The variance decomposition analysis in Table G.4.5 in Appendix G indicates that shocks to banking sector credit accounted for 18% of the fluctuations in prices, while own price shocks accounted for approximately 51% of the variations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 4% and 26% of the variations in prices, respectively. The results suggest that the credit channel plays a role in controlling inflation in Mauritius however; inflation is driven largely by past events.

On the other hand, the Granger causality tests banking sector credit does not Granger cause output in Mauritius. The impulse response function for output shows that output falls initially, in response to a positive shock to banking sector credit. It then rises sharply for two periods before falling again. The effects of the shock decay around the eleventh period, suggesting that any shocks to banking sector credit have temporary effects on output.

The variance decomposition analysis support this finding, indicating that shocks to banking sector credit accounted for less than 5% of the fluctuations in output, while own output shocks accounted for approximately 78% of the variations in the twelfth period. Money supply and price shocks on the other hand, accounted for approximately 10% and 7% of the variations, respectively. The results suggest that the credit channel is weak in Mauritius.

7.3.4.6 Mozambique

The Granger causality tests in Table F.8 of Appendix F found no evidence of a significant causal relationship between credit, inflation and output. The impulse response function for output in Figure H.4.6 in Appendix H shows that output falls for the first three periods, in response to a positive shock to banking sector credit. Thereafter, output fluctuates and the effects of the shock dissipate towards the twelfth period, suggesting that any shocks to

banking sector credit have temporary effects on output. In addition, the magnitude of the impulse response is very small, suggesting that the credit channel is weak in Mozambique.

The variance decomposition analysis in Table G.4.6 in Appendix G support this finding, indicating that shocks to banking sector credit accounted for approximately 8% of the fluctuations in output, while own output shocks accounted for approximately 60% of the variations in the twelfth period. Money supply and price shocks on the other hand, accounted for approximately 27% and 4% of the variations, respectively. The results suggest that the monetary aggregate channel and not the credit channel, plays a significant role in stimulating output in Mozambique. However, monetary policy has limited scope in determining economic performance.

On the other hand, the impulse response function for inflation shows that prices fall initially in response to a positive shock to banking sector credit. The impulse response decays towards the eleventh period, suggesting that any shocks to banking sector credit will have temporary effects on prices. The variance decomposition analysis indicates that shocks to banking sector credit accounted for 3% of the fluctuations in prices, while own price shocks accounted for approximately 39% of the variations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 29% and 28% of the variations in prices, respectively. The results suggest that the credit channel is weak in determining inflation in Mozambique. Inflation is driven partly by monetary expansion and partly by past events. Tables 4.15 and 4.16 in Chapter 4 show that Mozambique experienced a financial crisis in the past. The data for the last decade indicates that the financial sector is still under-developed, which would imply that the credit channel should be important in such an economy. However, the results suggest otherwise.

7.3.4.7 South Africa

The Granger causality tests in Table F.10 of Appendix F indicate that banking sector credit does not Granger cause either inflation or output in South Africa. The impulse response function in Figure H.4.7 in Appendix H for output shows that output increases for the first eight periods, in response to a positive shock to banking sector credit. In addition, the impulse response does not decay, suggesting that any shocks to banking sector credit have permanent effects on output. However, the magnitude of the response is very small, suggesting that any shocks to banking sector credit have minimal effects on output.

The variance decomposition analysis in Table G.4.7 in Appendix G indicates that shocks to banking sector credit accounted for approximately 29% of the fluctuations in output, while own output shocks accounted for approximately 16% of the variations in the twelfth period. Money supply and price shocks on the other hand, accounted for approximately 19% and 35% of the variations, respectively. The results suggest that the credit channel plays a role in stimulating output in South Africa. Table 4.17 in Chapter 4 suggests that the banking sector is efficient in issuing credit to the domestic sector, as the average ratio of domestic credit to liquid liabilities has been over 100% for the last two decades. Thus, increases in domestic credit stimulate aggregate demand, and hence output in South Africa.

On the other hand, the impulse response function for inflation shows that prices fall initially before rising in the fifth period, in response to a positive shock to banking sector credit. In addition, the impulse response does not decay, suggesting that any shocks to banking sector credit have permanent effects on prices. The variance decomposition analysis indicates that shocks to banking sector credit accounted for 29% of the fluctuations in prices, while own price shocks accounted for approximately 40% of the variations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 16% and 15% of the variations in prices, respectively. The results suggest that the credit channel plays a role in controlling inflation in South Africa.

7.3.4.8 Swaziland

The Granger causality tests in Table F.11 of Appendix F found no evidence of a significant causal relationship between banking sector credit, output and inflation in Swaziland. The impulse response function for output in Figure H.4.8 in Appendix H shows that output falls sharply in response to a positive shock to banking sector credit, which is contrary to economic expectations. Output rises between the second and fourth period and then falls again before remaining constant. However, the impulse response does not decay, suggesting that the effects of the shock are permanent. On the other hand, the magnitude of the response is small, implying that any shocks to credit will have minimal effects on output.

The variance decomposition analysis in Table G.4.8 in Appendix G indicates that shocks to banking sector credit accounted for approximately 14% of the fluctuations in output, while own output shocks accounted for approximately 56% of the variations in the twelfth period.

Money supply and price shocks on the other hand, accounted for approximately 13% and 16% of the variations, respectively. The results suggest that the credit channel is weak in stimulating output in Swaziland.

On the other hand, the impulse response function for inflation shows that prices rise sharply in the first two periods, in response to a positive shock to banking sector credit. Prices then fall during the next two periods, and then rise again briefly before remaining constant. However, the impulse response does not decay, suggesting that the effects of the shock are permanent. On the other hand, the magnitude of the response is small, implying that any shocks to credit will have minimal effects on prices.

The variance decomposition analysis indicates that shocks to banking sector credit accounted for 11% of the fluctuations in prices, while own price shocks accounted for approximately 78% of the variations in the twelfth period. On the other hand, shocks to money supply and output accounted for approximately 5% and 4% of the variations in prices, respectively. The results suggest that the credit channel is weak in Swaziland. In addition, the results support earlier findings that inflation in Swaziland is mainly imported inflation.

The results do not conform to expectations given that Table 4.17 in Chapter 4 suggests that the banking sector is efficient in issuing credit to the domestic sector, as the average ratio of domestic credit to liquid liabilities is high. On the other hand, Tables 4.15 and 4.16 indicate that the financial sector in Swaziland is under-developed. Hence, it is expected that the credit channel would be important in such an economy.

7.3.3.9 Summary

The results from the analyses suggest that the credit channel is important in Angola, the DRC and South Africa. For the rest of the SADC countries, the credit channel is weak. In addition, for Angola and the DRC, the credit channel is a dominant transmission mechanism, which conforms to economic theory that this channel dominates in economies that are under-developed financially. In addition, there is an initial decrease in output, in response to a positive shock to private sector credit in Mauritius, Mozambique and Swaziland. On the other hand, prices fall initially in Mozambique and South Africa. The results suggest that any shocks to credit will result in a divergence in economic performance in the SADC countries.

7.4 CONCLUSION

The results of the analyses indicate that the SADC member states display asymmetries in their responses to monetary policy shocks and the relative importance of transmission mechanisms. For most of the member states, the effects of monetary policy shocks do not dissipate but are permanent. This implies that a common monetary policy within the union is likely to widen cyclical variations between the member states. Hence, it is unlikely that monetary integration will result in a harmonisation of the business cycles of the SADC countries.

The monetary aggregate channel is weak in most of the SADC member states, with the exception of Madagascar, which may be an advantage for the monetary union because it implies that the possibilities of monetary expansions to finance budget deficits would be reduced. Similarly, inflationary pressures arising from seignorage would be reduced, which implies that there is reduced possibilities of weakening the value of the union currency. However, this is on condition that the member states do not allow countries with debt problems into the union, which may later put the union under pressure to monetise the deficits.

The exchange rate channel is weak in most of the SADC member states, with the exception of the DRC, Madagascar, Namibia, Swaziland and Tanzania. This implies that the costs of giving up the exchange rate as a policy instrument are fewer for most of the SADC countries as it is not the dominant transmission channel in these countries. On the other hand, the interest rate channel is important in Angola, Mauritius and Mozambique, while it is relatively weak in the rest of the countries. The relative insignificance of the interest rate channel in most SADC countries poses potential problems in the monetary union given that it is likely to be the main policy instrument for the union central bank. This is because the use of the monetary aggregate channel for adjustment purposes may not be favourable since it has the disadvantage of being inflationary, which has the potential of destabilising the value of the union currency.

Economic literature states that the credit channel is likely to dominate in developing countries due to inadequate development of their financial systems, which hinders the transmission of monetary policy through the money market. However, the study found that the credit channel is important in Angola, the DRC and South Africa, while it is relatively unimportant in the

other countries considered. However, the impact of shocks to the credit channel on output and inflation in the former group of countries remained small, which poses potential problems in that the union requires effective alternative adjustment mechanisms to the exchange rate.

The dissimilarities in responses to monetary policy shocks and the subsequent lack of effective adjustment mechanisms are due to the member states' failure to meet the OCA criteria. It was ascertained that most SADC states depend on primary production and the export of commodities and hence, their output performance is dependent on exogenous factors that affect their respective export markets. As such, national monetary policy has a limited effect, if any, on economic performance in the member states.

It has been suggested that for countries that have in the past failed to use independent monetary and exchange rate policy for domestic macroeconomic stabilisation purposes, monetary integration may be beneficial to them. It is argued that a regional monetary authority may be more efficient in setting policy, as the primary goal of most monetary unions is price stabilisation.

However, the study ascertained that the financial systems of most of the SADC member states were shallow and under-developed, which implies that even if the region implements monetary integration, the transmission of monetary policy would remain inefficient in these countries. Hence, the above argument may not apply to the SADC region at present because a regional monetary authority would encounter the same structural bottlenecks that national monetary authorities currently come across. The transmission of monetary policy would still be inefficient within the monetary union.

An additional cause for concern is the relative openness of the SADC countries and in particular, South Africa's close trade linkages with the rest of the world (especially the EU), which make it vulnerable to economic contagion. The high dependency of some of the smaller countries on South Africa implies that any negative shocks that affect South Africa's main trading partners will affect South Africa and in turn, the smaller countries. However, with no effective adjustment mechanisms for macroeconomic stabilisation, the union would have to endure the effects of the shocks, be it inflation or a recession. This would be counter-productive for the poor member states whose main macroeconomic objectives are poverty reduction and stimulating economic growth.

Thus, the study confirms that the similarity in shocks and business cycles is a “catch-all” OCA criterion. The failure to meet the other OCA criteria implies that the member states will respond asymmetrically to shocks. In turn, without the option to use the exchange rate for domestic stabilisation purposes and with no effective alternative adjustment mechanisms in place, the effects of the shocks will endure in union members. Given the dissimilarities in the economic structures and sizes of the SADC countries, the effects of the shocks are likely to differ in each country and monetary integration is likely not to result in a harmonisation of the economies of the member states. It can therefore, be concluded that under the prevailing conditions, the SADC countries are not suitable for monetary integration.

CHAPTER EIGHT

CONCLUSIONS AND POLICY RECOMMENDATIONS

8.1 CONCLUDING REMARKS

The purpose of the study was to determine the implications of monetary integration within the SADC countries for regional economic integration and development in the region. The findings of the study indicate that at present, a region-wide monetary union is not feasible for the SADC member states. The reasons behind this finding are summarised below in terms of the state of macroeconomic convergence, the optimum currency area (OCA) criteria and the efficiency of monetary and exchange rate policies.

8.1.1 Macroeconomic Convergence

The disparity in the economic size and performance of the member states presents an obstacle to monetary integration within the SADC region. Monetary integration entails a convergence in the primary macroeconomic stability indicators, i.e. inflation, interest rates and exchange rates. However, the poorer member states currently have different macroeconomic goals from the richer countries. The former group of countries focus on poverty reduction, macroeconomic reform for stabilisation and stimulating economic growth, while the latter group is intent on building competitiveness for their external sector and attracting inward and outward investment. This implies that the macroeconomic indicators will differ according to domestic policy. Thus, premature adherence by the smaller countries to the macroeconomic convergence criteria will be bad policy.

Premature convergence implies that higher inflation rates and unbalanced fiscal- monetary policy mixes in the smaller countries, reflected in positive interest rate differentials, may prompt authorities to cut their rates prematurely. However, this may delay economic convergence, as the underlying economic problems may persist. Furthermore, the low interest rates may send the wrong incentive for investment in the smaller countries, resulting in overheating economies and loss of competitiveness.

Lastly, the experience of the Euro zone with the sovereign debt crisis provides an example of the hazards of premature convergence between countries with different economic performances and unbalanced fiscal- monetary policy mixes. The SADC countries could

potentially face more severe problems than the Euro zone should they encounter a similar debt crisis because the region has less resources to bail out member states with debt problems. Furthermore, some of the SADC countries are included in the group of the world's highly indebted poor countries, which implies that they would be incapable of contributing to a bail-out fund should they be called upon to. Thus, a debt crisis could potentially lead to a break-up of the union. To avoid such a fall out, the member states are cautioned against premature integration.

Most studies conducted on this subject are in support of approaching monetary integration through an extension of the CMA arrangement. There are however, variations in the recommendations as to which non-CMA SADC countries are the most suitable candidates to join the CMA arrangement. Overall, Botswana, Mozambique and Zambia are the countries frequently cited as possible candidates, while some studies have also suggested that Angola, Malawi, Mauritius and Zimbabwe are potential candidates.

The present study found that Botswana and Mozambique were the most suitable countries to first ascend to the CMA arrangement, followed by Malawi and Zambia once they stabilise their exchange rates and inflation *vis-a-vis* the prevailing average rates in the CMA. On the other hand, Zimbabwe may be the most suitable candidate for CMA membership given that the country ceased official use of its national currency in 2009, opting for the use of multiple currencies. CMA membership would ease the problems of transacting in multiple currencies, which economic agents are currently experiencing. Furthermore, CMA membership offers gains in credibility in the determination of monetary policy for the country, whose central bank lost credibility due to political interference in the determination of monetary policy. However, there is insufficient data on the performance of key macroeconomic variables in Zimbabwe since the onset of a dollarised system to confirm this proposition.

An extension of the CMA arrangement however, implies the loss of sovereignty over monetary policy, which may discourage non-CMA SADC states from joining the CMA arrangement. If the SADC states opt to approach monetary integration through the enlargement of the CMA arrangement, they may have to modify the current agreement to one that gives the member countries a degree of authority in the determination of policy in the region.

8.1.2 The OCA Criteria

The findings of the study indicated that the SADC states currently do not currently meet the pre-requisites of an OCA. Of particular concern is that the member states lack diversity in their production structures, particularly in the smaller member states. This implies that, should a negative shock occur in the markets for their primary products that requires the use of domestic stabilisation policies, the effects of the shocks are likely to persist in the affected countries as the member states do not have effective alternative adjustment mechanisms for macroeconomic stabilisation.

The study also noted that the national currencies of the smaller countries are insignificant in the world market, while the ZAR is vulnerable to changes in the global market. In addition, it was noted that South Africa has close trade linkages with the rest of the world, especially the European Union. Thus, the integration of the South African economy with the rest of the world is likely to expose the smaller countries to economic contagion. However, the stabilisation policies that South Africa may wish to implement in response to external shocks that are asymmetric to the smaller countries may not provide sufficient adjustments in their economies, hence posing potential conflict within the union.

8.1.3 Efficiency of National Monetary and Exchange Rate Policy

Lastly, the study found that national monetary and exchange rate policies were inefficient in the determination of output performance and the control of inflation in most of the SADC states. It was however, concluded that the argument that countries that have in the past failed to use national monetary and exchange rate policy for domestic macroeconomic stabilisation purposes should join/ form a monetary union, with the understanding that a regional central bank will be more efficient in determining policy, may not hold for the SADC region.

This was attributed partly to the near-homogenous nature of production in the member states and the relative openness of their economies (which implies that national economic activity is determined by exogenous factors) and partly to the under-development of the financial systems of most of the member states (which implies that the transmission of monetary policy is inefficient in these economies). Hence, monetary policy determined by a union central bank is likely to remain ineffective under the current economic conditions.

An additional cause for concern is the approach to monetary integration through an extension of the CMA arrangement. The study determined that national monetary and exchange rate policies in the smaller CMA countries were ineffective in determining economic performance in these countries. However, it has been suggested that an extension of the CMA arrangement may require a revision of the current agreement that allows South Africa to determine monetary policy on behalf of the union. This implies that, the smaller CMA countries may not be suitable candidates of the monetary union as they do not meet the OCA criteria. Thus, approaching monetary integration through an extension of the CMA arrangement may cause problems at a later stage in terms of the suitability of the smaller CMA countries to be included as union members.

8.2 POLICY RECOMMENDATIONS

The findings of the study have a number of policy implications for monetary integration in the SADC countries; these are discussed in this subsection. To begin with, there is a need for the SADC countries to diversify their production. Production in the region currently comprises of “first-stop” primary goods hence; the countries depend on external markets for their exports. Diversified economies will be less susceptible to external shocks and would foster increased intra-regional trade, which would in turn reduce the likelihood of asymmetric shocks in the region.

Furthermore, the high divergence in the per capita income levels of the SADC countries implies that the rich countries have different policy objectives from the poor countries. It is therefore, premature to expect a convergence in macroeconomic stability indicators in the SADC countries. The countries should rather focus on stimulating growth in the poorer countries to foster real economic convergence before requiring a convergence in macroeconomic stability indicators.

Lastly, the effectiveness of monetary policy in the non-SACU countries may also be limited by the level of development in their financial sectors, which affects the transmission of policy. The countries therefore, need to work on the development and integration of their financial sectors, to complement their integration efforts.

8.3 LIMITATIONS OF THE STUDY

The SADC countries are still in the implementation phase of a FTA area. As such, there is limited integration in their economies. Trade liberalisation is expected to foster structural transformation in the economies of the member states; hence, some of the conclusions drawn on the suitability of monetary integration in the region may change with time.

The lack of valid data due to poor data reporting in some of the SADC countries presented a further limitation of the study. Conclusions drawn from the analyses are not inclusive of all the countries and therefore, do not provide a complete picture with regard to which countries are suitable for monetary integration.

8.4 SUGGESTED AREAS OF FUTURE RESEARCH

It is premature to expect the SADC countries to respond symmetrically to shocks given the divergence in their economies. However, as the SADC countries deepen regional economic integration, they are likely to meet some of the OCA criteria. Therefore, there is a need to continuously monitor the nature of the response to shocks in the SADC countries. Similarly, there is a need to continuously monitor the extent of economic convergence in the SADC countries as the countries become more integrated.

APPENDIX A

ADDITIONAL INFORMATION FOR CHAPTER THREE

Box A.1: The Solow Growth Model

The model assumes a closed economy where:

- i. Physical capital, human capital, labour and knowledge/technology are the only factors of production (natural resources and land are ignored);
- ii. All factors have positive marginal products, which are subject to diminishing returns;
- iii. The savings/ investment rate, s_k , is exogenous (no individual optimisation);
- iv. The labour force grows at a constant rate, n , which is exogenous;
- v. The depreciation rate, δ_k , is exogenous;
- vi. Technology grows at a constant rate, x , which is exogenous. This therefore implies that AL grows at a rate of $(n + x)$; and
- vii. Capital accumulation is the main driving force for wealth (Solow, 1956).

The model is expressed mathematically using a Cobb-Douglas production function, assuming constant returns to scale (CRTS) to factors of production, where:

$$Y = F(K, AL) \quad (\text{A.1})$$

Where: Y denotes output; K denotes capital; L denotes labour and A denotes technology. Technology is assumed to be labour-augmenting, thus AL denotes effective units of labour.

The assumption of CRTS implies that:

$$F(\lambda K, \lambda AL) = F\lambda(K, AL) \quad \text{For any } \lambda \geq 0 \quad (\text{A.2})$$

Expressing the function in Cobb-Douglas form gives:

$$Y = K^\alpha (AL)^{1-\alpha} \quad (\text{A.3})$$

The assumption of CRTS means that:

$$(\lambda K)^\alpha (\lambda AL)^{1-\alpha} \quad (\text{A.4})$$

$$= \lambda^\alpha K^\alpha \lambda^{1-\alpha} (AL)^{1-\alpha} \quad (\text{A.5})$$

$$= \lambda K^\alpha (AL)^{1-\alpha} \quad (\text{A.6})$$

Therefore, Y can be expressed in intensive form as:

If we define $\lambda = \frac{1}{AL}$ then it follows that:

$$F\left(\frac{K}{AL}, 1\right) = \frac{1}{AL} F(K, AL) \quad (\text{A.7})$$

Thus:

$$k = \frac{K}{AL} \quad y = \frac{Y}{AL} \quad f(k) = F(K, 1) \quad \text{and} \quad y = f(k) \quad (\text{A.8})$$

The assumption of diminishing returns implies that:

$$F'_K(K, AL) > 0, \quad F'_L(K, AL) > 0 \quad (\text{A.9})$$

and

$$F''_{KK}(K, AL) < 0, \quad F''_{LL}(K, AL) < 0 \quad (\text{A.10})$$

The rate of capital accumulation is expressed as:

$$K_{t+1} = K_t + S_t - \partial K_t \quad (\text{A.11})$$

Where: S is savings; and all the other variables are as defined above.

From equation A.11, it follows that:

$$K_{t+1} - K_t = S_t - \partial K_t \quad (\text{A.12})$$

The per-capita values are expressed as:

$$y_t \equiv Y_t / A_t L_t; \quad k_t \equiv K_t / A_t L_t \quad (\text{A.13})$$

Thus, the rate of capital accumulation can be expressed as:

$$\dot{k}_t = s_t y_t - (x + n + \partial_k) k_t \quad (\text{A.14})$$

The assumption of diminishing returns implies that the economy would eventually reach the steady-state values of k^* at which $\dot{k} = 0$.

Assuming a Cobb-Douglas production function of the form:

$$Y_t = K_t^\alpha (A_t L_t)^{(1-\alpha)} \quad (\text{A.15})$$

$$0 < \alpha < 1$$

with:

$$k^* = [(s_k^{(1-\alpha)}) / (x + n + \partial_k)]^{1/(1-\alpha)} \quad (\text{A.16})$$

Then if all the parameters in equation 5.16 for two economies, i and j , are identical then

$$k_i^* = k_j^*, \text{ and thus } y_i^* = y_j^* \quad (\text{A.17})$$

This implies that output per worker in economies i and j would converge to the same level when they reach the steady-state and from there on the economies will grow at the same constant level.

Source: Solow (1956); Mankiw *et al* (1992); Rassekh (1998)

The predictions of the model do not however imply that the economies experience the same output levels or growth rates beforehand, but rather that the evolution and the long run levels of income (i.e., the steady-state) of every country is determined by that economy's structural parameters. In other words, differences in output levels are explained by differences in s, n and δ . More specifically, a country's steady-state income is determined by its rates of accumulation of human and physical capital, as well as the rate of population growth. Thus, countries will reach different steady-states determined by their structural parameters. Therefore, *absolute* economic convergence is attainable only when the determinants of steady-state income are similar across countries (Rassekh, 1998:87).

Furthermore, the model predicts that permanent differences in growth rates are attributed to differences in x , while temporary differences are due to transition dynamics and/or shocks to s, n and δ . Thus, only *conditional* convergence can occur between countries with different initial levels of capital after controlling for the parameters that determine the different steady-states of each country (Mankiw *et al*, 1992; Jenkins and Thomas, 1997; Rassekh, 1998).

Box A.2: The Factor Price Equalisation (FPE) Theorem

The FPE theorem can be illustrated mathematically using two regions/countries (i and j):

National income expressed in factor earnings is written as:

$$Y_i = w_i L_i + r_i K_i \quad (\text{A.18})$$

Where: Y denotes income, w denotes wages, L denotes labour, r denotes interest, K denotes capital, and $i = 1, 2$.

In per capita terms:

$$Y_i/L_i = (w_i L_i + r_i K_i)/L_i \quad (\text{A.19})$$

Put differently:

$$y_i = w_i + r_i (K_i/L_i) = w_i + r_i (S_i/L_i) \quad (\text{A.20})$$

Where: y denotes per capita income and S denotes the savings rate.

Prior to economic integration, national incomes may differ due to differences in either factor endowments or factor prices. However, once the economies trade freely, the FPE theorem predicts that w and r would equalise, such that:

$$y_i = w + r(K_i/L_i) = w + r(S_i/L_i) \quad (\text{A.21})$$

This means that differences in the national incomes in the two countries will be determined by differences in their factor endowment ratios. Similarly, long run national incomes of the two countries will be determined by the size of their population or labor force, L and the savings rate (S/L).

However, if factors are mobile, then K/L would converge. Given that per capita savings rate is a decreasing function of per capita income, the savings rate declines when per capita income reaches its steady-state. Similarly, when the wage rate reaches its threshold level, growth in the labour force also ceases. The two factors combined should lead to a convergence in national incomes.

Source: Kim (1998)

Box A.3: EU's Fiscal Policy Framework

The EU's fiscal policy framework is based on the Excessive Deficit Procedure (EDP), the Stability and Growth Pact (SGP) and the Broad Economic Policy Guidelines (BEPG). The EDP-SGP framework imposes fiscal discipline on member nations by setting demanding fiscal requirements for allowing countries to join the monetary union and making budgetary prudence a permanent feature of the region. The BEPG, on the other hand, provide an opportunity to discuss macroeconomic priorities and try to steer the EU's overall fiscal-monetary policy mix in the right direction.

The EDP stipulates that countries must avoid "excessive deficits" prior to joining the union, which entails not having government budget deficits exceeding 3% of GDP (unless the ratio has been declining substantially and continually, and is close to that reference value, or the excess over that value is exceptional and temporary). The EDP also stipulates that countries should not have a public debt that exceeds 60% of GDP (unless the ratio is declining and approaching the reference value at a satisfactory rate).

The Council of Ministers, on a recommendation by the Commission, issues a confidential finding to any country designated to have an "excessive deficit". In this finding, the Council outlines its views on the fiscal policy needs of the country and recommends concrete corrective measures. If the country fails to respond appropriately within a specific time limit, the Council can make its recommendations public. In addition, countries benefiting from the Cohesion Fund may find their financing from this source in jeopardy if they fail to take corrective action. For euro-area countries, the Council may also impose sanctions such as the interruption of European Investment Bank lending, non-interest-bearing deposits, and fines.

The SGP strengthens the EDP. Under the SGP, EU countries commit themselves to a medium-term budgetary position close to balance or surplus. This is expected to allow the automatic fiscal stabilisers to work over the business cycle without breaching the Maastricht limit of a deficit of over 3% of GDP. In addition, the SGP defines the circumstances under which a deficit exceeding the 3% reference value may be considered exceptional, such as when it arises from an unusual event outside the control of the member state in question and having a major fiscal impact. An exception may also be made when an excessive deficit arises from a severe economic downturn, defined as a situation where annual GDP falls by at least 2%.

Furthermore, the SGP clarifies other aspects of the EDP, such as the imposition of sanctions, and strengthens the surveillance of fiscal policies by introducing an "early warning system". Member nations are required to present, on an annual basis, *stability programs* specifying their medium-term budgetary objectives and an adjustment path for the deficit/GDP and debt/GDP ratios. EU countries outside the euro-area must present *convergence programs* on an annual basis.

Critics of the fiscal policy rule, however argue that the room left by the SGP for discretionary, counter-cyclical fiscal policy is too limited because, unless countries succeed in running substantial surpluses during "normal times", the 3% of GDP limit will in most cases only allow for the operation of the automatic fiscal stabilisers.

Lastly, the BEPG discussions, conducted on an annual basis, provide an opportunity to discuss fiscal policy coordination issues within a more general framework that encompasses other macroeconomic policies and structural reforms. The BEPG are meant to be the synthesis of the EU's consensus on economic policy.

Source: Arroyo (2003:113).

APPENDIX B

ADDITIONAL INFORMATION FOR CHAPTER FOUR

Table B.1: Summary of Empirical Literature

Author and Year	Countries included in the Sample	Sample Period	Empirical Approach	Summary of Findings
Jenkins and Thomas (1997)	The SADC countries	1960-1990	The study investigated the degree of macroeconomic convergence between SADC countries using the σ -convergence approach, the β -convergence test, as well as Quah (1995)'s approach.	The results found no evidence of real convergence within the SADC countries. However, there was evidence of convergence occurring within the subset of the SACU countries, while a degree of divergence occurred for the rest of the countries. Thus, it was concluded that the region was not ready for monetary integration.
Grandes (2003)	The CMA countries and Botswana	1990-2001	The study investigated whether or not the CMA countries and Botswana form an OCA using cointegration techniques and a panel "G-PPP" model.	The results of the study found the existence of common long-run trends in the bilateral RERs; suggesting that the countries form an OCA.
Agbeyegebe (2003)	9 SADC countries (excluding all 4 CMA members)	1992-2000	The study applied the method of time varying analysis to establish the direction economic convergence.	The results of the exchange rate analysis showed differing degrees of non-convergence among the non-CMA currencies to the rand exchange rate with the exception of the Malawian Kwacha. Similarly, results from the inflation analysis suggested non-convergence in the inflation rates of the non-CMA countries to the average of the CMA countries.
Khamfula and Huizinga (2004)	Botswana, Lesotho, Malawi, Madagascar, Mauritius, Namibia, South	1980-1996	The study analysed the conditional RER variances between South Africa and the other SADC countries, the extent of symmetry of, as well as the persistence of RER disturbances. Furthermore, the study assessed the potential role of monetary and fiscal policy coordination	The results suggested that the conditional variances of the RER disturbances between South Africa and most fellow SADC members were comparable. It was therefore, suggested that Botswana, Lesotho, Malawi, Mauritius, Namibia, South Africa, Swaziland and

	Africa, Swaziland, Tanzania, and Zambia and Zimbabwe		in reducing RER variances in the member states using a GARCH model.	Zimbabwe could be the initial members of the monetary union. Furthermore, the results indicated that there were low degrees of symmetry of RER shocks across the countries. Lastly, the study found that coordinated monetary and fiscal policies, other than common monetary policies alone among potential members would guarantee relatively low degrees of RER variability in SADC.
Carrere (2004)	Sub-Saharan African countries	1962-1996	The study investigated the impact of regional trade agreements and the use of a common currency within Sub-Saharan African countries using a gravity model.	The results indicated that the use of a common currency increased trade between members of UEMOA and CEMAC by more than double the initial level. The results of the study were, however, inconclusive as to whether membership in a regional body increases trade between SADC countries.
Nielsen <i>et al</i> (2005)	The CMA countries, Botswana, Zambia and Zimbabwe	1994-2004	The study investigated the degree of financial integration using the concept of uncovered interest rate parity. The study also tested the speed of convergence in these countries using the beta-convergence test. Moving regressions were used in the analysis to observe changes over time.	The results suggested that the LNS countries were financially integrated with South Africa, while Botswana, Zambia and Zimbabwe were not.
Buiguit and Valev (2005)	Botswana, Burundi, Djibouti, Comoros, Egypt, Ethiopia, Kenya, Lesotho, Madagascar, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, South Africa,	1971- 2002 for most of the countries, while for Ethiopia, Tanzania, and Uganda, the data was from 1970-2001, whereas for the Comoros, Mauritius, Mozambique, and Namibia	The study investigated the possibility of monetary integration in Eastern and Southern African countries using structural vector autoregressive (SVAR) analysis. The Blanchard and Quah's (1989) two-step statistical method was used to identify and compare the underlying shocks to aggregate output and inflation in these countries. The study also investigated the possibility of forming currency union(s) linked to some hard currency, e.g. the euro, the dollar, or the British pound.	No evidence was found in support of an ESA-wide monetary integration, but rather a tri-polar route. The first monetary union could be in the form of an expansion of the CMA arrangement to include initially Botswana, Mozambique and Zambia. The second group could initially comprise members of the EAC community; the group could gradually expand to include Ethiopia, Sudan and Egypt, while the third group could comprise the island (IOC) economies. In addition, no evidence was found in support of linking a SADC currency to an external-anchor currency. On the other hand, there was strong evidence in support of linking an IOC

	Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe	the data was from 1980-2002		currency to the euro, while evidence in support of linking an EAC currency to the euro was weak.
Aziakpono (2006)	The SACU countries	1990-2004	The study investigated the extent of financial integration amongst the SACU countries using cointegration and error correction techniques. More specifically, the study investigated the presence of the arbitrage condition and the South African Dominant Hypothesis (SADH) in the SACU countries.	The results confirmed the occurrence of financial integration in the SACU countries, which was mainly a result of policy-, rather than market convergence. Thus, suggesting that there were limited arbitrage opportunities between the countries. In addition, the results indicated that there was a hierarchy in the level of integration with South Africa, with Namibia at the top, followed by Swaziland, then Lesotho, and lastly, Botswana. Lastly, the results confirmed the SADH in the SACU countries.
Aziakpono <i>et al</i> (2007)	All of the SADC countries except the DRC	1990- 2005	The study investigated the degree of banking market integration in the SADC countries using principal component analysis and pass-through analysis. The study tested the level of correlation in the national central bank rates, lending and deposit rates	The results confirmed the presence of a convergence club around the CMA countries, with some of the non-CMA SADC countries showing a tendency to converge with the CMA countries. The authors suggested that monetary integration in the form of an expansion of the CMA arrangement to include Botswana, Seychelles and Zambia was possible.
Aziakpono (2008)	SACU countries	1990-2005	The author investigated the extent of monetary and financial autonomy and interdependence between South Africa and the rest of the SACU countries using cointegration and error correction models, as well as long-run causality analysis (based on the weak exogeneity test).	The results suggested a low level of domestic policy autonomy in Botswana, Lesotho and Swaziland, while the contrary was the case for South Africa and Namibia. Furthermore, the results provided evidence that the SARB overwhelmingly influences policy stance and the money market behaviours of the other member states. Lastly, it was determined that causality runs from South Africa to the other member states, implying that convergence in market interest rates was due to efforts of banks in the BLNS countries to align interest

Johns (2009)	10 SADC Countries, namely Botswana, Lesotho, Madagascar, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia	1990-2007	The study investigated the extent of the pass-through of monetary policy in ten SADC countries using an interest rate pass-through model.	rates with those of South Africa. The conclusion reached was that a monetary unification, with the South African Rand as a common currency and the SARB as a sole central bank was feasible. The results identified a convergence group consisting of the SACU countries, Botswana, Malawi, and to some extent, Zambia. The study concluded that a region-wide monetary union was currently not feasible within the SADC countries. However, monetary integration in the form of an extension of the CMA arrangement to include Botswana, Malawi and Zambia was possible.
Obinyeluaku and Viegi (2009)	Botswana, Lesotho, Madagascar, Malawi, Mauritius, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe	1980-2006	The study investigated the relevance of fiscal and monetary policy in the determination of inflation in the SADC countries using VAR analysis.	The results indicated that fiscal policy dominated monetary policy in the determination of inflation in Lesotho, Botswana, Malawi, Zambia and Zimbabwe, while South Africa, Swaziland, Mauritius, Seychelles and Tanzania exhibited a monetary dominant regime. The study found that countries with independent monetary policy, such as Botswana and Lesotho, could still exhibit a fiscal dominant regime. Thus, it was suggested that the SADC countries aim to coordinate their monetary and fiscal policies in order to attain price stability within the proposed monetary union.

Table B.2: Summary of Exchange Rate Systems, Policy Framework, Exchange Control Restrictions on Capital and Current Account Transactions in the SADC Countries

Country	Exchange Rate System	Exchange Control on Current Account Transactions	Restrictions on Capital Account Transactions
Angola	Free floating exchange rate	Almost all current account transactions have been liberalised. Capital operations are subject to previous exchange licensing by the authorities.	Inward investment is prohibited in some strategic sectors such as defence and security. Capital repatriation upon liquidation is subject to prior approval of the Minister of Finance. Annual transfers of dividends are subject to approval by BNA. All capital transfers are subject to licensing and control.
Botswana	Crawling Peg (The currency is pegged to a weighted basket of currencies that comprises SDR currencies and the South African Rand).	Exchange controls were abolished in February 1999. There is a requirement for customers to complete forms to record inward and outward transfer or foreign currency payments where the amount exceeds an equivalent of P10 000.	Full capital account convertibility since February 1999
Lesotho	Fixed exchange rate (Pegged at par with the South African Rand)	No controls on current account Transactions**	- No restrictions on capital accounts within the CMA. - Limited reforms on capital account since June, 2003, which include: i. Foreign investment by private individuals outside the CMA is limited to M250,000; ii. Opening of foreign currency and offshore accounts for private individuals is limited to M250,000; iii. Direct investment by corporate / companies to countries outside the CMA is allowed up to M50 million within the SADC region and up to M30 million elsewhere iv. No restriction on long-term capital inflows
Madagascar	Independently floating*		
Malawi	Managed floating with no pre-determined path for the exchange rate	No controls on current account Transactions	Both inward and outward direct and portfolio investments require prior approval.
Mauritius	Managed floating with no pre-determined path for the exchange rate	No controls on current account Transactions**	No restrictions on capital account transactions in respect of both inward and outward

			investments
Mozambique	Free floating	• No restrictions are imposed on the exports of goods. • The importation of goods must be preceded by negotiation of foreign currency with commercial banks. • There are no restrictions on the entry of earnings for services. Payments for services exceeding a value equivalent to USD5 000 must be licensed by the central bank	• Non-residents and traveler can import any amount of foreign currency against declaration. • Only the foreign currency previously declared may be exported. • Foreigners are allowed to invest in the country. • Expatriation of profits and invested capital are also allowed and regulated by the law
Namibia	Fixed exchange rate (Pegged at par with the South African Rand)	No controls on current account Transactions**	• No capital account restrictions within the CMA • No restrictions on capital from non-residents for equity investment • Outward investments limit for corporate business is N\$750 million
South Africa	Free floating	No controls on current account transactions	• No restrictions on inward investment and disinvestment by non-residents • There are controls on outward capital investment
Swaziland	Fixed exchange rate (Pegged at par with the South African Rand)	No controls on current account transactions	Same as South Africa
Tanzania	Managed floating	No controls on current account Transactions**	The capital account is not fully liberalised
Zambia	Fully market determined	No controls on current account transactions	No exchange controls on capital account
Zimbabwe	Dollarised system		

Source: IMF (2005; 2007); SADC Bankers (2011).

Notes: *IMF notes that the regime operating de facto in the country is different from its de jure regime.

** Adopted Article VII of the IMF Articles of Agreement.

Table B.3: Summary of Scoring In Terms of OCA Criteria

	Rating
Trade Openness	High
In % of GDP	34.2
Diversification in Production	Low
Trade Interdependence	Very Low
Exports	11.58
Imports	12.86
Labour Mobility	Low
Likelihood of Asymmetric Shocks	High
Intra-regional Financial Integration	Interim
In SACU countries	High
Intra-regional Transfer System	No
In SACU countries	Yes
Existence of large country within the region from which to import credibility	Yes
Political Integration	High

Source: Own calculations

Table B.4: Summary of SADC Financial Systems: Structures, Policies and Markets

Country	Structure of the Financial Markets	Instruments used in the Financial Markets
Angola	• Money market is emerging. Central bank bills (TBC) auctions were introduced in June 1999 and are issued periodically by the central bank to absorb excess liquidity in the banking system. • Capital Market: Commission of the Capital market (CMC) created in March 2005. • The stock market is expected to start in the near future.	• Short-term Treasury bills and central bank bills • Medium and long-term Treasury bonds
Botswana	• Money market is growing. The Bank withdrew its participation in the secondary market for its Bank of Botswana Certificates (BoBC's) in 2004 to encourage secondary market trading among primary counterparties • Capital market is not broad based. There is a small stock market which commenced operation in 1989. • Bond Market: launched in March 2003 and is emerging • Only money and exchange markets exist, which remain under developed. However, shares and bonds are in circulation in the market	• The key short-term money market instrument is the BoBCs • Shares and bonds are the only instruments in the capital market
Democratic Republic of Congo	• Only money and exchange markets exist, which remain under developed. However, shares and bonds are in circulation in the market	-
Lesotho	• Money market is at a developmental stage, with limited financial products; • Capital market is not yet active. The Bank and the Government are in the process of introducing Treasury bonds; • Stock market does not exist but plans are in the pipeline to establish one	• Instruments used in the money market include various deposits, Treasury bills and the Central Bank paper; • The capital market will make use of 3 and 5 year T-bonds
Malawi	• Money market includes all commercial banks, finance houses, savings and credit institutions, institutional investors and discount houses. capital market is at a nascent stage of development with four stockbrokers operating on the Malawi Stock Exchange (MSE)	• Money market instruments include Treasury bills; promissory notes; Reserve Bank, monetary policy bills; local registered stocks; and bankers acceptances. • Capital market instruments include shares and Government of Malawi Local Registered Stocks (LRS)
Mauritius	• Money market consists of an interbank money market and a market for Treasury Bills/Bank of Mauritius Bills and other government securities • Stock market exists and it is the only organised market for the trading of company shares and debentures	• Money market instruments include Treasury Bills/Bank of Mauritius Bills/Notes and other government Securities • Capital market instruments include shares, bonds and T-bills
Mozambique	• The Interbank Money Market (MMI) was introduced in September 1997 • The Stock Market was introduced in October 1999	• Instruments used in both markets include Treasury Bills (T-Bills), Central Bank Bills (TAMs), Standing Facilities, Reserve Requirements (ROs), Repo and Reverse Repo, Treasury Bonds (T-Bonds), and; Corporate Bonds and Equities
Namibia	• Money market: local interbank lending is limited as local banks frequently deal with the South African interbank market. This is due	• Money market instruments include demand and savings deposits, notice and fixed deposits, negotiable certificates of

	mainly to their close links with South African parent or affiliated companies	deposits, and Treasury bills
	Capital market: Stock exchange exists	Capital market instruments include shares listed and traded on the stock exchange, listed government stock, and bills, debentures and bonds issued by state-owned enterprises
South Africa	- Money market consists of markets in the securities of ultimate borrowers and financial intermediaries, and the interbank market - Capital market consists of the variable and fixed interest securities markets, and the stock exchange	- Money market instruments: Treasury bills and government bonds (with less than twelve months to maturity); bankers' acceptances; promissory notes; Eskom commercial paper bills; Transnet bills and bonds; Telkom commercial paper notes and bearer coupon stock; SARB debentures; Land Bank bills and promissory notes; SA Housing Trust bonds; negotiable certificates of deposit (NCD's); forward rate agreements, short-term securities issued by the Trans-Caledon Tunnel Authority (TCTA); and commercial paper of banks and other corporations - Capital market instruments include government inflation-linked and floating rate bonds with more than twelve months to maturity; bonds issued by public corporations and public utilities; corporate bonds; and shares or equities. - There is also a well-developed derivatives market where futures and options on commodity, money, capital and foreign exchange market instruments are traded.
Swaziland	- Money market: dealings in the money market are done by the commercial banks and the central bank. - Capital market: all dealings in the capital market are carried out by the Swaziland Stock Brokers (LTD), the African Alliance of Swaziland Securities (LTD) and Interneuron Swaziland (PTY) (LTD)	- Money market instruments include Treasury bills, central bank bills, bankers' acceptances, and negotiable certificates of deposits - Capital market instruments include debentures and bonds, equities, and unit trusts
Tanzania	- The financial market was introduced in August 2003 and it deals with short-term financial instruments with maturities not exceeding one year - Stock market exists	Money market instruments include Treasury bills, Treasury bonds, and Repurchase Agreements
Zambia	- Money market is dominated by commercial banks that mainly trade in short-term financial instruments. The market also includes the inter-bank market, and the foreign exchange market - Capital market: Stock exchange was established in February 1994	- Money market instruments include Treasury bills, commercial paper, term deposits and repurchase agreements (Repos) - Capital market instruments include government bonds, shares or equities and bonds
Zimbabwe	Money market: The interbank market comprises deposit money banks (commercial and merchant banks, including discount houses) and other banking institutions (finance houses, building societies and the People's Own Savings Bank (POSB))	Money market instruments include Treasury bills, central bank paper (OMO bills), parastatal paper usually guaranteed by Government, negotiable certificates of deposits, bills of Exchange especially Bankers Acceptances

	Capital market comprises non-bank financial institutions, micro-finance institutions (money lenders), insurance companies, pension funds, provident funds, corporate bodies, public enterprises, local authorities, stock broking firms and the Zimbabwe Stock Exchange (ZSE). Since February 2009, the Zimbabwe Stock Exchange (ZSE) has completely rolled over to the foreign currency regime, under the multiple currency framework. All share prices are quoted and traded in foreign currency.	(Since the adoption of the multicurrency regime in February 2009, the instruments which have been dominant in the money market are bankers acceptances. Most of the banks with such securities have, however, been holding these to maturity thereby limiting trades. The Government has been operating under a strict cash budgeting framework and has, therefore, not come into the market to raise funds through the traditional Treasury bills). Capital market instruments include shares, debentures, government bonds, public enterprise bonds, and local government bonds

Source: SADC Bankers (2011)

APPENDIX C

ADDITIONAL INFORMATION FOR CHAPTER FIVE

Box C.1: The European Monetary System (1979-1998)

The European Monetary System (EMS) was formed in March 1979 in keeping with the EU's (then called the European Economic Community or ECC) aim for monetary integration, with the ultimate goal of establishing a common currency with a regional central bank. The UK did not join the EMS at on-set.

The aim of the EMS was to obtain stability in the exchange rates between the EU currencies and to encourage convergence of economic and monetary policies. Thus, the EMS facilitated the interdependence of the EU countries through the use of an exchange rate mechanism (ERM), which had four main components; the European Currency Unit (ECU), the parity grid, the divergence indicator and the credit facilities.

The ECU was a monetary unit based on a basket of the weighted average of the currencies of the member nations. The number of units of each participating currency in the ECU was fixed, while the weights of the various currencies changed over time, as intra-European exchange rates fluctuated. An advantage of the ECU is that it offered greater stability than any one of the national currencies. The ECU also functioned as a reserve instrument issued by the European Monetary Cooperation Fund (EMCF) to EMS central banks. The countries were allocated a quota into the EMCF, 20% to be paid in gold (valued at market price) and the remainder in dollars, in exchange for ECUs.

The parity grid consisted of the central rate, the bi-central rate and the marginal intervention. Each participating nation had a central rate for its currency that was determined by all members and was expressed as the amount of that nation's currency equal to one ECU. The central rates were fixed but could be revised only with a re-alignment. In this way, the EMS was a fixed but adjustable exchange rate system, with the currencies of the member nations floating jointly against the dollar.

The central rates were used in the parity grid to monitor currency fluctuations relative to each other. The ratio of one country's central rate to another's formed the bi-central rate. The value of this ratio was allowed to fluctuate by a maximum of 2.25% on either side of its parity. When the ratio reached the allowable "margin", i.e., 75% of its allowed limits, a *threshold of divergence* was reached, the affected nation was expected to take a number of corrective steps to prevent its currency fluctuating outside the allowed range. These included diversified intervention measures of domestic monetary policy, changes in central parity, or other measures of economic policy. This was known as marginal intervention.

In the extreme case, where the exchange rate reached the limit of its range, the weak- and the strong-currency members had to share the burden of the necessary adjustment. For example, if the French franc depreciated to its upper limit against the German mark, the French central bank had to sell Deutsche mark (DM) reserves and the German central bank had to lend the necessary DM to France. The divergence indicator was designed to give a country a warning when its currency was nearing the divergence of the ECU central rate.

Lastly, the EU countries established EMCF to provide short- and medium-term balance-of-payments support to members. There are three financing facilities in the EMS: the Very Short Term Financing Facility (VSTF), the Short Term Monetary Support (STMS) and the Medium Term Financial Assistance (MTFA). The VSTF and the STMS were issued by the central banks, while the MTFA was issued by the Council of Ministers.

The VSTF consisted of an unlimited credit line that participating central banks opened to each other, in their own currencies to finance obligatory intervention in EC currencies. The amounts drawn were expressed in ECU's and carried interest. On the other hand, the STMS and the MTFA were systems of mutual credit that EC member states could grant each other. The initial loan period under the STMS was three months, but was extendable to a total duration of nine months, while that of the MTFA was two to five years.

Source: Kondonassis and Malliaris (1994:296-7), Salvatore (2004: 715), Mongelli (2008).

Box C.2: The 1992-1993 Currency Crises in the European Monetary System

A combination of several factors led to the 1992-1993 crises within the exchange rate mechanism (ERM). To begin with, Germany was experiencing a prolonged cyclical upswing in the aftermath of the unification of the East and West German economies while the rest of the European countries were undergoing a recession. The high cost of restructuring East Germany in 1992 increased the nation's inflationary pressures, which prompted the German central bank (the Bundesbank) to tighten its monetary policy. This resulted in an increase in interest rates and an appreciation in the mark against other currencies. The United Kingdom and Italy felt they could not maintain the exchange rate within the ERM in the face of high and rising unemployment.

In addition, there were increasing doubts about the future of the EMU due to the negative outcome of the Danish referendum in June 1992, which were exacerbated in the run-up to the French referendum in September that same year. Furthermore, high inflation countries within the European Monetary System (EMS) periodically needed to devalue their currencies with respect to the EMS in order to maintain competitiveness relative to low inflation countries, such as Germany. However, more than five years had lapsed without realignments of the parities in the ERM as such; countries that had not advanced in nominal convergence experienced a loss in competitiveness. Finally, the several contagion effects between the countries prompted the onset of the crisis and fuelled its persistence.

In late 1992, the United Kingdom and Italy withdrew from the EMS, enabling their currencies to depreciate and their interest rates to fall, which stimulated economic growth, while Sweden, Finland and Norway abandoned the unilateral links of their currencies to the ECU. Numerous other realignments followed. However, the Bundesbank refused to lower the discount rate as was expected by financial analysts and traders. Speculators responded by selling the currencies of France, Spain, Portugal, Denmark and Belgium.

The combined market intervention efforts of the central banks of the member nations could not reverse the market forces in the face of the massive speculative attack. Market doubts concerning the preparedness and ability of EU central banks to raise interest rates in defence of exchange rates in situations where such policies might clash with the requirements of the domestic economy led to pressures within the EMS. As a result, the monetary authorities agreed to abandon the narrow band of ± 2.25 percent for a much wider band of ± 15 percent on either side of the central rates. This put an end to the speculative attacks but exchange rates remained at their pre-crisis level.

Source: Alberola *et al.*, (2003:34); Salvatore (2004:716)

APPENDIX D

RESULTS FOR PRELIMINARY TESTS

Table D.1: Univariate Unit Root Tests

Country	Variable	DF-GLS*			PP*			PP**		
		Level	1 st Diff	2 nd Diff	Level	1 st Diff	2 nd Diff	Level	1 st Diff	2 nd Diff
ANG	GDP	-4.16 ^a			-4.32 ^a			-4.35 ^a		
	Inflation	-0.63	-4.83 ^a		-1.02	-5.21 ^a		-3.19	-5.20 ^a	
	Interest Rate	-0.15	-0.68	1.66	-4.91 ^a			-5.09 ^a		
	Money Supply	-0.79	-1.48	-0.27	-1.10	-8.16 ^a		-2.19	-10.13 ^a	
	Exchange Rate	-2.11 ^b			-2.28	-8.44 ^a		-3.16	-8.39 ^a	
BOT	Credit	-0.36	-0.40	-1.05	-3.47 ^b			-1.64	-8.47 ^a	
	GDP	1.68	-1.54	-0.10	-1.69	-16.34 ^a		-3.97 ^b		
	Inflation	-0.11	-1.16	-1.48	-2.90 ^b			-3.15	-12.33 ^a	
	Interest Rate	0.05	-5.67 ^a		-1.20	-0.24 ^a		-2.57	-9.20 ^a	
	Money Supply	1.33	-1.47	-0.30	-1.88	-6.43 ^a		-2.37	-6.26 ^a	
DRC	Exchange Rate	0.01	-9.55 ^a		-0.86	-10.45 ^a		-2.47	-19.46 ^a	
	Credit	0.22	-2.96 ^a		-1.08	-3.71 ^a		-2.09	-3.72 ^b	
	GDP	0.06	-2.17 ^b		-0.61	-9.51 ^a		-1.24	-9.49 ^a	
	Inflation	-1.82 ^c	-3.01 ^a		-1.73	-4.77 ^a		-1.73	-4.63 ^a	
	Money Supply	0.39	-9.79 ^a		-0.74	-9.87 ^a		-2.16	-9.82 ^a	
LES	Exchange Rate	-1.33	-9.03 ^a		-2.15	-10.35 ^a		-1.67	-10.49 ^a	
	Credit	-0.89	-1.17	-0.12	-2.40	-7.12 ^a		-0.77	-7.62 ^a	
	GDP	1.73	-9.29 ^a		-0.03	-9.15 ^a		-2.77	-9.12 ^a	
	Inflation	-0.94	-1.46 ^c	-9.27 ^a	-2.70 ^c	-9.29 ^a		-3.88 ^b		
	Interest Rate	-0.43	-10.96 ^a		-1.34	-11.12 ^a		-2.83	-11.08 ^a	
MAD	Money Supply	-0.42	-8.17 ^a		-3.21 ^b			-3.35 ^c	-10.58 ^a	
	Exchange Rate	-1.01	-9.55 ^a		-1.66	-9.52 ^a		-2.27	-9.49 ^a	
	Credit	-1.43	-4.76 ^c		-1.92	-4.96 ^a		-1.93	-9.53 ^a	
	GDP	-0.43	-7.07 ^a		-1.19	-13.43 ^a		-2.71	-13.17 ^a	
	Inflation	-1.93 ^c	-4.47 ^a		-6.23 ^a			-6.43 ^a		
MAL	Interest Rate	-5.64 ^a			-5.36 ^a			-5.50 ^a		
	Money Supply	-5.94 ^a			-5.34 ^a			-5.28 ^a		
	Exchange Rate	-1.12	-6.74 ^a		-1.71	-12.97 ^a		-2.85	-14.03 ^a	
	Credit	-0.88	-3.28 ^a		-0.68	-3.50 ^a		-2.67	-3.37 ^c	-9.73 ^a
	GDP	0.99	-1.64 ^c	-2.84 ^a	1.12	-10.39 ^a		-1.70	-10.87 ^a	
MAL	Inflation	-3.67 ^a			-3.13 ^b			-3.17 ^c	-9.59 ^a	
	Interest Rate	1.31	-1.48	-1.19	-4.77 ^a			-2.55	-12.10 ^a	
	Money Supply	-3.30 ^a			-2.60 ^c	-13.56 ^a		-3.64 ^b		

	Exchange Rate	-1.13	-8.31 ^a	-6.70 ^a	-1.70	-7.95 ^a	-3.83	-7.90 ^a	
MAU	Credit	-1.79	-1.54	-6.70 ^a	-0.81	-6.65 ^a	-1.34	-6.65 ^a	
	GDP	1.07	-4.31 ^a		-1.14	-7.20 ^a	-2.78	-7.17 ^a	
	Inflation	-1.07	-6.76 ^a		-3.35 ^b		-3.12	-8.31 ^a	
	Interest Rate	-1.10	-2.34 ^b		-3.48 ^b		-3.42	-5.98 ^a	
	Money Supply	0.18	-0.88	-1.74 ^c	-2.43	-7.65 ^a	-3.49 ^b		
MOZ	Exchange Rate	-1.84	-1.99 ^b		-2.03	-8.31 ^a	-3.03	-8.29 ^a	
	Credit	0.49	-2.90 ^a		-2.25	-5.66 ^a	-1.29	-5.95 ^a	
	GDP	1.47	-6.46 ^a		-1.13	-8.29 ^a	-1.91	-12.36 ^a	
	Inflation	-0.76	-4.34 ^a		-2.39	-4.66 ^a	-2.33	-4.59 ^a	
	Interest Rate	-2.81 ^a			-2.19	-7.02 ^a	-2.81	-6.99 ^a	
NAM	Money Supply	0.08	-1.71	-12.21 ^a	-1.44	-7.76 ^a	-2.24	-7.75 ^a	
	Exchange Rate	-0.90	-4.83 ^a		-1.70	-6.32 ^a	-2.36	-6.24 ^a	
	Credit	-0.33	-4.03 ^a		-0.41	-8.55 ^a	-1.44	-8.60 ^a	
	GDP	-2.10 ^b			-1.24	-2.46	-0.81	-2.84	-6.03 ^a
	Inflation	-1.66	-3.64 ^a		-1.94	-3.98 ^a	-2.15	-3.88 ^b	
RSA	Interest Rate	-1.17	-2.60 ^b		-1.27	-3.08 ^b	-1.72	-3.11	-6.34 ^a
	Money Supply	-1.03	-5.87 ^a		-0.28	-3.15 ^b	-0.39	-3.09	-6.29 ^a
	Exchange Rate	-0.53	-4.83 ^a		-2.97 ^b		-3.08	-5.87 ^a	
	GDP	2.47	-2.93 ^a		1.10	-5.83 ^a	-0.97	-5.99 ^a	
	Inflation	-1.39	-8.11 ^a		-1.83	-9.69 ^a	-2.76	-9.63 ^a	
SWA	Interest Rate	-1.34	-4.91 ^a		-1.26	-6.38 ^a	-2.78	-6.46 ^a	
	Money Supply	2.27	-7.96 ^a		0.03	-8.02 ^a	-1.87	-7.99 ^a	
	Exchange Rate	-0.73	-3.15 ^a		-1.59	-10.37 ^a	-2.42	-10.36 ^a	
	Credit	-0.95	-3.45 ^a		-0.14	-3.49 ^a	-2.04	-3.42 ^c	-11.10 ^a
	GDP	1.86	-9.93 ^a		-0.55	-9.89 ^a	-1.48	-9.85 ^a	
TAN	Inflation	-1.77	-11.36 ^a		-3.39 ^a		-4.46 ^a		
	Interest Rate	-0.77	-2.16 ^a		-1.51	-10.32 ^a	-2.53	-10.28 ^a	
	Money Supply	2.17	-11.48 ^a		0.47	-15.00 ^a	-3.63 ^b		
	Exchange Rate	-0.29	-2.69 ^a		-1.11	-10.66 ^a	-2.33	-10.69 ^a	
	Credit	0.46	-0.93	-7.44 ^a	-1.47	-5.20 ^a	-1.95	-5.13 ^a	
ZAM	GDP	0.73	-2.08 ^b		-0.05	-9.09 ^a	-2.70	-9.14 ^a	
	Inflation	-1.35	-0.45	-15.99 ^a	-1.22	-14.67 ^a	-3.08	-14.60 ^a	
	Interest Rate	0.53	-1.53	-3.26 ^a	-4.75 ^a		-4.83 ^a		
	Money Supply	-0.49	-3.54 ^a		0.07	-11.53 ^a	-1.45	-11.89 ^a	
	Exchange Rate	-1.97	-9.86 ^a		-1.88	-11.95 ^a	-1.89	-11.95 ^a	
ZAM	GDP	-0.15	-1.32	-8.50 ^a	-1.56	-11.58 ^a	-1.44	-12.95 ^a	
	Inflation	-0.91	-6.61 ^a		-0.96	-6.66 ^a	-2.70	-6.68 ^a	
	Interest Rate	0.94	-0.55	-0.38	-3.20 ^b		-3.42	-15.49 ^a	
	Money Supply	4.33	-5.92 ^a		11.69	-6.10 ^a	3.27	-11.84 ^a	

	Exchange Rate	-0.14	-9.29 ^a		-0.95	-11.75 ^a	-3.94 ^b	

Source: Derived using Eviews 7

Notes: * and ** indicate that the unit root tests were carried out with an intercept only and an intercept and time trend, respectively.

- a, b, and c indicate rejection of the null hypothesis (H₀) at the 1%, 5% and 10% level of significance, respectively.
- ANG= Angola, BOT= Botswana, DRC= Democratic Republic of Congo, LES= Lesotho, MAD= Madagascar, MAL= Malawi, MAU= Mauritius, MOZ= Mozambique, NAM= Namibia, RSA= Republic of South Africa, SWA= Swaziland, TAN= Tanzania, and ZAM= Zambia. These definitions apply for all estimations thereafter.

Table D.2: Cointegration Tests

Table D.2.1: Cointegration Tests- Monetary Aggregate Channel

Country	Rank	Max -Eigen			Trace		
		Statistic	Prob. (95%)	Prob. (99%)	Statistic	Prob. (95%)	Prob. (99%)
DRC	$r=0$	33.11	0.00*	0.00*	55.52	0.00*	0.00*
	$r \leq 1$	21.24	0.00*	0.00*	22.41	0.00*	0.00*
	$r \leq 2$	1.18	0.28	0.28	1.18	0.28	0.28
LES	$r=0$	54.01	0.00*	0.00*	84.76	0.00*	0.00*
	$r \leq 1$	21.40	0.00*	0.00*	30.75	0.00*	0.00*
	$r \leq 2$	9.34	0.00*	0.00*	9.34	0.00*	0.00*
MOZ	$r=0$	29.15	0.00*	0.00*	55.45	0.00*	0.00*
	$r \leq 1$	20.28	0.00*	0.00*	26.30	0.00*	0.00*
	$r \leq 2$	6.02	0.01*	0.01	6.019	0.01*	0.01
RSA	$r=0$	33.91	0.00*	0.00*	77.35	0.00*	0.00*
	$r \leq 1$	29.80	0.00*	0.00*	43.44	0.00*	0.00*
	$r \leq 2$	13.63	0.00*	0.00*	13.63	0.00*	0.00*
SWA	$r=0$	43.36	0.00*	0.00*	78.53	0.00*	0.00*
	$r \leq 1$	19.15	0.00*	0.00*	35.16	0.00*	0.00*
	$r \leq 2$	16.01	0.00*	0.00*	16.01	0.00*	0.00*
TAN	$r=0$	62.44	0.00*	0.00*	85.27	0.00*	0.00*
	$r \leq 1$	16.29	0.02*	0.02	22.83	0.00*	0.00*
	$r \leq 2$	6.54	0.01*	0.01	6.54	0.01*	0.01
ZAM	$r=0$	25.25	0.01*	0.01	46.00	0.00*	0.00*
	$r \leq 1$	12.67	0.08	0.08	20.75	0.00*	0.00*
	$r \leq 2$	8.08	0.00	0.00	8.08	0.00*	0.00*

Source: Derived using Eviews 7

Notes: Critical values for the trace statistic for $r=0$, $r \leq 1$ and $r \leq 2$ are 29.80, 15.49 and 3.84 at the 95% level of significance, and 35.46, 19.94 and 6.63 at the 99% level of significance, respectively.

- Critical values for the max-eigen statistic for $r=0$, $r \leq 1$ and $r \leq 2$ are 21.13, 14.26 and 3.84 at the 95% level of significance, and 25.86, 18.52 and 6.63 at the 99% level of significance, respectively.
- * Indicates the presence of at least 1, 2, 3, or 4 cointegrating vectors.

Table D.2.2: Cointegration Tests- Interest Rate Channel

Country	Rank	Max-Eigen			Trace		
		Statistic	Prob. (95%)	Prob. (99%)	Statistic	Prob. (95%)	Prob. (99%)
LES	$r=0$	53.41	0.00*	0.00*	112.91	0.00*	0.00*
	$r \leq 1$	28.02	0.00*	0.00*	59.50	0.00*	0.00*
	$r \leq 2$	21.17	0.00*	0.00*	31.48	0.00*	0.00*
	$r \leq 3$	10.30	0.00*	0.00*	10.30	0.00*	0.00*
RSA	$r=0$	45.36	0.00*	0.00*	101.94	0.00*	0.00*
	$r \leq 1$	31.26	0.00*	0.00*	56.58	0.00*	0.00*
	$r \leq 2$	15.63	0.03*	0.03	25.32	0.00*	0.00*
	$r \leq 3$	9.69	0.00*	0.00	9.69	0.00*	0.00*
SWA	$r=0$	44.32	0.00*	0.00*	116.43	0.00*	0.00*
	$r \leq 1$	38.71	0.00*	0.00*	72.10	0.00*	0.00*
	$r \leq 2$	18.47	0.01*	0.01	33.39	0.00*	0.00*
	$r \leq 3$	14.92	0.00*	0.00	14.92	0.00*	0.00*
TAN	$r=0$	67.97	0.00*	0.00*	119.00	0.00*	0.00*
	$r \leq 1$	27.17	0.00*	0.00*	51.04	0.00*	0.00*
	$r \leq 2$	16.75	0.01*	0.01	23.87	0.00*	0.00*
	$r \leq 3$	7.12	0.00*	0.00	7.12	0.00*	0.00*
ZAM	$r=0$	40.74	0.00*	0.00*	76.14	0.00*	0.00*
	$r \leq 1$	20.60	0.05	0.05	35.40	0.01*	0.01
	$r \leq 2$	8.16	0.36	0.36	14.80	0.06	0.06
	$r \leq 3$	6.64	0.00	0.00	6.64	0.00	0.00

Source: Derived using Eviews 7

Notes: Critical values for the trace statistic for $r=0$, $r \leq 1$, $r \leq 2$, and $r \leq 3$ are 47.86, 29.80, 15.49 and 3.84 at the 95% level of significance, and 54.68, 35.46, 19.94 and 6.63 at the 99% level of significance, respectively.

- Critical values for the max-eigen statistic for $r=0$, $r \leq 1$, $r \leq 2$, and $r \leq 3$ are 27.58, 21.13, 14.26 and 3.84 at the 95% level of significance, and 32.71, 25.86, 18.52 and 6.63 at the 99% level of significance, respectively.
- * Indicates the presence of at least 1, 2, 3, or 4 cointegrating vectors.

Table D.2.3: Cointegration Tests- Exchange Rate Channel

Country	Rank	Max-Eigen			Trace		
		Statistic	Prob. (95%)	Prob. (99%)	Statistic	Prob. (95%)	Prob. (99%)
DRC	$r=0$	51.89	0.00*	0.00*	101.16	0.00*	0.00*
	$r \leq 1$	30.21	0.00*	0.00*	49.27	0.00*	0.00*
	$r \leq 2$	17.49	0.01*	0.01	19.06	0.01*	0.01
	$r \leq 3$	1.56	0.21	0.21	1.56	0.21	0.21
LES	$r=0$	52.19	0.00*	0.00*	104.79	0.00*	0.00*
	$r \leq 1$	24.09	0.02*	0.02	52.60	0.00*	0.00*
	$r \leq 2$	17.95	0.01*	0.01	28.51	0.00*	0.00*
	$r \leq 3$	10.56	0.00*	0.00	10.56	0.00*	0.00*
MOZ	$r=0$	44.49	0.00*	0.00*	87.67	0.00*	0.00*
	$r \leq 1$	24.87	0.01*	0.01	43.18	0.00*	0.00*
	$r \leq 2$	11.45	0.13	0.13	18.31	0.01*	0.01
	$r \leq 3$	6.87	0.00	0.00	6.87	0.00*	0.00
RSA	$r=0$	39.13	0.00*	0.00*	103.48	0.00*	0.00*
	$r \leq 1$	30.48	0.00*	0.00*	64.34	0.00*	0.00*
	$r \leq 2$	21.67	0.00*	0.00*	33.87	0.00*	0.00*
	$r \leq 3$	12.20	0.00*	0.00*	12.20	0.00*	0.00*
SWA	$r=0$	47.45	0.00*	0.00*	102.58	0.00*	0.00*
	$r \leq 1$	23.50	0.02*	0.02	55.13	0.00*	0.00*
	$r \leq 2$	17.90	0.01*	0.01	31.63	0.00*	0.00*
	$r \leq 3$	13.73	0.00*	0.00	13.73	0.00*	0.00*
TAN	$r=0$	71.94	0.00*	0.00*	115.68	0.00*	0.00*
	$r \leq 1$	27.55	0.00*	0.00*	43.75	0.00*	0.00*
	$r \leq 2$	10.10	0.20	0.20	16.20	0.03*	0.03
	$r \leq 3$	6.09	0.01	0.01	6.09	0.01*	0.01
ZAM	$r=0$	26.79	0.06	0.06	56.32	0.00*	0.00*
	$r \leq 1$	14.39	0.33	0.33	29.53	0.05	0.05
	$r \leq 2$	9.00	0.28	0.28	15.13	0.05	0.05
	$r \leq 3$	6.13	0.01	0.01	6.13	0.01	0.01

Source: Derived using Eviews 7

Notes: Critical values for the trace statistic for $r=0$, $r \leq 1$, $r \leq 2$, and $r \leq 3$ are 47.86, 29.80, 15.49 and 3.84 at the 95% level of significance, and 54.68, 35.46, 19.94 and 6.63 at the 99% level of significance, respectively.

- Critical values for the max-eigen statistic for $r=0$, $r \leq 1$, $r \leq 2$, and $r \leq 3$ are 27.58, 21.13, 14.26 and 3.84 at the 95% level of significance, and 32.71, 25.86, 18.52 and 6.63 at the 99% level of significance, respectively.
- *Indicates the presence of at least 1, 2, 3, or 4 cointegrating vectors.

Table D.2.4: Cointegration Tests- Credit Channel

Country	Rank	Max-Eigen			Trace		
		Statistic	Prob. (95%)	Prob. (99%)	Statistic	Prob. (95%)	Prob. (99%)
LES	$r = 0$	44.77	0.00*	0.00*	80.02	0.00*	0.00*
	$r \leq 1$	18.06	0.13	0.13	35.26	0.01*	0.01*
	$r \leq 2$	16.81	0.02	0.02	17.20	0.03*	0.03*
	$r \leq 3$	0.39	0.53	0.53	0.39	0.53	0.53
MOZ	$r = 0$	30.42	0.02*	0.02	63.67	0.00*	0.00*
	$r \leq 1$	23.18	0.02*	0.02	33.24	0.01*	0.01
	$r \leq 2$	7.02	0.48*	0.48	10.06	0.27	0.27
	$r \leq 3$	3.03	0.08*	0.08	3.03	0.08	0.08
RSA	$r = 0$	56.60	0.00*	0.00*	103.68	0.00*	0.00*
	$r \leq 1$	29.57	0.00*	0.00*	47.08	0.00*	0.00*
	$r \leq 2$	12.90	0.08	0.08	17.51	0.02*	0.02
	$r \leq 3$	4.61	0.03	0.03	4.61	0.03*	0.03
SWA	$r = 0$	55.03	0.00*	0.00*	154.24	0.00*	0.00*
	$r \leq 1$	38.38	0.00*	0.00*	99.20	0.00*	0.00*
	$r \leq 2$	32.53	0.00*	0.00*	60.82	0.00*	0.00*
	$r \leq 3$	28.29	0.00*	0.00*	28.29	0.00*	0.00*

Source: Derived using Eviews 7

Notes: Critical values for the trace statistic for $r=0$, $r \leq 1$, $r \leq 2$, and $r \leq 3$ are 47.86, 29.80, 15.49 and 3.84 at the 95% level of significance, and 54.68, 35.46, 19.94 and 6.63 at the 99% level of significance, respectively.

- Critical values for the max-eigen statistic for $r=0$, $r \leq 1$, $r \leq 2$, and $r \leq 3$ are 27.58, 21.13, 14.26 and 3.84 at the 95% level of significance, and 32.71, 25.86, 18.52 and 6.63 at the 99% level of significance, respectively.
- * Indicates the presence of at least 1, 2, 3, or 4 cointegrating vectors.

APPENDIX E

RESULTS FOR LAG SELECTION ANALYSIS

Table E.1: Angola

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	44.65	NA	1.37e-05	-2.68	-2.55	-2.64
1	70.32	44.71	4.68e-06	-3.76	-3.21	-3.58
2	81.68	17.59	4.10e-06	-3.91	-2.94	-3.59
3	82.99	1.77	7.06e-06	-3.41	-2.03	-2.96
4	119.56	42.46*	1.31e-06*	-5.19*	-3.39*	-4.60*
Interest Rate Channel						
0	-153.35	NA	0.30	10.15	10.34	10.21
1	-112.24	68.96	0.06	8.53	9.45	8.83
2	-65.97	65.68	0.00	6.57	8.24	7.12
3	-50.92	17.47	0.01	6.64	9.04	7.42
4	15.53	60.02*	0.00*	3.38*	6.53*	4.40*
Exchange Rate Channel						
0	16.21	NA	5.35e-06	-0.78	-0.60	-0.72
1	118.33	171.30	2.09e-08	-6.34	-5.41	-6.04
2	147.60	41.54	9.39e-09	-7.20	-5.53	-6.65
3	179.85	37.45	3.83e-09	-8.24	-5.84	-7.46
4	265.50	77.36*	5.91e-11*	-12.74*	-9.59*	-11.71*
Credit Channel						
0	32.44	NA	1.88e-06	-1.83	-1.65	-1.77
1	126.54	157.82	1.23e-08	-6.87	-5.94	-6.57
2	145.21	26.50	1.10e-08	-7.04	-5.38	-6.50
3	159.89	17.04	1.39e-08	-6.96	-4.55	-6.17
4	244.65	76.56*	2.27e-10*	-11.39*	-8.25*	-10.37*

Source: Derived using Eviews 7

Notes: * indicates lag order selected by the criterion

- LR = sequential modified LR test statistic (each test at 5% level); FPE = Final Prediction Error; AIC = Akaike information criterion; SC = Schwarz information criterion; HQ = Hannan-Quinn Information Criterion
- These definitions apply for all analyses from here on

Table E.2: Botswana

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	72.55	NA	4.21e-06	-3.86	-3.73	-3.81
1	106.50	60.35	1.06e-06	-5.25	-4.72*	-5.06
2	120.29	22.20	8.19e-07	-5.51	-4.59	-5.19*
3	124.98	6.78	1.07e-06	-5.27	-3.95	-4.81
4	140.82	20.23*	7.77e-07*	-5.65*	-3.94	-5.05
Interest Rate Channel						
0	55.70	NA	6.65e-07	-2.87	-2.69	-2.81
1	106.01	86.64	9.95e-08	-4.77	-3.89*	-4.47*
2	124.25	27.35*	9.11e-08*	-4.90	-3.31	-4.35
3	141.38	21.89	9.39e-08	-4.96	-2.67	-4.16
4	160.55	20.23	9.51e-08	-5.14*	-2.15	-4.09
Exchange Rate Channel						
0	119.93	NA	1.87e-08	-6.44	-6.26	-6.37
1	160.68	70.17	4.77e-09	-7.81	-6.93*	-7.50*
2	180.98	30.44*	3.90e-09*	-8.05*	-6.47	-7.50
3	188.96	10.20	6.68e-09	-7.60	-5.32	-6.81
4	208.72	20.85	6.55e-09	-7.81	-4.82	-6.77
Credit Channel						
0	135.52	NA	3.16e-09	-8.22	-8.03	-8.15
1	171.19	60.19	9.35e-10	-9.44	-8.53*	-9.14
2	190.77	28.15	7.87e-10	-9.67	-8.02	-9.12
3	202.34	13.73	1.19e-09	-9.39	-7.01	-8.60
4	239.90	35.21*	4.12e-10*	-10.74*	-7.62	-9.71*

Source: Derived using Eviews 7

Table E.3: The Democratic Republic of Congo

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-304.86	NA	0.366	7.51	7.60	7.54
1	-285.30	37.21	0.28	7.25	7.60	7.39
2	-278.22	12.94	0.30	7.30	7.91	7.54
3	-271.41	11.97	0.31	7.35	8.23	7.70
4	-196.43	126.18*	0.06*	5.74*	6.89*	6.20*
Exchange Rate Channel						
0	-278.12	NA	0.01	6.88	6.70*	6.93
1	-246.32	59.72	0.01	6.49	7.08	6.73
2	-232.95	23.80	0.01	6.56	7.62	6.98
3	-220.03	21.73	0.01	6.63	8.16	7.25
4	-144.14	120.32*	0.00*	5.17*	7.17	5.97*
Credit Channel						
0	-234.43	NA	1.32	11.63	11.80	11.69
1	-207.83	46.70	0.79	11.11	11.95	11.42
2	-177.31	47.64	0.40	10.40	11.91	10.95
3	-142.62	47.39	0.17	9.49	11.67	10.28
4	-97.05	53.35*	0.04*	8.05*	10.89*	9.09*

Source: Derived using Eviews 7

Table E.4: Lesotho

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	195.94	NA	2.26e-06	-4.49	-4.40	-4.45
1	232.28	69.30	1.20e-06	-5.12	-4.78*	-4.98*
2	240.39	14.91	1.22e-06	-5.10	-4.50	-4.86
3	242.91	4.45	1.42e-06	-4.95	-4.09	-4.61
4	267.76	42.18*	9.89e-07*	-5.32*	-4.21	-4.87
Interest Rate Channel						
0	-87.23	NA	9.81e-05	2.12	2.23	2.17
1	-46.34	77.01	5.50e-05	1.54	2.11*	1.77*
2	-33.31	23.33	5.91e-05	1.61	2.64	2.02
3	-28.47	8.22	7.71e-05	1.87	3.35	2.47
4	13.95	68.08*	4.22e-05*	1.26*	3.20	2.04
Exchange Rate Channel						
0	365.15	NA	2.65e-09	-8.40	-8.28	-8.35
1	404.68	74.47	1.53e-09	-8.95	-8.37*	-8.72*
2	417.68	23.27	1.65e-09	-8.88	-7.85	-8.46
3	426.48	14.93	1.96e-09	-8.71	-7.22	-8.11
4	454.89	45.60*	1.48e-09*	-8.99*	-7.06	-8.22
Credit Channel						
0	195.78	NA	3.36e-09	-8.16	-8.00	-8.10
1	244.20	86.54	8.47e-10	-9.54	-8.75*	-9.24*
2	254.50	16.64	1.10e-09	-9.30	-7.88	-8.76
3	266.09	16.78	1.38e-09	-9.11	-7.06	-8.34
4	298.86	41.82*	7.30e-10*	-9.82*	-7.15	-8.82

Source: Derived using Eviews 7

Table E.5: Madagascar

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-260.65	NA	0.03	5.12	5.20	5.15
1	148.54	786.60	1.42e-05	-2.65	-2.34	-2.53
2	188.10	73.74	7.83e-06	-3.24	-2.71*	-3.03*
3	196.17	14.57	7.98e-06	-3.23	-2.46	-2.91
4	208.99	22.41*	7.43e-06*	-3.30*	-2.30	-2.90
Interest Rate Channel						
0	1111.04	NA	5.43e-15	-21.50	-21.40	-21.45
1	1548.26	831.98	1.52e-18	-29.67	-29.16	-29.47
2	1589.92	76.04	9.26e-19*	-30.17*	-29.25*	-29.80*
3	1599.72	17.13	1.05e-18	-30.05	-28.72	-29.51
4	1618.91	32.03*	9.93e-19	-30.11	-28.37	-29.41
Exchange Rate Channel						
0	-166.69	NA	0.00	3.314	3.42	3.35
1	243.92	781.34	1.52e-07	-4.35	-3.84	-4.14
2	289.99	84.09*	8.49e-08*	-4.93*	-4.01*	-4.56*
3	300.92	19.10	9.40e-08	-4.83	-3.50	-4.29
4	315.79	24.83	9.68e-08	-4.81	-3.07	-4.11
Credit Channel						
0	-26.43	NA	0.00	2.90	3.10	2.94
1	81.70	164.78	3.42e-08	-5.88	-4.88	-5.66
2	103.76	25.21	2.34e-08	-6.45	-4.66	-6.06
3	139.23	27.02*	6.68e-09*	-8.31*	-5.72*	-7.75*

Source: Derived using Eviews 7

Table E.6: Malawi

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-203.51	NA	0.01	3.72	3.79	3.75
1	-17.65	358.32	0.00	0.53	0.83	0.65
2	17.80	66.43	0.00	0.06	0.57	0.26
3	40.25	40.86*	0.00*	-0.18*	0.55*	0.11*
4	47.04	11.98	0.00	-0.14	0.81	0.24
Interest Rate Channel						
0	-962.44	NA	429.18	17.41	17.51	17.45
1	-559.33	769.91	0.40	10.44	10.93	10.64
2	-517.33	77.17	0.25	9.97	10.85*	10.34
3	-488.40	51.09*	0.20*	9.74*	11.01	10.25*
4	-475.26	22.25	0.21	9.79	11.45	10.46
Exchange Rate Channel						
0	-80.47	NA	5.38e-05	1.52	1.62	1.56
1	114.07	371.57	2.16e-06	-1.69	-1.21	-1.50
2	152.55	70.71	1.44e-06	-2.10	-1.22*	-1.74
3	183.73	55.06*	1.10e-06*	-2.37*	-1.10	-1.86*
4	197.28	22.95	1.16e-06	-2.33	-0.67	-1.66
Credit Channel						
0	-1637.44	NA	5.41e+15	47.58	47.71	47.63
1	-1438.01	369.95	2.66e+13	42.26	42.91	42.52
2	-1379.04	102.56	7.68e+12	41.01	42.18*	41.48*
3	-1360.36	30.33*	7.20e+12*	40.94*	42.62	41.60
4	-1347.51	19.37	8.07e+12	41.03	43.23	41.90

Source: Derived using Eviews 7

Table E.7: Mauritius

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	205.44	NA	5.21e-07	-5.95	-5.85	-5.91
1	237.44	60.24	2.65e-07	-6.63	-6.23*	-6.47
2	240.93	6.25	3.12e-07	-6.46	-5.78	-6.19
3	249.72	14.99	3.15e-07	-6.46	-5.48	-6.07
4	284.97	57.02*	1.47e-07*	-7.23*	-5.96	-6.73*
Interest Rate Channel						
0	110.33	NA	5.15e-07	-3.12	-2.99	-3.07
1	217.38	198.37	3.54e-08	-5.80	-5.15*	-5.54*
2	232.46	26.16	3.66e-08	-5.77	-4.60	-5.31
3	243.38	17.65	4.30e-08	-5.62	-3.93	-4.95
4	282.59	58.81*	2.23e-08*	-6.31*	-4.09	-5.43
Exchange Rate Channel						
0	339.24	NA	6.14e-10	-9.86	-9.72	-9.80
1	377.88	71.59	3.16e-10	-10.52	-9.87*	-10.26
2	386.89	15.63	3.90e-10	-10.32	-9.14	-9.85
3	409.02	35.79	3.30e-10	-10.50	-8.80	-9.82
4	447.66	57.94*	1.74e-10*	-11.16*	-8.94	-10.28*
Credit Channel						
0	349.01	NA	3.96e-10	-10.29	-10.16	-10.24
1	401.78	97.66	1.32e-10	-11.39	-10.73*	-11.13
2	406.59	8.32	1.86e-10	-11.06	-9.87	-10.59
3	416.86	16.55	2.23e-10	-10.89	-9.18	-10.21
4	472.24	82.65*	7.07e-11*	-12.06*	-9.82	-11.18*

Source: Derived using Eviews 7

Table E.8: Mozambique

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	122.57	NA	8.75e-07	-5.43	-5.31	-5.39
1	146.25	43.05	4.50e-07	-6.10	-5.61*	-5.92
2	159.00	21.45	3.82e-07	-6.27	-5.42	-5.96
3	177.09	27.96*	2.57e-07*	-6.69*	-5.47	-6.23*
4	181.34	5.98	3.28e-07	-6.47	-4.89	-5.88
Interest Rate Channel						
0	4.567	NA	1.15e-05	-0.02	0.14	0.03
1	178.71	308.71	8.69e-09	-7.21	-6.40	-6.91
2	213.48	55.32	3.77e-09	-8.07	-6.61	-7.53
3	249.05	50.12*	1.63e-09*	-8.96	-6.85*	-8.17*
4	266.68	21.63	1.67e-09	-9.03*	-6.27	-8.01
Exchange Rate Channel						
0	181.73	NA	3.64e-09	-8.08	-7.92*	-8.02
1	209.92	49.97	2.10e-09	-8.63	-7.82	-8.33*
2	227.99	28.74	1.95e-09	-8.73	-7.27	-8.18
3	251.55	33.19*	1.45e-09*	-9.07*	-6.96	-8.29
4	262.11	12.97	2.05e-09	-8.82	-6.07	-7.80
Credit Channel						
0	66.44	NA	5.18e-07	-3.12	-2.95*	-3.06
1	90.63	42.33	3.46e-07	-3.53	-2.69	-3.23
2	110.10	30.18	2.98e-07	-3.70	-2.18	-3.15
3	135.30	34.02*	2.01e-07*	-4.16*	-1.97	-3.37*
4	146.53	12.92	2.92e-07	-3.93	-1.05	-2.89

Source: Derived using Eviews 7

Table E.9: Namibia

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	33.60	NA	8.01e-06	-3.22	-3.07	-3.19
1	55.82	35.07*	2.03e-06	-4.61	-4.01*	-4.51
2	62.19	8.05	2.93e-06	-4.33	-3.29	-4.15
3	71.59	8.90	3.58e-06	-4.37	-2.88	-4.12
4	92.55	13.23	1.79e-06*	-5.63*	-3.69	-5.30*
Interest Rate Channel						
0	35.99	NA	4.79e-07	-3.19	-3.00	-3.16
1	61.92	38.89*	1.85e-07*	-4.19	-3.19*	-3.99
2	77.31	16.93	2.49e-07	-4.13	-2.33	-3.78
3	98.18	14.60	3.16e-07	-4.61*	-2.02	-4.11*
Exchange Rate Channel						
0	64.87	NA	2.67e-08	-6.08	-5.88	-6.04
1	90.00	37.70*	1.12e-08	-7.00	-6.00	-6.80
2	113.32	25.64	6.80e-09	-7.73	-5.93	-7.38
3	141.40	19.66	4.19e-09*	-8.94*	-6.35*	-8.43*

Source: Derived using Eviews 7

Table E.8: South Africa

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	618.70	NA	4.49e-09	-10.71	-10.64	-10.68
1	663.16	85.84	2.42e-09	-11.32	-11.04*	-11.21*
2	672.64	17.79	2.40e-09	-11.33	-10.83	-11.13
3	677.99	9.78	2.56e-09	-11.27	-10.55	-10.98
4	692.27	25.33*	2.34e-09*	-11.36*	-10.43	-10.98
Interest Rate Channel						
0	238.75	NA	1.98e-07	-4.08	-3.99	-4.04
1	298.84	114.95	9.21e-08	-4.85	-4.37*	-4.65*
2	313.20	26.48	9.48e-08	-4.82	-3.96	-4.47
3	332.54	34.30	8.97e-08	-4.88	-3.64	-4.37
4	356.78	41.31*	7.81e-08*	-5.02*	-3.39	-4.36
Exchange Rate Channel						
0	745.67	NA	2.94e-11	-12.90	-12.80	-12.86
1	795.48	95.30	1.63e-11	-13.49	-13.01*	-13.29*
2	814.27	34.63	1.56e-11	-13.53	-12.67	-13.19
3	827.59	23.64	1.64e-11	-13.49	-12.25	-12.98
4	848.49	35.61*	1.51e-11*	-13.57*	-11.95	-12.91
Credit Channel						
0	745.67	NA	2.94e-11	-12.90	-12.80	-12.86
1	795.48	95.30	1.63e-11	-13.49	-13.01*	-13.29*
2	814.27	34.63	1.56e-11	-13.53	-12.67	-13.19
3	827.59	23.64	1.64e-11	-13.49	-12.25	-12.98
4	848.49	35.61*	1.51e-11*	-13.57*	-11.95	-12.91

Source: Derived using Eviews 7

Table E.11: Swaziland

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	337.05	NA	4.37e-07	-6.13	-6.05*	-6.10*
1	348.42	21.92	4.19e-07	-6.17	-5.88	-6.05
2	354.69	11.73	4.40e-07	-6.12	-5.60	-5.91
3	359.69	9.08	4.74e-07	-6.05	-5.31	-5.75
4	390.13	53.61*	3.21e-07*	-6.44*	-5.48	-6.05
Interest Rate Channel						
0	-56.57	NA	3.57e-05	1.11	1.21*	1.15*
1	-42.23	27.35	3.68e-05	1.14	1.63	1.34
2	-30.88	20.82	4.02e-05	1.23	2.12	1.59
3	-23.85	12.39	4.75e-05	1.39	2.67	1.91
4	16.80	68.62*	3.04e-05*	0.94*	2.62	1.62
Exchange Rate Channel						
0	466.47	NA	2.43e-09	-8.48	-8.39*	-8.44*
1	479.43	24.73	2.57e-09	-8.43	-7.94	-8.23
2	489.32	18.15	2.87e-09	-8.32	-7.43	-7.96
3	500.78	20.19	3.13e-09	-8.23	-6.95	-7.71
4	534.26	56.52*	2.29e-09*	-8.55*	-6.88	-7.87
Credit Channel						
0	327.62	NA	2.43e-10*	-10.79*	-10.65*	-10.73*
1	342.32	26.95	2.54e-10	-10.74	-10.04	-10.47
2	351.98	16.42	3.16e-10	-10.53	-9.28	-10.04
3	365.86	21.75	3.46e-10	-10.46	-8.65	-9.75
4	388.46	32.39*	2.87e-10	-10.68	-8.31	-9.75

Source: Derived using Eviews 7

Table E.12: Tanzania

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	208.72	NA	3.01e-06	-4.20	-4.12	-4.17
1	229.62	40.08	2.37e-06	-4.44	-4.12*	-4.31
2	246.31	31.01	2.02e-06	-4.60	-4.04	-4.37
3	249.16	5.12	2.30e-06	-4.47	-3.68	-4.15
4	289.77	70.44*	1.21e-06*	-5.12*	-4.09	-4.70*
Interest Rate Channel						
0	-294.01	NA	0.01	6.08	6.19	6.12
1	-243.35	96.16	0.00	5.37	5.90	5.59
2	-199.05	80.46	0.00	4.80	5.75*	5.18
3	-186.55	21.69	0.00	4.87	6.24	5.42
4	-141.48	74.50*	0.00*	4.27*	6.07	5.00*
Exchange Rate Channel						
0	291.00	NA	3.36e-08	-5.86	-5.75*	-5.81
1	325.52	65.51	2.30e-08	-6.23	-5.71	-6.02
2	346.76	38.59	2.07e-08	-6.34	-5.39	-5.96
3	357.16	18.04	2.33e-08	-6.23	-4.85	-5.67
4	416.96	98.85*	9.62e-09*	-7.12*	-5.33	-6.40*

Source: Derived using Eviews 7

Table E.13: Zambia

Monetary Aggregate Channel						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	173.99	NA	1.39e-07	-7.28	-7.13	-7.23
1	196.53	41.25	7.81e-08	-7.85	-7.38	-7.67
2	216.94	34.74	4.83e-08	-8.34	-7.51	-8.03
3	245.73	45.33	2.11e-08	-9.18	-7.99*	-8.73
4	262.64	24.46*	1.54e-08*	-9.52*	-7.98	-8.94*
Interest Rate Channel						
0	-50.40	NA	0.000241	3.02	3.20	3.08
1	18.23	118.21	1.31e-05	0.10	0.98	0.40
2	48.95	46.07	5.98e-06	-0.72	0.86	-0.17
3	82.28	42.59	2.50e-06	-1.68	0.60	-0.88
4	115.51	35.07*	1.16e-06*	-2.64*	0.35*	-1.59*
Exchange Rate Channel						
0	221.21	NA	1.14e-09	-9.24	-9.08*	-9.18
1	248.92	49.53	6.93e-10	-9.74	-8.95	-9.44
2	275.98	43.76	4.40e-10	-10.21	-8.79	-9.68
3	308.08	46.44	2.31e-10	-10.90	-8.85	-10.13
4	331.36	29.72*	1.83e-10*	-11.21*	-8.53	-10.20*

Source: Derived using Eviews 7

APPENDIX F

RESULTS FOR GRANGER CAUSALITY TESTS

Table F.1: Angola

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	5.83	0.21	GDP does not granger cause M	4	11.17	0.02 ^a
INF does not granger cause GDP	4	24.34	0.00 ^a	M does not granger cause GDP	4	2.01	0.73
M does not granger cause INF	4	8.70	0.07 ^c	INF does not granger cause M	4	4.81	0.30
Interest Rate Channel							
GDP does not granger cause INF	4	4.23	0.37	INT does not granger cause INF	4	11.35	0.02 ^a
INF does not granger cause GDP	4	10.83	0.02 ^a	INF does not granger cause INT	4	4.15	0.38
M does not granger cause INF	4	6.42	0.17	INT does not granger cause GDP	4	23.53	0.00 ^a
GDP does not granger cause M	4	41.60	0.00 ^a	GDP does not granger cause INT	4	9.63	0.05 ^b
M does not granger cause GDP	4	2.55	0.63	M does not granger cause INT	4	16.26	0.00 ^a
INF does not granger cause M	4	6.60	0.15	INT does not granger cause M	4	25.12	0.00 ^a
Exchange Rate Channel							
GDP does not granger cause INF	4	6.60	0.16	RER does not granger cause INF	4	5.99	0.19
INF does not granger cause GDP	4	7.59	0.11	INF does not granger cause RER	4	49.62	0.00 ^a
M does not granger cause INF	4	4.65	0.32	RER does not granger cause GDP	4	102.12	0.00 ^a
GDP does not granger cause M	4	84.63	0.00 ^a	GDP does not granger cause RER	4	36.06	0.00 ^a
M does not granger cause GDP	4	7.32	0.12	M does not granger cause RER	4	21.80	0.00 ^a
INF does not granger cause M	4	46.46	0.00 ^a	RER does not granger cause M	4	50.58	0.00 ^a
Credit Channel							
GDP does not granger cause INF	4	6.08	0.19	CP does not granger cause INF	4	18.45	0.00 ^a
INF does not granger cause GDP	4	8.67	0.07 ^c	INF does not granger cause CP	4	7.81	0.09 ^c
M does not granger cause INF	4	16.71	0.00 ^a	CP does not granger cause GDP	4	52.45	0.00 ^a
GDP does not granger cause M	4	56.55	0.00 ^a	GDP does not granger cause CP	4	6.84	0.14
M does not granger cause GDP	4	6.10	0.19	M does not granger cause CP	4	3.22	0.52
INF does not granger cause M	4	42.71	0.00 ^a	CP does not granger cause M	4	41.93	0.00 ^a

Source: Derived using Eviews 7

Notes: a, b, or c denotes rejection of the null hypothesis at the 1%, 5% or 10% level of significance, respectively

- These definitions apply for all the tests

Table F.2: Botswana

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	3.26	0.51	GDP does not granger cause M	4	0.18	0.99
INF does not granger cause GDP	4	4.32	0.36	M does not granger cause GDP	4	1.36	0.85
M does not granger cause INF	4	0.45	0.98	INF does not granger cause M	4	4.20	0.38
Interest Rate Channel							
GDP does not granger cause INF	2	1.09	0.58	INT does not granger cause INF	2	0.49	0.78
INF does not granger cause GDP	2	1.80	0.41	INF does not granger cause INT	2	8.42	0.01 ^b
M does not granger cause INF	2	0.35	0.84	INT does not granger cause GDP	2	2.74	0.25
GDP does not granger cause M	2	0.16	0.92	GDP does not granger cause INT	2	6.67	0.03 ^b
M does not granger cause GDP	2	0.73	0.69	M does not granger cause INT	2	2.79	0.25
INF does not granger cause M	2	2.44	0.29	INT does not granger cause M	2	1.99	0.37
Exchange Rate Channel							
GDP does not granger cause INF	3	2.60	0.46	RER does not granger cause INF	3	2.43	0.49
INF does not granger cause GDP	3	1.98	0.57	INF does not granger cause RER	3	1.08	0.78
M does not granger cause INF	3	0.97	0.81	RER does not granger cause GDP	3	1.21	0.75
GDP does not granger cause M	3	0.40	0.93	GDP does not granger cause RER	3	4.95	0.17
M does not granger cause GDP	3	2.56	0.46	M does not granger cause RER	3	5.47	0.14
INF does not granger cause M	3	2.55	0.47	RER does not granger cause M	3	0.99	0.80
Credit Channel							
GDP does not granger cause INF	4	1.92	0.75	CP does not granger cause INF	4	3.44	0.49
INF does not granger cause GDP	4	0.25	0.99	INF does not granger cause CP	4	0.15	0.99
M does not granger cause INF	4	6.18	0.19	CP does not granger cause GDP	4	6.42	0.17
GDP does not granger cause M	4	5.73	0.22	GDP does not granger cause CP	4	12.56	0.01 ^a
M does not granger cause GDP	4	1.46	0.83	M does not granger cause CP	4	7.12	0.13
INF does not granger cause M	4	5.22	0.26	CP does not granger cause M	4	14.39	0.01 ^b

Source: Derived using Eviews 7

Table F.3: The Democratic Republic of Congo

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	5.79	0.21	GDP does not granger cause M	4	17.06	0.00 ^a
INF does not granger cause GDP	4	24.43	0.00 ^a	M does not granger cause GDP	4	2.39	0.66
M does not granger cause INF	4	9.07	0.06 ^c	INF does not granger cause M	4	0.85	0.93
Exchange Rate Channel							
GDP does not granger cause INF	4	4.89	0.30	RER does not granger cause INF	4	4.31	0.36
INF does not granger cause GDP	4	27.26	0.00 ^a	INF does not granger cause RER	4	15.87	0.00 ^a
M does not granger cause INF	4	7.52	0.11	RER does not granger cause GDP	4	5.91	0.20
GDP does not granger cause M	4	24.17	0.00 ^a	GDP does not granger cause RER	4	6.88	0.14
M does not granger cause GDP	4	2.35	0.67	M does not granger cause RER	4	8.36	0.08 ^c
INF does not granger cause M	4	2.73	0.60	RER does not granger cause M	4	16.01	0.00 ^a
Credit Channel							
GDP does not granger cause INF	4	1.34	0.85	CP does not granger cause INF	4	1.43	0.84
INF does not granger cause GDP	4	12.60	0.01 ^a	INF does not granger cause CP	4	6.07	0.19
M does not granger cause INF	4	4.84	0.30	CP does not granger cause GDP	4	8.42	0.08 ^c
GDP does not granger cause M	4	15.55	0.00 ^a	GDP does not granger cause CP	4	15.18	0.00 ^a
M does not granger cause GDP	4	10.23	0.04 ^b	M does not granger cause CP	4	3.73	0.44
INF does not granger cause M	4	4.40	0.35	CP does not granger cause M	4	16.21	0.00 ^a

Source: Derived using Eviews 7

Table F.4: Lesotho

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	23.29	0.00 ^a	GDP does not granger cause M	4	4.53	0.34
INF does not granger cause GDP	4	0.82	0.94	M does not granger cause GDP	4	10.40	0.03 ^b
M does not granger cause INF	4	2.17	0.70	INF does not granger cause M	4	2.75	0.60
Interest Rate Channel							
GDP does not granger cause INF	4	26.68	0.00 ^a	INT does not granger cause INF	4	10.36	0.03 ^b
INF does not granger cause GDP	4	1.13	0.89	INF does not granger cause INT	4	1.36	0.85
M does not granger cause INF	4	3.54	0.47	INT does not granger cause GDP	4	41.50	0.00 ^a
GDP does not granger cause M	4	2.87	0.58	GDP does not granger cause INT	4	4.60	0.33
M does not granger cause GDP	4	12.57	0.01 ^b	M does not granger cause INT	4	1.22	0.87
INF does not granger cause M	4	2.04	0.63	INT does not granger cause M	4	7.79	0.10
Exchange Rate Channel							
GDP does not granger cause INF	4	16.22	0.00 ^a	RER does not granger cause INF	4	9.84	0.04 ^b
INF does not granger cause GDP	4	0.95	0.92	INF does not granger cause RER	4	12.22	0.01 ^b
M does not granger cause INF	4	10.12	0.04 ^b	RER does not granger cause GDP	4	5.06	0.28
GDP does not granger cause M	4	0.81	0.94	GDP does not granger cause RER	4	1.80	0.77
M does not granger cause GDP	4	13.51	0.01 ^a	M does not granger cause RER	4	4.37	0.36
INF does not granger cause M	4	8.53	0.07 ^c	RER does not granger cause M	4	2.16	0.71
Credit Channel							
GDP does not granger cause INF	4	5.92	0.20	CP does not granger cause INF	4	3.53	0.47
INF does not granger cause GDP	4	0.90	0.92	INF does not granger cause CP	4	8.52	0.07 ^c
M does not granger cause INF	4	9.29	0.05 ^c	CP does not granger cause GDP	4	1.57	0.81
GDP does not granger cause M	4	11.43	0.02	GDP does not granger cause CP	4	9.65	0.04 ^b
M does not granger cause GDP	4	1.43	0.84	M does not granger cause CP	4	17.85	0.00 ^a
INF does not granger cause M	4	16.04	0.00 ^a	CP does not granger cause M	4	16.43	0.00 ^a

Source: Derived using Eviews 7

Table F.5: Madagascar

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	7.51	0.11	GDP does not granger cause M	4	6.58	0.16
INF does not granger cause GDP	4	11.13	0.03 ^b	M does not granger cause GDP	4	13.81	0.01 ^b
M does not granger cause INF	4	15.26	0.00 ^a	INF does not granger cause M	4	6.35	0.17
Interest Rate Channel							
GDP does not granger cause INF	2	0.05	0.98	INT does not granger cause INF	2	0.31	0.85
INF does not granger cause GDP	2	5.65	0.06 ^c	INF does not granger cause INT	2	0.34	0.84
M does not granger cause INF	2	12.65	0.00 ^a	INT does not granger cause GDP	2	2.63	0.27
GDP does not granger cause M	2	0.95	0.62	GDP does not granger cause INT	2	0.29	0.86
M does not granger cause GDP	2	8.10	0.02 ^b	M does not granger cause INT	2	0.24	0.89
INF does not granger cause M	2	6.12	0.04 ^b	INT does not granger cause M	2	1.14	0.57
Exchange Rate Channel							
GDP does not granger cause INF	2	0.80	0.67	RER does not granger cause INF	2	1.42	0.49
INF does not granger cause GDP	2	6.95	0.03 ^b	INF does not granger cause RER	2	6.62	0.04 ^b
M does not granger cause INF	2	12.38	0.00 ^a	RER does not granger cause GDP	2	2.21	0.33
GDP does not granger cause M	2	0.53	0.77	GDP does not granger cause RER	2	4.19	0.12
M does not granger cause GDP	2	12.04	0.00 ^a	M does not granger cause RER	2	12.45	0.00 ^a
INF does not granger cause M	2	7.19	0.03 ^b	RER does not granger cause M	2	1.38	0.50

Source: Derived using Eviews 7

Table F.6: Malawi

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	3	6.22	0.10	GDP does not granger cause M	3	0.50	0.92
INF does not granger cause GDP	3	7.33	0.06 ^c	M does not granger cause GDP	3	1.84	0.60
M does not granger cause INF	3	2.94	0.40	INF does not granger cause M	3	5.60	0.13
Interest Rate Channel							
GDP does not granger cause INF	3	7.44	0.06 ^c	INT does not granger cause INF	3	6.73	0.08 ^c
INF does not granger cause GDP	3	6.68	0.08 ^c	INF does not granger cause INT	3	4.88	0.18
M does not granger cause INF	3	2.01	0.57	INT does not granger cause GDP	3	3.78	0.29
GDP does not granger cause M	3	0.37	0.94	GDP does not granger cause INT	3	3.76	0.29
M does not granger cause GDP	3	2.63	0.45	M does not granger cause INT	3	3.57	0.31
INF does not granger cause M	3	4.57	0.21	INT does not granger cause M	3	3.92	0.27
Exchange Rate Channel							
GDP does not granger cause INF	3	7.44	0.11	RER does not granger cause INF	3	11.26	0.02 ^b
INF does not granger cause GDP	3	9.49	0.05 ^c	INF does not granger cause RER	3	3.76	0.44
M does not granger cause INF	3	2.03	0.73	RER does not granger cause GDP	3	2.96	0.57
GDP does not granger cause M	3	1.65	0.80	GDP does not granger cause RER	3	8.67	0.07 ^c
M does not granger cause GDP	3	4.75	0.31	M does not granger cause RER	3	2.96	0.56
INF does not granger cause M	3	7.90	0.09 ^c	RER does not granger cause M	3	5.45	0.24

Source: Derived using Eviews 7

Table F.7: Mauritius

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	2.14	0.70	GDP does not granger cause M	4	5.04	0.28
INF does not granger cause GDP	4	5.58	0.23	M does not granger cause GDP	4	7.76	0.10
M does not granger cause INF	4	4.11	0.39	INF does not granger cause M	4	0.17	0.99
Interest Rate Channel							
GDP does not granger cause INF	4	2.24	0.69	INT does not granger cause INF	4	1.08	0.89
INF does not granger cause GDP	4	2.75	0.59	INF does not granger cause INT	4	7.05	0.13
M does not granger cause INF	4	3.90	0.41	INT does not granger cause GDP	4	1.94	0.74
GDP does not granger cause M	4	5.56	0.23	GDP does not granger cause INT	4	0.92	0.92
M does not granger cause GDP	4	7.27	0.12	M does not granger cause INT	4	0.15	0.99
INF does not granger cause M	4	0.54	0.96	INT does not granger cause M	4	1.10	0.89
Exchange Rate Channel							
GDP does not granger cause INF	4	2.00	0.73	RER does not granger cause INF	4	12.81	0.01 ^b
INF does not granger cause GDP	4	4.74	0.31	INF does not granger cause RER	4	6.17	0.18
M does not granger cause INF	4	5.76	0.22	RER does not granger cause GDP	4	2.30	0.68
GDP does not granger cause M	4	2.37	0.66	GDP does not granger cause RER	4	1.80	0.77
M does not granger cause GDP	4	7.92	0.09 ^c	M does not granger cause RER	4	9.06	0.05 ^c
INF does not granger cause M	4	0.12	0.99	RER does not granger cause M	4	6.17	0.18
Credit Channel							
GDP does not granger cause INF	4	2.93	0.56	CP does not granger cause INF	4	8.76	0.06 ^c
INF does not granger cause GDP	4	7.27	0.12	INF does not granger cause CP	4	11.60	0.02 ^b
M does not granger cause INF	4	1.30	0.86	CP does not granger cause GDP	4	4.30	0.36
GDP does not granger cause M	4	2.66	0.61	GDP does not granger cause CP	4	24.22	0.00 ^a
M does not granger cause GDP	4	9.77	0.04 ^b	M does not granger cause CP	4	3.42	0.48
INF does not granger cause M	4	0.35	0.98	CP does not granger cause M	4	2.98	0.56

Source: Derived using Eviews 7

Table F.8: Mozambique

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	3	9.94	0.02 ^b	GDP does not granger cause M	3	7.42	0.06 ^c
INF does not granger cause GDP	3	7.77	0.05 ^c	M does not granger cause GDP	3	3.12	0.37
M does not granger cause INF	3	3.47	0.32	INF does not granger cause M	3	2.03	0.56
Interest Rate Channel							
GDP does not granger cause INF	3	8.36	0.04 ^b	INT does not granger cause INF	3	20.77	0.00 ^a
INF does not granger cause GDP	3	0.39	0.94	INF does not granger cause INT	3	1.29	0.73
M does not granger cause INF	3	4.88	0.18	INT does not granger cause GDP	3	3.53	0.32
GDP does not granger cause M	3	10.62	0.01 ^b	GDP does not granger cause INT	3	33.68	0.00 ^a
M does not granger cause GDP	3	5.22	0.15	M does not granger cause INT	3	5.45	0.14
INF does not granger cause M	3	0.99	0.80	INT does not granger cause M	3	1.73	0.63
Exchange Rate Channel							
GDP does not granger cause INF	3	4.18	0.24	RER does not granger cause INF	3	0.37	0.94
INF does not granger cause GDP	3	1.11	0.77	INF does not granger cause RER	3	0.09	0.99
M does not granger cause INF	3	5.64	0.13	RER does not granger cause GDP	3	1.42	0.70
GDP does not granger cause M	3	8.02	0.04 ^b	GDP does not granger cause RER	3	5.02	0.17
M does not granger cause GDP	3	3.81	0.28	M does not granger cause RER	3	0.11	0.99
INF does not granger cause M	3	0.92	0.82	RER does not granger cause M	3	8.30	0.04 ^b
Credit Channel							
GDP does not granger cause INF	3	4.46	0.21	CP does not granger cause INF	3	1.16	0.76
INF does not granger cause GDP	3	0.48	0.92	INF does not granger cause CP	3	3.69	0.30
M does not granger cause INF	3	1.25	0.74	CP does not granger cause GDP	3	2.50	0.47
GDP does not granger cause M	3	4.47	0.21	GDP does not granger cause CP	3	1.39	0.71
M does not granger cause GDP	3	7.16	0.07 ^c	M does not granger cause CP	3	2.12	0.55
INF does not granger cause M	3	2.74	0.43	CP does not granger cause M	3	3.75	0.29

Source: Derived using Eviews 7

Table F.9: Namibia

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	4.71	0.31	GDP does not granger cause M	4	3.07	0.54
INF does not granger cause GDP	4	7.35	0.12	M does not granger cause GDP	4	3.45	0.48
M does not granger cause INF	4	1.30	0.86	INF does not granger cause M	4	3.66	0.45
Interest Rate Channel							
GDP does not granger cause INF	3	0.73	0.86	INT does not granger cause INF	3	2.79	0.42
INF does not granger cause GDP	3	0.43	0.93	INF does not granger cause INT	3	10.09	0.02 ^b
M does not granger cause INF	3	2.35	0.50	INT does not granger cause GDP	3	1.06	0.78
GDP does not granger cause M	3	3.37	0.33	GDP does not granger cause INT	3	15.14	0.00 ^a
M does not granger cause GDP	3	0.21	0.97	M does not granger cause INT	3	4.19	0.24
INF does not granger cause M	3	1.37	0.71	INT does not granger cause M	3	3.08	0.37
Exchange Rate Channel							
GDP does not granger cause INF	3	7.74	0.05 ^c	RER does not granger cause INF	3	12.05	0.01 ^b
INF does not granger cause GDP	3	4.07	0.25	INF does not granger cause RER	3	3.07	0.37
M does not granger cause INF	3	4.87	0.18	RER does not granger cause GDP	3	6.71	0.08 ^c
GDP does not granger cause M	3	2.52	0.47	GDP does not granger cause RER	3	3.13	0.37
M does not granger cause GDP	3	4.10	0.25	M does not granger cause RER	3	5.71	0.12
INF does not granger cause M	3	6.78	0.07 ^c	RER does not granger cause M	3	9.37	0.02 ^b

Source: Derived using Eviews 7

Table F.10: South Africa

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	1.67	0.79	GDP does not granger cause M	4	4.01	0.40
INF does not granger cause GDP	4	0.32	0.99	M does not granger cause GDP	4	16.32	0.00 ^a
M does not granger cause INF	4	1.29	0.86	INF does not granger cause M	4	2.73	0.60
Interest Rate Channel							
GDP does not granger cause INF	4	2.95	0.57	INT does not granger cause INF	4	1.95	0.74
INF does not granger cause GDP	4	0.59	0.96	INF does not granger cause INT	4	1.74	0.78
M does not granger cause INF	4	1.27	0.87	INT does not granger cause GDP	4	27.39	0.00 ^a
GDP does not granger cause M	4	3.84	0.43	GDP does not granger cause INT	4	32.82	0.00 ^a
M does not granger cause GDP	4	18.36	0.00 ^a	M does not granger cause INT	4	4.53	0.34
INF does not granger cause M	4	2.18	0.70	INT does not granger cause M	4	11.86	0.02 ^b
Exchange Rate Channel							
GDP does not granger cause INF	4	2.48	0.65	RER does not granger cause INF	4	7.77	0.10
INF does not granger cause GDP	4	0.54	0.97	INF does not granger cause RER	4	2.90	0.57
M does not granger cause INF	4	0.57	0.97	RER does not granger cause GDP	4	6.96	0.14
GDP does not granger cause M	4	4.71	0.32	GDP does not granger cause RER	4	6.97	0.14
M does not granger cause GDP	4	16.79	0.00 ^a	M does not granger cause RER	4	0.46	0.98
INF does not granger cause M	4	2.32	0.68	RER does not granger cause M	4	11.08	0.02 ^b
Credit Channel							
GDP does not granger cause INF	4	4.32	0.36	CP does not granger cause INF	4	2.93	0.57
INF does not granger cause GDP	4	3.22	0.52	INF does not granger cause CP	4	14.01	0.01 ^b
M does not granger cause INF	4	4.83	0.30	CP does not granger cause GDP	4	0.41	0.98
GDP does not granger cause M	4	20.75	0.00 ^a	GDP does not granger cause CP	4	8.20	0.08 ^c
M does not granger cause GDP	4	15.59	0.00 ^a	M does not granger cause CP	4	6.02	0.20
INF does not granger cause M	4	20.74	0.00 ^a	CP does not granger cause M	4	18.51	0.00 ^a

Source: Derived using Eviews 7

Table F.11: Swaziland

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	7.94	0.09	GDP does not granger cause M	4	3.79	0.43
INF does not granger cause GDP	4	11.14	0.02 ^b	M does not granger cause GDP	4	10.38	0.03 ^b
M does not granger cause INF	4	13.27	0.01 ^b	INF does not granger cause M	4	2.34	0.67
Interest Rate Channel							
GDP does not granger cause INF	4	20.94	0.00 ^a	INT does not granger cause INF	4	7.49	0.11
INF does not granger cause GDP	4	16.58	0.00 ^a	INF does not granger cause INT	4	0.95	0.92
M does not granger cause INF	4	12.98	0.01 ^b	INT does not granger cause GDP	4	4.51	0.34
GDP does not granger cause M	4	5.12	0.27	GDP does not granger cause INT	4	5.45	0.24
M does not granger cause GDP	4	8.96	0.06 ^c	M does not granger cause INT	4	13.49	0.01 ^b
INF does not granger cause M	4	1.41	0.84	INT does not granger cause M	4	4.07	0.39
Exchange Rate Channel							
GDP does not granger cause INF	4	23.88	0.00 ^a	RER does not granger cause INF	4	6.14	0.19
INF does not granger cause GDP	4	13.96	0.01 ^b	INF does not granger cause RER	4	6.16	0.19
M does not granger cause INF	4	10.32	0.03 ^b	RER does not granger cause GDP	4	0.75	0.94
GDP does not granger cause M	4	4.95	0.29	GDP does not granger cause RER	4	3.34	0.50
M does not granger cause GDP	4	8.82	0.06 ^c	M does not granger cause RER	4	11.53	0.02 ^b
INF does not granger cause M	4	2.29	0.68	RER does not granger cause M	4	3.13	0.53
Credit Channel							
GDP does not granger cause INF	1	0.16	0.69	CP does not granger cause INF	1	1.92	0.16
INF does not granger cause GDP	1	1.11	0.29	INF does not granger cause CP	1	2.78	0.09
M does not granger cause INF	1	4.76	0.03 ^b	CP does not granger cause GDP	1	0.40	0.52
GDP does not granger cause M	1	0.09	0.75	GDP does not granger cause CP	1	0.09	0.76
M does not granger cause GDP	1	1.55	0.21	M does not granger cause CP	1	1.69	0.19
INF does not granger cause M	1	0.13	0.71	CP does not granger cause M	1	0.01	0.92

Source: Derived using Eviews 7

Table F.12: Tanzania

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	7.06	0.13	GDP does not granger cause M	4	2.09	0.72
INF does not granger cause GDP	4	5.37	0.25	M does not granger cause GDP	4	3.84	0.43
M does not granger cause INF	4	4.50	0.34	INF does not granger cause M	4	5.20	0.27
Interest Rate Channel							
GDP does not granger cause INF	4	5.97	0.20	INT does not granger cause INF	4	18.44	0.00 ^a
INF does not granger cause GDP	4	5.20	0.27	INF does not granger cause INT	4	5.52	0.24
M does not granger cause INF	4	7.68	0.10	INT does not granger cause GDP	4	17.65	0.00 ^a
GDP does not granger cause M	4	4.23	0.37	GDP does not granger cause INT	4	11.98	0.02 ^b
M does not granger cause GDP	4	3.77	0.44	M does not granger cause INT	4	4.96	0.29
INF does not granger cause M	4	4.35	0.36	INT does not granger cause M	4	14.43	0.00 ^a
Exchange Rate Channel							
GDP does not granger cause INF	4	15.19	0.00 ^a	RER does not granger cause INF	4	11.84	0.02 ^b
INF does not granger cause GDP	4	1.90	0.75	INF does not granger cause RER	4	1.99	0.74
M does not granger cause INF	4	2.95	0.57	RER does not granger cause GDP	4	22.44	0.00 ^a
GDP does not granger cause M	4	2.50	0.64	GDP does not granger cause RER	4	20.39	0.00 ^a
M does not granger cause GDP	4	11.64	0.02 ^b	M does not granger cause RER	4	25.04	0.00 ^a
INF does not granger cause M	4	5.20	0.27	RER does not granger cause M	4	4.18	0.38

Source: Derived using Eviews 7

Table F.13: Zambia

Monetary Aggregate Channel							
Null Hypothesis	df	Chi-Square	Prob.	Null Hypothesis	df	Chi-Square	Prob.
GDP does not granger cause INF	4	11.72	0.02 ^b	GDP does not granger cause M	4	5.55	0.23
INF does not granger cause GDP	4	5.94	0.20	M does not granger cause GDP	4	11.64	0.02 ^b
M does not granger cause INF	4	10.65	0.03 ^b	INF does not granger cause M	4	6.56	0.16
Interest Rate Channel							
GDP does not granger cause INF	4	8.51	0.07 ^c	INT does not granger cause INF	4	2.90	0.57
INF does not granger cause GDP	4	3.81	0.43	INF does not granger cause INT	4	7.99	0.09 ^c
M does not granger cause INF	4	9.75	0.04 ^b	INT does not granger cause GDP	4	5.62	0.23
GDP does not granger cause M	4	5.31	0.00 ^a	GDP does not granger cause INT	4	25.64	0.00 ^a
M does not granger cause GDP	4	9.35	0.05 ^c	M does not granger cause INT	4	8.78	0.07 ^c
INF does not granger cause M	4	14.97	0.25	INT does not granger cause M	4	16.53	0.00 ^a
Exchange Rate Channel							
GDP does not granger cause INF	4	5.35	0.25	RER does not granger cause INF	4	3.39	0.49
INF does not granger cause GDP	4	4.05	0.39	INF does not granger cause RER	4	2.04	0.73
M does not granger cause INF	4	2.90	0.57	RER does not granger cause GDP	4	4.66	0.32
GDP does not granger cause M	4	5.84	0.21	GDP does not granger cause RER	4	1.45	0.83
M does not granger cause GDP	4	5.17	0.27	M does not granger cause RER	4	2.49	0.64
INF does not granger cause M	4	5.02	0.28	RER does not granger cause M	4	2.39	0.66

Source: Derived using Eviews 7

APPENDIX G

RESULTS FOR VARIANCE DECOMPOSITION ANALYSIS

G.1: Monetary Aggregate Channel

Table G.1.1: Angola

Variance Decomposition of D(D(LRMS)):				
Period	S.E.	D(D(LRMS))	LRGDP	D(LINF)
1	0.10	100.00	0.00	0.00
4	0.15	94.25	1.79	3.95
8	0.16	86.03	6.94	7.02
12	0.16	82.13	8.99	8.86
Variance Decomposition of LRGDP:				
Period	S.E.	D(D(LRMS))	LRGDP	D(LINF)
1	0.14	43.01	56.98	0.00
4	0.14	40.62	56.42	2.94
8	0.22	38.33	34.16	27.50
12	0.24	41.36	30.69	27.93
Variance Decomposition of D(LINF):				
Period	S.E.	D(D(LRMS))	LRGDP	D(LINF)
1	0.06	2.97	3.61	93.40
4	0.11	29.45	6.51	64.03
8	0.11	32.20	6.66	61.12
12	0.11	32.00	6.61	61.38
Cholesky Ordering: D(D(LRMS)) LRGDP D(LINF)				

Source: Derived using Eviews 7

Table G.1.2: Botswana

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	LRGDP	LINF
1	0.07	100.00	0.00	0.00
4	0.08	87.63	0.87	11.50
8	0.08	86.11	2.58	11.31
12	0.08	85.42	2.99	11.59
Variance Decomposition of LRGDP:				
Period	S.E.	D(LRMS)	LRGDP	LINF
1	0.06	0.71	99.29	0.00
4	0.07	5.84	86.89	7.26
8	0.08	5.05	89.28	5.66
12	0.08	4.95	89.19	5.86
Variance Decomposition of LINF:				
Period	S.E.	D(LRMS)	LRGDP	LINF
1	0.14	10.09	9.30	80.60
4	0.23	11.55	9.11	79.34
8	0.29	10.29	13.47	76.23
12	0.31	10.33	13.38	76.29
Cholesky Ordering: D(LRMS) LRGDP LINF				

Source: Derived using Eviews 7

Table G.1.3: The Democratic Republic of Congo

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.89	100.00	0.00	0.00
4	0.98	91.88	5.95	2.17
8	1.02	86.04	11.51	2.44
12	1.06	80.67	16.72	2.61
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.64	1.88	98.12	0.00
4	0.83	3.88	82.40	13.71
8	1.06	5.66	84.14	10.19
12	1.28	4.63	85.17	10.20
Variance Decomposition of D(LINF):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.43	5.29	23.57	71.14
4	0.52	13.47	31.38	55.14
8	0.63	19.32	29.68	50.99
12	0.67	21.57	28.50	49.93
Cholesky Ordering: D(LRMS) D(LRGDP) D(LINF)				
Source: Derived using Eviews 7				

Table G.1.4: Lesotho

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(D(LINF))
1	0.21	100.00	0.00	0.00
4	0.23	99.74	0.13	0.13
8	0.25	89.84	9.51	0.64
12	0.26	86.54	12.71	0.75
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(D(LINF))
1	0.03	7.10	92.90	0.00
4	0.03	9.20	90.65	0.15
8	0.04	9.96	89.87	0.17
12	0.05	11.20	88.66	0.13
Variance Decomposition of D(D(LINF)):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(D(LINF))
1	0.17	0.34	42.94	56.72
4	0.20	1.82	47.25	50.92
8	0.25	5.14	61.22	33.63
12	0.26	11.77	57.35	30.87
Cholesky Ordering: D(LRMS) D(LRGDP) D(D(LINF))				
Source: Derived using Eviews 7				

Table G.1.5: Madagascar

Variance Decomposition of LRMS:				
Period	S.E.	LRMS	D(LRGDP)	D(LINF)
1	0.48	100.00	0.00	0.00
4	0.89	95.56	3.13	1.31
8	0.98	85.88	5.38	8.74
12	0.99	85.71	5.43	8.86
Variance Decomposition of D(LRGDP):				
Period	S.E.	LRMS	D(LRGDP)	D(LINF)
1	0.41	60.47	39.53	0.00
4	0.48	61.90	36.99	1.10
8	0.51	60.15	37.37	2.48
12	0.52	59.99	36.84	3.16
Variance Decomposition of D(LINF):				
Period	S.E.	LRMS	D(LRGDP)	D(LINF)
1	0.30	26.83	72.80	0.37
4	0.32	28.81	65.45	5.74
8	0.36	32.39	61.82	5.78
12	0.36	33.66	60.21	6.12
Cholesky Ordering: LRMS D(LRGDP) D(LINF)				

Source: Derived using Eviews 7

Table G.1.6: Malawi

Variance Decomposition of LRMS:				
Period	S.E.	LRMS	D(D(LRGDP))	LINF
1	0.66	100.00	0.00	0.00
4	1.08	99.51	0.13	0.36
8	1.30	93.28	1.60	5.12
12	1.44	83.78	3.65	12.57
Variance Decomposition of D(D(LRGDP)):				
Period	S.E.	LRMS	D(D(LRGDP))	LINF
1	0.06	0.03	99.96	0.00
4	0.08	1.45	97.26	1.29
8	0.09	1.42	97.29	1.28
12	0.09	1.42	97.30	1.27
Variance Decomposition of LINF:				
Period	S.E.	LRMS	D(D(LRGDP))	LINF
1	0.30	0.44	9.98	89.58
4	0.62	2.12	17.45	80.43
8	0.71	4.09	17.45	78.46
12	0.71	5.45	17.19	77.35
Cholesky Ordering: LRMS D(D(LRGDP)) LINF				

Source: Derived using Eviews 7

Table G.1.7: Mauritius

Variance Decomposition of D(D(LRMS)):				
Period	S.E.	D(D(LRMS))	D(LRGDP)	LINF
1	0.12	100.00	0.00	0.00
4	0.13	93.43	6.46	0.10
8	0.16	92.46	7.29	0.24
12	0.18	92.30	7.40	0.29
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(D(LRMS))	D(LRGDP)	LINF
1	0.01	0.00	99.99	0.00
4	0.01	2.04	92.76	5.18
8	0.01	6.80	84.51	8.67
12	0.01	8.67	82.58	8.74
Variance Decomposition of LINF:				
Period	S.E.	D(D(LRMS))	D(LRGDP)	LINF
1	0.20	0.55	3.89	95.55
4	0.30	4.04	5.70	90.24
8	0.31	5.27	9.41	85.31
12	0.32	5.38	9.81	84.80
Cholesky Ordering: D(D(LRMS)) D(LRGDP) LINF				

Source: Derived using Eviews 7

Table G.1.8: Mozambique

Variance Decomposition of D(D(LRMS)):				
Period	S.E.	D(D(LRMS))	D(LRGDP)	D(LINF)
1	0.04	100.00	0.00	0.00
4	0.07	73.39	16.31	10.30
8	0.08	67.58	14.24	18.18
12	0.09	68.01	13.41	18.58
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(D(LRMS))	D(LRGDP)	D(LINF)
1	0.02	30.28	69.71	0.00
4	0.03	29.45	58.60	11.94
8	0.03	23.00	50.69	26.30
12	0.04	21.20	44.83	33.96
Variance Decomposition of D(LINF):				
Period	S.E.	D(D(LRMS))	D(LRGDP)	D(LINF)
1	0.56	26.66	9.62	63.73
4	0.69	20.99	11.66	67.35
8	0.81	18.21	16.02	65.77
12	0.89	15.36	14.78	69.86
Cholesky Ordering: D(D(LRMS)) D(LRGDP) D(LINF)				

Source: Derived using Eviews 7

Table G.1.9: Namibia

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	LRGDP	D(LINF)
1	0.24	100.00	0.00	0.00
4	0.27	76.05	5.12	18.82
8	0.41	60.16	3.35	36.47
12	0.48	53.48	8.47	38.03
Variance Decomposition of LRGDP:				
Period	S.E.	D(LRMS)	LRGDP	D(LINF)
1	0.01	31.88	68.11	0.00
4	0.03	11.84	78.33	9.82
8	0.07	5.49	59.00	35.50
12	0.08	3.81	55.11	41.06
Variance Decomposition of D(LINF):				
Period	S.E.	D(LRMS)	LRGDP	D(LINF)
1	0.29	24.57	3.47	71.94
4	0.37	30.58	7.11	62.29
8	0.44	23.21	25.43	51.34
12	0.52	20.27	25.20	54.51
Cholesky Ordering: D(LRMS) LRGDP D(LINF)				

Source: Derived using Eviews 7

Table G.1.10: South Africa

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.03	100.00	0.00	0.00
4	0.03	92.36	6.87	0.76
8	0.04	87.66	11.02	1.32
12	0.04	86.69	12.08	1.22
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.01	3.76	96.24	0.00
4	0.01	31.89	67.99	0.12
8	0.01	44.95	54.68	0.36
12	0.01	49.94	49.35	0.71
Variance Decomposition of D(LINF):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.22	6.20	0.06	93.74
4	0.26	8.62	2.04	89.34
8	0.29	13.87	2.29	83.83
12	0.30	14.00	2.33	83.67
Cholesky Ordering: D(LRMS) D(LRGDP) D(LINF)				

Source: Derived using Eviews 7

Table G.1.11: Swaziland

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.07	100.00	0.00	0.00
4	0.07	97.24	1.23	1.53
8	0.09	93.71	4.57	1.72
12	0.09	94.43	3.94	1.63
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.03	2.28	97.72	0.00
4	0.03	3.41	94.85	1.74
8	0.04	10.20	83.43	6.37
12	0.04	10.13	81.80	8.07
Variance Decomposition of D(LINF):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(LINF)
1	0.26	12.18	13.22	74.60
4	0.27	15.21	16.42	68.37
8	0.32	20.94	22.82	56.24
12	0.32	22.26	23.01	54.73
Cholesky Ordering: D(LRMS) D(LRGDP) D(LINF)				
Source: Derived using Eviews 7				

Table G.1.12: Tanzania

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(D(LINF))
1	0.08	100.00	0.00	0.00
4	0.09	96.31	1.40	2.28
8	0.09	94.73	2.07	3.20
12	0.10	94.29	2.60	3.10
Variance Decomposition of D(LRGDP):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(D(LINF))
1	0.06	24.22	75.77	0.00
4	0.07	21.09	75.78	3.12
8	0.08	15.21	79.45	5.33
12	0.10	13.23	80.99	5.77
Variance Decomposition of D(D(LINF)):				
Period	S.E.	D(LRMS)	D(LRGDP)	D(D(LINF))
1	0.25	26.14	4.10	69.75
4	0.34	30.87	6.26	62.85
8	0.40	43.86	9.98	46.14
12	0.41	43.23	10.43	46.32
Cholesky Ordering: D(LRMS) D(LRGDP) D(D(LINF))				
Source: Derived using Eviews 7				

Table G.1.13: Zambia

Variance Decomposition of D(LRMS):				
Period	S.E.	D(LRMS)	D(D(LRGDP))	D(LINF)
1	0.06	100.00	0.00	0.00
4	0.07	86.78	8.28	4.92
8	0.08	84.68	9.72	5.59
12	0.08	83.58	10.84	5.56
Variance Decomposition of D(D(LRGDP)):				
Period	S.E.	D(LRMS)	D(D(LRGDP))	D(LINF)
1	0.01	7.62	92.37	0.00
4	0.02	31.43	67.12	1.43
8	0.02	39.45	54.93	5.61
12	0.02	43.15	51.59	5.24
Variance Decomposition of D(LINF):				
Period	S.E.	D(LRMS)	D(D(LRGDP))	D(LINF)
1	0.11	10.49	39.31	50.18
4	0.12	18.02	41.17	40.79
8	0.15	13.44	50.95	35.60
12	0.16	12.80	51.34	35.84
Cholesky Ordering: D(LRMS) D(D(LRGDP)) D(LINF)				

Source: Derived using Eviews 7

G.2: Interest Rate Channel

Table G.2.1: Angola

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	D(D(RINT))	LRGDP	D(LINF)
1	0.07	100.00	0.00	0.00	0.00
4	0.10	84.91	7.50	0.23	7.34
8	0.12	59.29	16.42	16.84	7.43
12	0.14	48.38	22.54	19.52	9.54
Variance Decomposition of D(D(RINT)):					
Period	S.E.	D(D(LRMS))	D(D(RINT))	LRGDP	D(LINF)
1	55.54	0.00	99.99	0.00	0.00
4	64.57	3.63	83.46	9.18	3.70
8	68.11	10.55	75.71	9.06	4.66
12	71.28	10.19	72.93	12.29	4.58
Variance Decomposition of LRGDP:					
Period	S.E.	D(D(LRMS))	D(D(RINT))	LRGDP	D(LINF)
1	0.09	2.86	46.44	50.69	0.00
4	0.11	3.79	54.96	38.86	2.38
8	0.21	7.81	51.67	23.90	16.60
12	0.28	8.79	53.25	20.53	17.40
Variance Decomposition of D(LINF):					
Period	S.E.	D(D(LRMS))	D(D(RINT))	LRGDP	D(LINF)
1	0.05	0.59	39.70	10.52	49.16
4	0.10	15.58	32.09	11.51	40.80
8	0.12	14.77	37.21	11.46	36.54
12	0.12	13.93	39.94	11.57	34.54
Cholesky Ordering: D(D(LRMS)) D(D(RINT)) LRGDP D(LINF)					

Source: Derived using Eviews 7

Table G.2.2: Botswana

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	LINF
1	0.06	100.00	0.00	0.00	0.00
4	0.07	92.38	2.30	0.81	4.49
8	0.07	91.73	2.51	0.94	4.79
12	0.07	91.49	2.61	0.94	4.94
Variance Decomposition of D(RINT):					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	LINF
1	0.32	3.60	96.39	0.00	0.00
4	0.40	9.01	66.30	14.07	10.60
8	0.42	8.30	61.80	13.37	16.51
12	0.43	8.07	60.74	12.98	18.20
Variance Decomposition of LRGDP:					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	LINF
1	0.07	0.06	11.16	88.76	0.00
4	0.10	0.60	23.34	74.03	2.01
8	0.12	0.53	27.54	69.83	2.08
12	0.12	0.51	27.86	69.02	2.58
Variance Decomposition of LINF:					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	LINF
1	0.14	3.47	20.02	0.63	75.86
4	0.28	1.97	17.33	5.39	75.29
8	0.31	1.98	20.95	5.65	71.40
12	0.31	1.96	21.03	5.55	71.43
Cholesky Ordering: D(LRMS) D(RINT) LRGDP LINF					

Source: Derived using Eviews 7

Table G.2.3: Lesotho

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(D(LINF))
1	0.20	100.00	0.00	0.00	0.00
4	0.24	93.91	2.99	2.88	0.22
8	0.26	92.59	3.76	2.83	0.81
12	0.26	92.05	3.84	3.12	0.98
Variance Decomposition of D(RINT):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(D(LINF))
1	6.30	2.05	97.95	0.00	0.00
4	6.49	3.20	95.62	0.55	0.64
8	6.61	4.24	92.98	2.09	0.69
12	6.72	4.65	91.07	3.60	0.68
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(D(LINF))
1	0.02	3.94	0.07	95.98	0.00
4	0.02	6.05	3.48	89.67	0.79
8	0.03	10.49	29.03	59.90	0.59
12	0.04	9.49	31.33	58.68	0.50
Variance Decomposition of D(D(LINF)):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(D(LINF))
1	0.17	1.56	0.05	37.07	61.31
4	0.20	1.48	3.29	41.02	54.21
8	0.25	4.30	7.57	51.58	36.55
12	0.27	10.14	13.87	45.14	30.84
Cholesky Ordering: D(LRMS) D(RINT) D(LRGDP) D(D(LINF))					

Source: Derived using Eviews 7

Table G.2.4: Madagascar

Variance Decomposition of LRMS:					
Period	S.E.	LRMS	RINT	D(LRGDP)	D(LINF)
1	0.51	100.00	0.00	0.00	0.00
4	1.00	96.29	2.28	0.90	0.53
8	1.04	93.72	3.65	1.87	0.76
12	1.05	93.53	3.78	1.92	0.76
Variance Decomposition of RINT:					
Period	S.E.	LRMS	RINT	D(LRGDP)	D(LINF)
1	3.53E-07	12.59	87.41	0.00	0.00
4	4.53E-07	19.37	80.04	0.20	0.39
8	4.55E-07	19.79	79.40	0.25	0.55
12	4.55E-07	19.83	79.36	0.26	0.55
Variance Decomposition of D(LRGDP):					
Period	S.E.	LRMS	RINT	D(LRGDP)	D(LINF)
1	0.45	60.65	2.39	36.96	0.00
4	0.52	61.12	5.27	32.49	1.12
8	0.56	64.99	5.18	28.78	1.04
12	0.56	65.32	5.18	28.47	1.03
Variance Decomposition of D(LINF):					
Period	S.E.	LRMS	RINT	D(LRGDP)	D(LINF)
1	0.33	23.97	4.72	70.99	0.31
4	0.34	30.36	4.57	64.75	0.32
8	0.35	33.49	5.07	60.99	0.44
12	0.36	33.90	5.06	60.58	0.44
Cholesky Ordering: LRMS RINT D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.2.5: Malawi

Variance Decomposition of LRMS:					
Period	S.E.	LRMS	RINT	D(D(LRGDP))	LINF
1	0.66	100.00	0.00	0.00	0.00
4	1.02	98.90	0.43	0.08	0.58
8	1.13	94.34	0.38	1.14	4.13
12	1.19	86.31	0.37	2.89	10.42
Variance Decomposition of RINT:					
Period	S.E.	LRMS	RINT	D(D(LRGDP))	LINF
1	32.38	0.03	99.96	0.00	0.00
4	53.65	1.43	95.33	0.49	2.74
8	68.95	0.91	84.04	1.53	13.52
12	79.65	0.69	74.66	2.94	21.71
Variance Decomposition of D(D(LRGDP)):					
Period	S.E.	LRMS	RINT	D(D(LRGDP))	LINF
1	0.06	0.02	0.03	99.94	0.00
4	0.08	1.55	2.71	94.42	1.32
8	0.09	1.80	3.09	93.79	1.32
12	0.09	1.85	3.22	93.63	1.30
Variance Decomposition of D(LINF):					
Period	S.E.	LRMS	RINT	D(D(LRGDP))	LINF
1	0.29	0.70	0.04	9.27	89.98
4	0.64	2.35	4.22	18.01	75.41
8	0.73	3.94	5.33	18.47	72.25
12	0.74	4.83	5.32	18.31	71.54
Cholesky Ordering: LRMS RINT D(D(LRGDP)) D(LINF)					

Source: Derived using Eviews 7

Table G.2.6: Mauritius

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	LINF
1	0.12	100.00	0.00	0.00	0.00
4	0.13	92.07	0.30	7.23	0.39
8	0.17	91.25	0.26	7.92	0.55
12	0.19	91.13	0.29	8.00	0.57
Variance Decomposition of RINT:					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	LINF
1	0.37	2.74	97.25	0.00	0.00
4	0.93	1.98	88.66	0.61	8.73
8	1.16	1.47	69.74	1.82	26.95
12	1.22	1.40	62.88	3.92	31.78
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	LINF
1	0.01	0.00	6.57	93.42	0.00
4	0.01	2.29	10.39	83.95	3.35
8	0.01	6.49	9.97	76.19	7.34
12	0.01	8.62	9.85	74.14	7.37
Variance Decomposition of LINF:					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	LINF
1	0.21	0.69	31.86	0.58	66.85
4	0.31	4.72	36.15	2.13	56.98
8	0.33	5.82	35.04	6.17	52.94
12	0.33	5.91	36.67	6.44	50.96
Cholesky Ordering: D(D(LRMS)) RINT D(LRGDP) LINF					

Source: Derived using Eviews 7

Table G.2.7: Mozambique

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	D(LINF)
1	0.04	100.00	0.00	0.00	0.00
4	0.07	72.53	17.47	7.64	2.35
8	0.08	72.82	17.51	7.51	2.15
12	0.08	73.65	16.92	7.24	2.19
Variance Decomposition of RINT:					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	D(LINF)
1	0.25	21.05	78.95	0.00	0.00
4	0.47	9.13	83.98	5.49	1.40
8	0.55	10.67	70.95	14.40	3.98
12	0.59	11.70	64.71	17.67	5.93
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	D(LINF)
1	0.03	24.40	54.20	21.40	0.00
4	0.03	20.94	55.92	23.00	0.13
8	0.03	20.89	55.84	23.09	0.18
12	0.03	20.92	55.84	23.07	0.18
Variance Decomposition of D(LINF):					
Period	S.E.	D(D(LRMS))	RINT	D(LRGDP)	D(LINF)
1	0.47	32.65	13.81	3.97	49.56
4	0.54	28.33	22.44	10.08	39.14
8	0.57	27.88	25.05	11.10	35.97
12	0.57	27.68	25.58	11.25	35.48
Cholesky Ordering: D(D(LRMS)) RINT D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.2.8: Namibia

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	D(LINF)
1	0.31	100.00	0.00	0.00	0.00
4	0.42	69.63	11.33	12.96	6.06
8	0.61	39.16	5.77	44.02	11.03
12	0.74	27.18	8.42	56.34	8.04
Variance Decomposition of D(RINT):					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	D(LINF)
1	0.23	0.97	99.02	0.00	0.00
4	0.53	8.94	22.79	49.65	18.60
8	0.92	3.04	16.55	72.37	8.02
12	1.62	1.05	12.33	83.38	3.22
Variance Decomposition of LRGDP:					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	D(LINF)
1	0.01	2.52	0.79	96.68	0.00
4	0.04	0.85	7.42	91.66	0.05
8	0.09	0.26	10.78	88.08	0.87
12	0.16	0.09	11.00	87.99	0.90
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(RINT)	LRGDP	D(LINF)
1	0.26	22.50	23.02	8.59	45.88
4	0.42	21.36	11.04	42.71	24.87
8	0.48	17.53	10.78	50.82	20.85
12	0.55	13.73	11.16	58.86	16.24
Cholesky Ordering: D(LRMS) D(RINT) LRGDP D(LINF)					

Source: Derived using Eviews 7

Table G.2.9: South Africa

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	0.02	100.00	0.00	0.00	0.00
4	0.03	87.95	0.65	10.73	0.65
8	0.04	83.61	1.38	14.24	0.75
12	0.04	82.64	1.23	15.48	0.64
Variance Decomposition of D(RINT):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	5.65	5.57	94.42	0.00	0.00
4	8.33	19.48	64.77	15.16	0.57
8	9.42	29.15	57.54	12.79	0.49
12	10.43	30.51	57.61	11.42	0.44
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	0.00	5.29	0.97	93.73	0.00
4	0.00	33.54	1.84	63.97	0.63
8	0.01	36.19	17.58	45.54	0.68
12	0.01	37.82	17.14	44.34	0.68
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	0.22	6.65	0.21	0.06	93.06
4	0.26	9.01	1.52	1.45	87.99
8	0.30	12.05	3.41	2.26	82.25
12	0.30	11.73	4.75	2.34	81.16
Cholesky Ordering: D(LRMS) D(RINT) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.2.10: Swaziland

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	0.07	100.00	0.00	0.00	0.00
4	0.07	94.44	1.87	2.45	1.24
8	0.09	91.03	2.36	5.33	1.28
12	0.09	91.85	2.19	4.64	1.32
Variance Decomposition of D(RINT):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	8.67	0.00	99.99	0.00	0.00
4	9.49	5.49	89.53	4.46	0.52
8	10.65	13.70	78.54	6.85	0.91
12	11.08	15.16	74.79	9.11	0.94
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	0.03	1.68	1.74	96.57	0.00
4	0.04	1.98	4.61	91.97	1.44
8	0.05	6.60	4.50	81.20	7.69
12	0.06	5.49	3.88	83.82	6.81
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(RINT)	D(LRGDP)	D(LINF)
1	0.26	11.10	1.90	14.67	72.32
4	0.28	13.28	3.79	18.93	64.00
8	0.33	18.43	8.75	22.63	50.19
12	0.35	19.71	9.28	23.51	47.49
Cholesky Ordering: D(LRMS) D(RINT) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.2.11: Tanzania

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(D(RINT))	D(LRGDP)	D(D(LINF))
1	0.07	100.00	0.00	0.00	0.00
4	0.08	85.07	8.20	3.78	2.94
8	0.10	81.81	9.79	4.86	3.52
12	0.11	81.27	9.77	5.81	3.12
Variance Decomposition of D(D(RINT)):					
Period	S.E.	D(LRMS)	D(D(RINT))	D(LRGDP)	D(D(LINF))
1	26.47	0.38	99.61	0.00	0.00
4	41.99	4.41	84.89	9.25	1.42
8	44.47	7.99	78.06	10.04	3.88
12	45.67	8.49	77.68	9.72	4.09
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(D(RINT))	D(LRGDP)	D(D(LINF))
1	0.05	15.75	0.00	84.24	0.00
4	0.07	11.06	11.58	73.63	3.70
8	0.09	8.04	8.73	76.73	6.48
12	0.10	7.05	7.01	78.78	7.14
Variance Decomposition of D(D(LINF)):					
Period	S.E.	D(LRMS)	D(D(RINT))	D(LRGDP)	D(D(LINF))
1	0.22	16.29	0.11	1.77	81.81
4	0.32	19.22	8.40	2.72	69.64
8	0.40	28.44	19.47	5.08	46.99
12	0.41	27.41	20.70	5.12	46.74
Cholesky Ordering: D(LRMS) D(D(RINT)) D(LRGDP) D(D(LINF))					

Source: Derived using Eviews 7

Table G.2.12: Zambia

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	RINT	D(D(LRGDP))	D(LINF)
1	0.06	100.00	0.00	0.00	0.00
4	0.09	71.47	5.56	3.59	19.36
8	0.11	63.23	7.31	10.28	19.16
12	0.13	60.34	8.05	11.08	20.50
Variance Decomposition of RINT:					
Period	S.E.	D(LRMS)	RINT	D(D(LRGDP))	D(LINF)
1	7.87	0.91	99.08	0.00	0.00
4	21.09	16.82	78.44	1.69	3.02
8	27.54	12.90	78.48	5.75	2.85
12	35.22	10.75	76.71	8.12	4.41
Variance Decomposition of D(D(LRGDP)):					
Period	S.E.	D(LRMS)	RINT	D(D(LRGDP))	D(LINF)
1	0.01	45.04	3.54	51.40	0.00
4	0.02	43.41	18.45	37.54	0.58
8	0.03	36.80	16.23	24.05	22.90
12	0.03	30.37	16.69	25.43	27.50
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	RINT	D(D(LRGDP))	D(LINF)
1	0.11	16.68	2.93	29.27	51.10
4	0.21	7.19	8.88	16.08	67.83
8	0.24	17.23	9.33	13.95	59.46
12	0.29	15.31	8.88	13.06	62.73
Cholesky Ordering: D(LRMS) RINT D(D(LRGDP)) D(LINF)					

Source: Derived using Eviews 7

G.3: Exchange Rate Channel

Table G.3.1: Angola

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	LRER	LRGDP	D(LINF)
1	0.05	100.00	0.00	0.00	0.00
4	0.08	52.45	11.15	9.40	26.98
8	0.11	30.39	14.27	16.44	38.88
12	0.12	29.34	13.50	17.32	39.82
Variance Decomposition of LRER:					
Period	S.E.	D(D(LRMS))	LRER	LRGDP	D(LINF)
1	0.02	32.75	67.24	0.00	0.00
4	0.04	22.31	35.83	4.84	37.00
8	0.15	3.78	5.43	5.40	85.37
12	0.20	2.59	6.40	4.51	86.48
Variance Decomposition of LRGDP:					
Period	S.E.	D(D(LRMS))	LRER	LRGDP	D(LINF)
1	0.05	23.34	3.96	72.69	0.00
4	0.07	21.77	17.11	45.58	15.52
8	0.13	11.34	6.31	21.80	60.53
12	0.14	9.83	6.44	20.13	63.58
Variance Decomposition of D(LINF):					
Period	S.E.	D(D(LRMS))	LRER	LRGDP	D(LINF)
1	0.06	1.95	0.23	4.23	93.57
4	0.09	5.26	2.55	2.87	89.30
8	0.09	8.64	3.42	4.39	83.53
12	0.09	8.97	3.58	4.34	83.09
Cholesky Ordering: D(D(LRMS)) LRER LRGDP D(LINF)					

Source: Derived using Eviews 7

Table G.3.2: Botswana

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	LRGDP	LINF
1	0.07	100.00	0.00	0.00	0.00
4	0.07	90.12	1.35	0.43	8.08
8	0.07	89.11	1.51	0.91	8.45
12	0.07	88.69	1.65	0.94	8.69
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	LRGDP	LINF
1	0.07	0.26	99.73	0.00	0.00
4	0.08	13.83	79.11	4.69	2.35
8	0.08	14.28	77.35	5.51	2.84
12	0.08	14.23	76.97	5.94	2.83
Variance Decomposition of LRGDP:					
Period	S.E.	D(LRMS)	D(LRER)	LRGDP	LINF
1	0.07	0.11	26.49	73.38	0.00
4	0.09	4.60	25.26	66.56	3.56
8	0.10	4.03	26.20	66.31	3.44
12	0.11	3.69	25.60	67.59	3.10
Variance Decomposition of LINF:					
Period	S.E.	D(LRMS)	D(LRER)	LRGDP	LINF
1	0.14	3.02	0.57	0.39	96.00
4	0.27	3.20	2.73	5.96	88.09
8	0.31	2.76	3.57	5.68	87.97
12	0.33	2.66	4.55	5.56	87.21
Cholesky Ordering: D(LRMS) D(LRER) LRGDP LINF					

Source: Derived using Eviews 7

Table G.3.3: The Democratic Republic of Congo

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.80	100.00	0.00	0.00	0.00
4	0.93	79.43	9.15	10.31	1.09
8	1.12	55.64	20.61	13.89	9.84
12	1.18	52.06	20.96	16.67	10.29
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.17	0.38	99.61	0.00	0.00
4	0.20	5.78	72.98	11.31	9.91
8	0.23	10.35	67.48	9.33	12.82
12	0.25	9.84	65.35	10.67	14.12
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.63	6.20	2.42	91.36	0.00
4	0.84	5.83	9.34	74.59	10.21
8	1.05	6.48	10.28	75.95	7.26
12	1.28	5.50	12.01	75.88	6.59
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.44	6.34	11.75	13.79	68.10
4	0.59	10.88	30.24	12.52	46.36
8	0.72	17.71	28.53	15.15	38.59
12	0.86	16.41	32.67	11.67	39.24
Cholesky Ordering: D(LRMS) D(LRER) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.3.4: Lesotho

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.23	100.00	0.00	0.00	0.00
4	0.36	94.93	0.72	0.04	4.30
8	0.44	88.01	1.31	1.25	9.43
12	0.50	87.87	1.32	1.61	9.19
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.04	0.00	99.99	0.00	0.00
4	0.04	6.40	90.58	0.14	2.88
8	0.05	4.55	91.33	1.71	2.41
12	0.05	5.05	90.68	1.80	2.47
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.03	8.04	7.35	84.60	0.00
4	0.03	9.22	7.98	82.76	0.04
8	0.04	8.28	8.86	81.94	0.91
12	0.05	7.68	7.44	84.02	0.86
Variance Decomposition of D(D(LINF)):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.17	1.98	13.08	31.21	53.72
4	0.20	4.50	17.17	32.66	45.66
8	0.28	11.26	36.57	27.40	24.85
12	0.30	16.93	38.26	23.41	21.39
Cholesky Ordering: D(LRMS) D(LRER) D(LRGDP) D(D(LINF))					

Source: Derived using Eviews 7

Table G.3.5: Madagascar

Variance Decomposition of LRMS:					
Period	S.E.	LRMS	D(LRER)	D(LRGDP)	D(LINF)
1	0.51	100.00	0.00	0.00	0.00
4	1.01	97.95	1.21	0.04	0.80
8	1.04	96.52	2.06	0.22	1.19
12	1.05	96.45	2.13	0.23	1.19
Variance Decomposition of D(LRER):					
Period	S.E.	LRMS	D(LRER)	D(LRGDP)	D(LINF)
1	0.45	59.72	40.28	0.00	0.00
4	0.52	60.92	36.36	1.04	1.68
8	0.56	64.84	32.35	1.27	1.53
12	0.56	65.27	31.95	1.26	1.52
Variance Decomposition of D(LRGDP):					
Period	S.E.	LRMS	D(LRER)	D(LRGDP)	D(LINF)
1	0.45	60.94	34.58	4.48	0.00
4	0.52	62.61	32.17	3.81	1.41
8	0.56	66.73	28.38	3.60	1.29
12	0.56	67.14	28.01	3.56	1.29
Variance Decomposition of D(LINF):					
Period	S.E.	LRMS	D(LRER)	D(LRGDP)	D(LINF)
1	0.33	23.64	67.72	8.33	0.31
4	0.35	30.18	60.60	8.93	0.30
8	0.36	33.78	57.30	8.45	0.46
12	0.36	34.23	56.90	8.40	0.47
Cholesky Ordering: LRMS D(LRER) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.3.6: Malawi

Variance Decomposition of LRMS:					
Period	S.E.	LRMS	D(LRER)	D(D(LRGDP))	LINF
1	0.64	100.00	0.00	0.00	0.00
4	1.11	96.29	1.05	1.63	1.03
8	1.38	92.02	3.11	2.43	2.43
12	1.49	85.46	4.46	4.94	5.14
Variance Decomposition of D(LRER):					
Period	S.E.	LRMS	D(LRER)	D(D(LRGDP))	LINF
1	0.06	0.47	0.00	99.53	0.00
4	0.08	1.68	3.30	91.48	3.54
8	0.09	1.99	4.69	89.54	3.77
12	0.09	2.22	4.87	89.05	3.85
Variance Decomposition of D(D(LRGDP)):					
Period	S.E.	LRMS	D(LRER)	D(D(LRGDP))	LINF
1	0.08	0.33	97.01	2.66	0.00
4	0.08	1.11	94.02	3.11	1.75
8	0.09	1.40	93.50	2.99	2.11
12	0.09	1.42	93.48	2.90	2.19
Variance Decomposition of D LINF:					
Period	S.E.	LRMS	D(LRER)	D(D(LRGDP))	LINF
1	0.29	0.82	10.14	0.90	88.14
4	0.58	2.78	13.19	11.28	72.75
8	0.71	7.76	9.74	25.28	57.21
12	0.73	10.19	9.53	24.94	55.34
Cholesky Ordering: LRMS D(LRER) D(D(LRGDP)) LINF					

Source: Derived using Eviews 7

Table G.3.7: Mauritius

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	LINF
1	0.12	100.00	0.00	0.00	0.00
4	0.13	88.70	7.91	2.59	0.78
8	0.17	89.52	5.25	4.30	0.91
12	0.19	89.83	4.61	4.60	0.94
Variance Decomposition of D(LRER):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	LINF
1	0.03	5.17	94.82	0.00	0.00
4	0.04	10.97	83.11	3.33	2.57
8	0.04	11.77	79.29	3.42	5.50
12	0.04	12.06	78.50	3.58	5.84
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	LINF
1	0.01	0.18	21.31	78.49	0.00
4	0.01	3.69	20.39	72.59	3.31
8	0.01	7.25	20.87	65.32	6.54
12	0.01	8.71	20.64	63.89	6.74
Variance Decomposition of LINF:					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	LINF
1	0.19	1.46	1.80	4.96	91.77
4	0.29	10.09	10.86	2.15	76.88
8	0.32	9.33	24.56	1.79	64.30
12	0.33	8.96	23.97	1.91	65.14
Cholesky Ordering: D(D(LRMS)) D(LRER) D(LRGDP) LINF					

Source: Derived using Eviews 7

Table G.3.8: Mozambique

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	D(LINF)
1	0.04	100.00	0.00	0.00	0.00
4	0.07	61.89	10.81	16.85	10.45
8	0.08	52.19	20.39	13.74	13.67
12	0.09	51.33	22.42	12.40	13.85
Variance Decomposition of D(LRER):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	D(LINF)
1	0.08	27.09	72.91	0.00	0.00
4	0.10	28.82	61.92	8.94	0.32
8	0.12	27.74	63.37	8.65	0.25
12	0.14	27.53	63.28	8.93	0.26
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	D(LINF)
1	0.03	28.72	0.06	71.22	0.00
4	0.04	16.43	4.96	75.20	3.40
8	0.05	13.25	5.41	78.29	3.04
12	0.05	11.09	4.90	81.03	2.97
Variance Decomposition of D(LINF):					
Period	S.E.	D(D(LRMS))	D(LRER)	D(LRGDP)	D(LINF)
1	0.62	32.16	0.02	16.84	50.97
4	0.97	16.06	3.08	20.63	60.23
8	1.20	12.93	3.97	18.56	64.54
12	1.40	10.66	4.48	17.58	67.27
Cholesky Ordering: D(D(LRMS)) D(LRER) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.3.9: Namibia

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	LRER	LRGDP	D(LINF)
1	0.24	100.00	0.00	0.00	0.00
4	0.38	62.84	24.11	12.13	0.89
8	0.71	60.89	18.17	13.00	7.93
12	1.08	51.31	14.63	22.95	11.09
Variance Decomposition of LRER:					
Period	S.E.	D(LRMS)	LRER	LRGDP	D(LINF)
1	0.06	4.03	95.96	0.00	0.00
4	0.08	7.47	78.72	6.84	6.94
8	0.09	27.31	55.96	10.51	6.19
12	0.12	32.32	43.38	14.49	9.79
Variance Decomposition of LRGDP:					
Period	S.E.	D(LRMS)	LRER	LRGDP	D(LINF)
1	0.01	28.78	4.86	66.34	0.00
4	0.04	58.39	2.27	31.17	8.15
8	0.10	55.93	5.53	25.62	12.90
12	0.24	54.45	6.53	24.90	14.10
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	LRER	LRGDP	D(LINF)
1	0.18	19.45	8.45	0.31	71.77
4	0.42	17.34	41.38	24.47	16.79
8	0.47	15.81	44.81	25.18	14.18
12	0.50	16.46	44.63	25.57	13.32
Cholesky Ordering: D(LRMS) LRER LRGDP D(LINF)					

Source: Derived using Eviews 7

Table G.3.10: South Africa

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.02	100.00	0.00	0.00	0.00
4	0.03	83.40	9.79	5.71	1.07
8	0.03	70.33	18.11	9.77	1.77
12	0.04	64.83	22.42	10.58	2.15
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.08	1.14	98.85	0.00	0.00
4	0.08	2.07	92.07	5.13	0.71
8	0.09	2.25	89.72	5.42	2.59
12	0.09	2.73	88.93	5.59	2.73
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.00	2.07	0.17	97.74	0.00
4	0.00	21.54	7.98	70.37	0.09
8	0.01	24.82	20.76	53.83	0.56
12	0.01	26.67	23.17	48.60	1.55
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.21	5.43	2.82	0.47	91.27
4	0.25	7.29	8.23	4.75	79.71
8	0.29	10.26	15.93	4.14	69.65
12	0.30	9.98	17.77	4.04	68.18
Cholesky Ordering: D(LRMS) D(LRER) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.3.11: Swaziland

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.07	100.00	0.00	0.00	0.00
4	0.07	96.54	0.86	1.56	1.04
8	0.09	90.74	3.53	4.42	1.30
12	0.09	91.19	3.71	3.77	1.32
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.07	0.44	99.56	0.00	0.00
4	0.09	7.34	89.61	0.95	2.09
8	0.11	9.52	84.42	0.66	5.40
12	0.12	10.30	83.31	0.60	5.77
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.03	2.07	0.14	97.79	0.00
4	0.04	2.07	1.11	96.01	0.80
8	0.05	4.97	1.04	89.71	4.28
12	0.06	4.01	0.99	91.17	3.82
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(LINF)
1	0.27	13.34	0.01	16.10	70.55
4	0.28	13.97	3.67	19.46	62.90
8	0.32	15.79	6.32	25.65	52.24
12	0.34	15.28	7.38	27.18	50.16
Cholesky Ordering: D(LRMS) D(LRER) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.3.12: Tanzania

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.08	100.00	0.00	0.00	0.00
4	0.08	94.02	3.86	0.85	1.25
8	0.09	90.48	5.04	1.76	2.70
12	0.10	90.04	4.58	2.82	2.54
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.10	5.78	94.21	0.00	0.00
4	0.12	12.81	71.99	14.18	1.01
8	0.14	15.59	67.79	15.41	1.18
12	0.15	15.79	69.18	13.76	1.25
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.05	26.15	16.63	57.20	0.00
4	0.06	20.40	36.21	42.75	0.62
8	0.07	15.54	49.80	32.95	1.69
12	0.08	14.31	56.92	27.18	1.57
Variance Decomposition of D(D(LINF)):					
Period	S.E.	D(LRMS)	D(LRER)	D(LRGDP)	D(D(LINF))
1	0.23	31.41	2.13	9.05	57.39
4	0.33	36.67	3.16	14.48	45.67
8	0.41	42.82	4.76	21.27	31.12
12	0.41	42.74	5.11	21.07	31.06
Cholesky Ordering: D(LRMS) D(LRER) D(LRGDP) D(D(LINF))					

Source: Derived using Eviews 7

Table G.3.13: Zambia

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRER)	D(D(LRGDP))	D(LINF)
1	0.06	100.00	0.00	0.00	0.00
4	0.08	82.71	1.35	10.66	5.27
8	0.08	79.16	3.45	11.70	5.67
12	0.09	78.70	3.48	11.98	5.82
Variance Decomposition of D(LRER):					
Period	S.E.	D(LRMS)	D(LRER)	D(D(LRGDP))	D(LINF)
1	0.12	43.65	56.34	0.00	0.00
4	0.13	44.57	50.36	2.75	2.30
8	0.13	46.21	47.71	3.63	2.42
12	0.13	46.42	47.05	3.85	2.66
Variance Decomposition of D(D(LRGDP)):					
Period	S.E.	D(LRMS)	D(LRER)	D(D(LRGDP))	D(LINF)
1	0.01	14.12	0.75	85.11	0.00
4	0.02	39.75	4.74	54.52	0.97
8	0.02	46.96	8.11	40.96	3.95
12	0.02	50.53	7.47	38.17	3.82
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(LRER)	D(D(LRGDP))	D(LINF)
1	0.11	10.85	6.32	37.13	45.67
4	0.13	20.95	14.27	31.88	32.89
8	0.16	17.39	15.58	38.82	28.19
12	0.17	16.97	17.38	37.98	27.65
Cholesky Ordering: D(LRMS) D(LRER) D(D(LRGDP)) D(LINF)					

Source: Derived using Eviews 7

G.4: Credit Channel

Table G.4.1: Angola

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	LRCP	LRGDP	D(LINF)
1	0.05	100.00	0.00	0.00	0.00
4	0.08	74.57	3.62	15.88	5.91
8	0.10	49.90	5.98	34.09	10.02
12	0.12	42.67	10.35	34.50	12.46
Variance Decomposition of LRCP:					
Period	S.E.	D(D(LRMS))	LRCP	LRGDP	D(LINF)
1	0.04	0.99	99.00	0.00	0.00
4	0.20	2.99	89.98	3.66	3.34
8	0.46	1.48	90.00	3.41	5.09
12	0.66	1.49	90.21	3.48	4.80
Variance Decomposition of LRGDP:					
Period	S.E.	D(D(LRMS))	LRCP	LRGDP	D(LINF)
1	0.07	10.04	1.88	88.07	0.00
4	0.09	13.29	27.22	57.91	1.56
8	0.18	3.68	68.84	21.56	5.90
12	0.24	3.21	74.85	16.80	5.12
Variance Decomposition of D(LINF):					
Period	S.E.	D(D(LRMS))	LRCP	LRGDP	D(LINF)
1	0.04	0.00	52.62	2.09	45.27
4	0.11	0.33	81.68	4.33	13.65
8	0.12	3.02	81.35	4.67	10.94
12	0.13	2.88	81.35	4.68	11.07
Cholesky Ordering: D(D(LRMS)) LRCP LRGDP D(LINF)					

Source: Derived using Eviews 7

Table G.4.2: Botswana

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRCP)	LRGDP	LINF
1	0.06	100.00	0.00	0.00	0.00
4	0.08	63.54	14.14	12.20	10.09
8	0.09	51.31	30.14	10.35	8.18
12	0.10	49.98	31.59	10.25	8.16
Variance Decomposition of D(LRCP):					
Period	S.E.	D(LRMS)	D(LRCP)	LRGDP	LINF
1	0.02	0.00	99.99	0.00	0.00
4	0.02	21.95	71.57	6.31	0.16
8	0.03	22.96	70.41	6.01	0.61
12	0.03	29.53	63.88	5.32	1.24
Variance Decomposition of LRGDP:					
Period	S.E.	D(LRMS)	D(LRCP)	LRGDP	LINF
1	0.06	2.69	0.33	96.96	0.00
4	0.07	6.18	25.17	68.47	0.17
8	0.09	9.34	25.09	65.29	0.26
12	0.11	9.69	26.42	63.63	0.24
Variance Decomposition of LINF:					
Period	S.E.	D(LRMS)	D(LRCP)	LRGDP	LINF
1	0.12	20.47	0.02	19.59	59.90
4	0.21	12.90	23.30	17.58	46.20
8	0.31	7.19	16.16	33.96	42.67
12	0.36	5.48	19.08	35.09	40.32
Cholesky Ordering: D(LRMS) D(LRCP) LRGDP LINF					

Source: Derived using Eviews 7

Table G.4.3: The Democratic Republic of Congo

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.41	100.00	0.00	0.00	0.00
4	0.58	55.25	23.36	18.79	2.58
8	0.71	40.58	22.72	30.47	6.21
12	0.82	35.99	24.47	32.77	6.75
Variance Decomposition of D(D(LRCP)):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	1.20	4.79	95.20	0.00	0.00
4	1.76	12.01	78.19	5.40	4.39
8	2.37	16.24	68.20	8.40	7.13
12	2.89	28.86	50.21	13.77	7.15
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.72	23.83	2.03	74.13	0.00
4	1.27	44.44	7.62	39.27	8.65
8	1.84	32.20	28.34	33.62	5.82
12	2.33	23.33	46.73	25.55	4.37
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.58	52.86	5.11	6.05	35.96
4	0.70	49.26	7.93	14.66	28.13
8	0.85	51.89	12.87	12.58	22.64
12	0.88	51.09	12.85	14.44	21.60
Cholesky Ordering: D(LRMS) D(D(LRCP)) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.4.4: Lesotho

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(D(LINF))
1	0.18	100.00	0.00	0.00	0.00
4	0.31	79.82	6.16	0.44	13.56
8	0.40	61.92	9.95	4.79	23.33
12	0.47	55.82	9.62	10.07	24.47
Variance Decomposition of D(LRCP):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(D(LINF))
1	0.06	75.63	24.36	0.00	0.00
4	0.12	38.95	60.43	0.17	0.43
8	0.16	36.21	57.95	5.02	0.80
12	0.18	37.80	55.80	3.94	2.44
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(D(LINF))
1	0.01	5.14	1.53	93.32	0.00
4	0.01	5.44	2.95	90.51	1.08
8	0.02	5.69	2.39	90.73	1.17
12	0.02	6.43	2.35	89.95	1.25
Variance Decomposition of D(D(LINF)):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(D(LINF))
1	0.18	32.35	1.42	1.42	64.79
4	0.19	30.24	1.65	4.98	63.11
8	0.23	32.25	5.61	13.42	48.71
12	0.25	31.65	7.84	12.60	47.89
Cholesky Ordering: D(LRMS) D(LRCP) D(LRGDP) D(D(LINF))					

Source: Derived using Eviews 7

Table G.4.5: Mauritius

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	LINF
1	0.12	100.00	0.00	0.00	0.00
4	0.13	93.50	2.02	3.95	0.51
8	0.17	91.76	3.85	3.50	0.88
12	0.19	91.06	4.80	3.28	0.85
Variance Decomposition of D(LRCP):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	LINF
1	0.02	12.01	87.98	0.00	0.00
4	0.02	7.63	74.09	15.02	3.24
8	0.03	6.41	62.67	20.33	10.57
12	0.03	6.27	59.61	22.25	11.85
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	LINF
1	0.01	0.16	0.74	99.08	0.00
4	0.01	3.53	3.79	90.13	2.53
8	0.01	8.04	4.18	80.14	7.61
12	0.01	10.29	4.56	77.71	7.41
Variance Decomposition of LINF:					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	LINF
1	0.19	1.00	6.71	11.02	81.25
4	0.32	4.32	16.57	21.57	57.52
8	0.34	4.48	17.42	25.77	52.31
12	0.35	4.45	18.39	26.30	50.83
Cholesky Ordering: D(D(LRMS)) D(LRCP) D(LRGDP) LINF					

Source: Derived using Eviews 7

Table G.4.6: Mozambique

Variance Decomposition of D(D(LRMS)):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	D(LINF)
1	0.04	100.00	0.00	0.00	0.00
4	0.06	62.23	15.13	15.19	7.43
8	0.08	60.66	15.21	14.18	9.93
12	0.08	60.94	14.37	13.78	10.89
Variance Decomposition of D(LRCP):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	D(LINF)
1	0.77	5.68	94.31	0.00	0.00
4	0.94	15.60	73.60	0.47	10.32
8	0.98	16.02	67.64	4.56	11.76
12	0.98	16.20	67.44	4.61	11.73
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	D(LINF)
1	0.02	31.86	4.46	63.67	0.00
4	0.03	27.08	6.23	66.09	0.58
8	0.03	27.66	7.88	60.88	3.55
12	0.03	27.55	8.27	60.24	3.92
Variance Decomposition of D(LINF):					
Period	S.E.	D(D(LRMS))	D(LRCP)	D(LRGDP)	D(LINF)
1	0.55	32.61	0.60	16.41	50.36
4	0.62	30.14	2.69	25.95	41.20
8	0.64	29.13	3.28	28.45	39.12
12	0.64	29.13	3.40	28.46	39.00
Cholesky Ordering: D(D(LRMS)) D(LRCP) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.4.7: South Africa

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(LINF)
1	0.01	100.00	0.00	0.00	0.00
4	0.05	31.31	40.19	20.07	8.41
8	0.07	28.44	26.32	13.47	31.76
12	0.11	42.92	21.81	11.21	24.03
Variance Decomposition of D(LRCP):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(LINF)
1	0.02	19.59	80.40	0.00	0.00
4	0.06	22.11	52.47	11.06	14.34
8	0.09	33.26	35.34	9.10	22.28
12	0.13	40.01	29.76	11.52	18.70
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(LINF)
1	0.00	23.36	5.59	71.04	0.00
4	0.00	20.42	21.84	37.81	19.92
8	0.02	25.28	36.04	16.14	22.52
12	0.02	19.39	28.94	16.02	35.64
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(LRCP)	D(LRGDP)	D(LINF)
1	0.51	2.75	28.79	26.77	41.67
4	0.72	10.49	29.51	29.27	30.71
8	2.04	20.49	31.60	30.55	17.34
12	3.53	15.69	29.13	14.92	40.23
Cholesky Ordering: D(LRMS) D(LRCP) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

Table G.4.8: Swaziland

Variance Decomposition of D(LRMS):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.06	100.00	0.00	0.00	0.00
4	0.07	98.18	1.00	0.12	0.69
8	0.07	98.12	1.01	0.13	0.73
12	0.07	98.07	1.01	0.13	0.77
Variance Decomposition of D(D(LRCP)):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.04	7.94	92.05	0.00	0.00
4	0.05	12.96	66.82	5.12	15.08
8	0.05	11.57	57.99	4.91	25.50
12	0.06	10.50	51.92	4.53	33.03
Variance Decomposition of D(LRGDP):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.02	9.73	15.20	75.05	0.00
4	0.03	14.48	14.74	64.14	6.62
8	0.03	13.90	14.42	60.01	11.65
12	0.03	13.23	14.19	56.44	16.13
Variance Decomposition of D(LINF):					
Period	S.E.	D(LRMS)	D(D(LRCP))	D(LRGDP)	D(LINF)
1	0.29	3.64	3.66	14.41	78.27
4	0.43	7.52	11.98	8.51	71.97
8	0.55	6.23	11.69	5.90	76.16
12	0.64	5.43	11.46	4.82	78.27
Cholesky Ordering: D(LRMS) D(D(LRCP)) D(LRGDP) D(LINF)					

Source: Derived using Eviews 7

APPENDIX H

IMPULSE RESPONSE FUNCTIONS OF A MONETARY POLICY SHOCK

H.1: Monetary Aggregate Channel

Figure H.1.1: Angola

Response to Cholesky One S.D. Innovations ± 2 S.E.

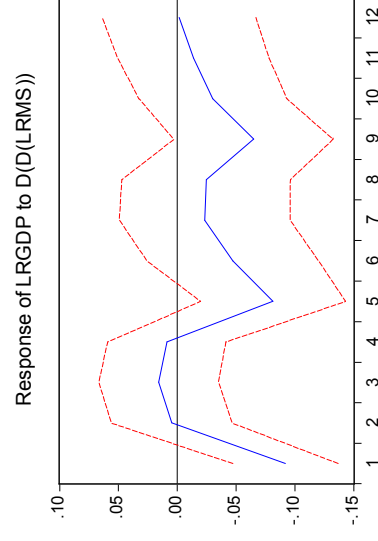


Figure H.1.2: Botswana

Response to Cholesky One S.D. Innovations ± 2 S.E.

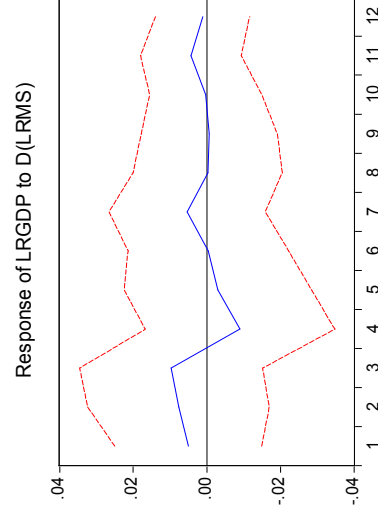
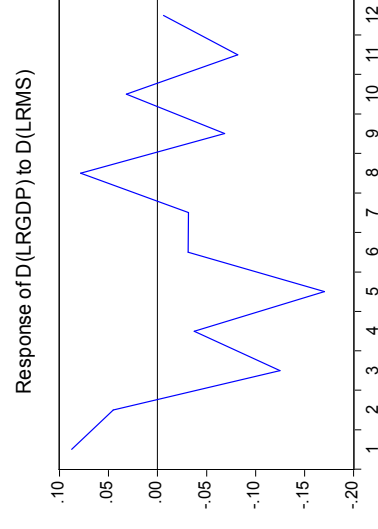
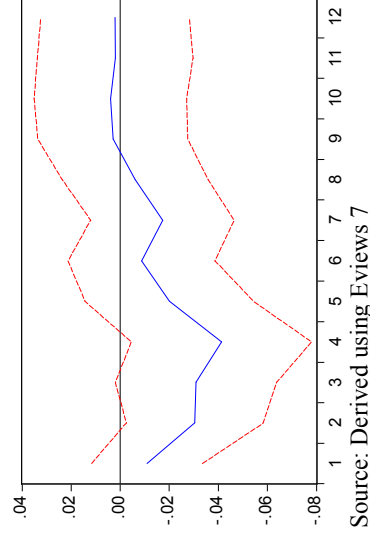


Figure H.1.3: The Democratic Republic of Congo

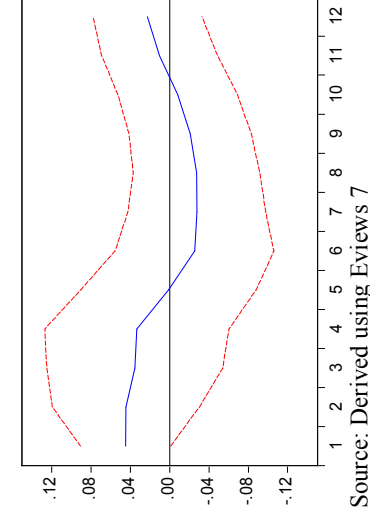
Response to Cholesky One S.D. Innovations



Response of D(LINF) to D(D(LRMS))



Response of LINF to D(LRMS)



Response of D(LINF) to D(LRMS)

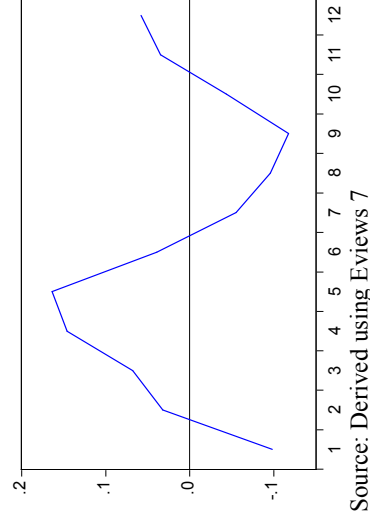


Figure H.1.4: Lesotho
 Response to Cholesky One S.D. Innovations

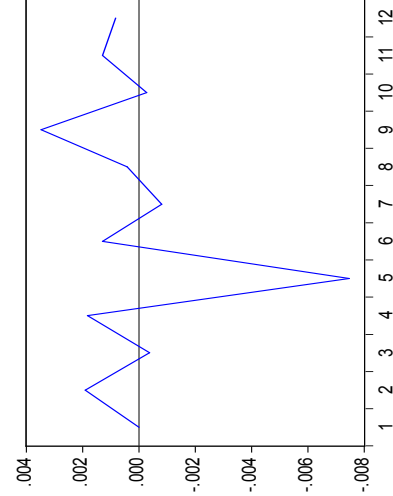


Figure H.1.5: Madagascar
 Response to Cholesky One S.D. Innovations ± 2 S.E.

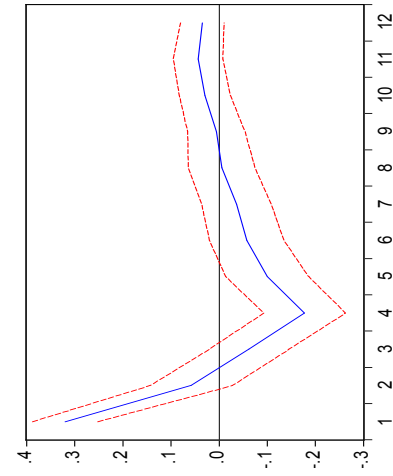
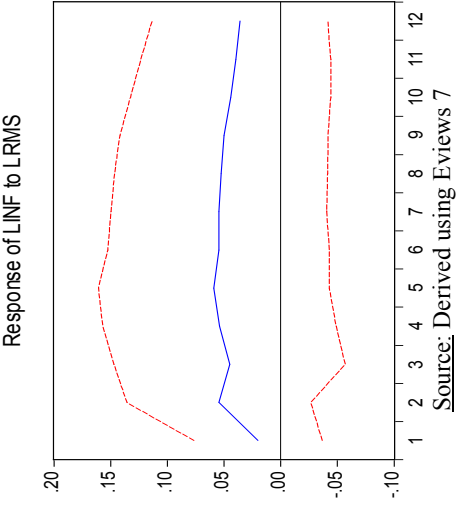
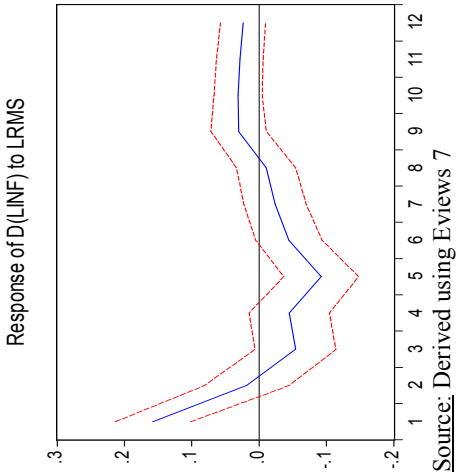
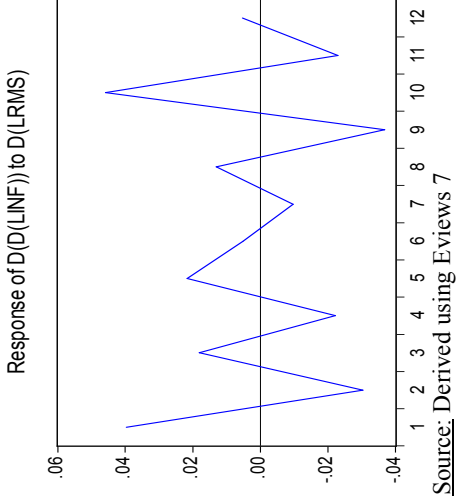
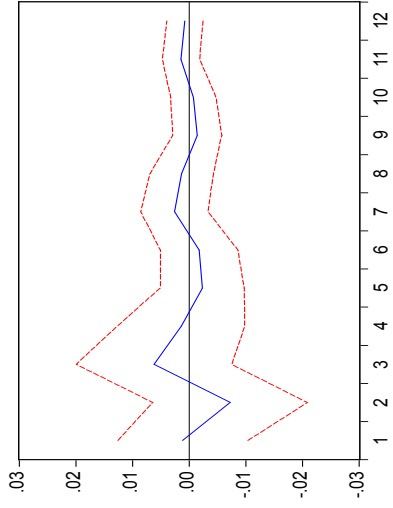


Figure H.1.6: Malawi
 Response to Cholesky One S.D. Innovations ± 2 S.E.



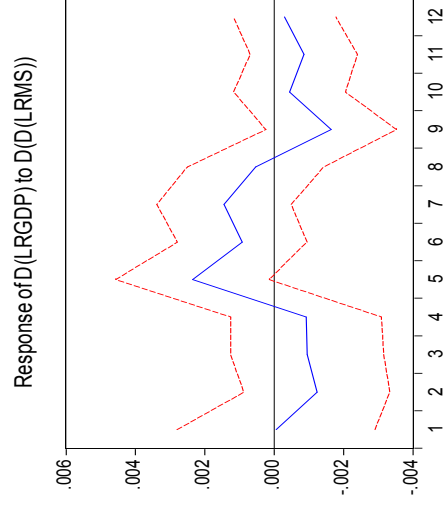
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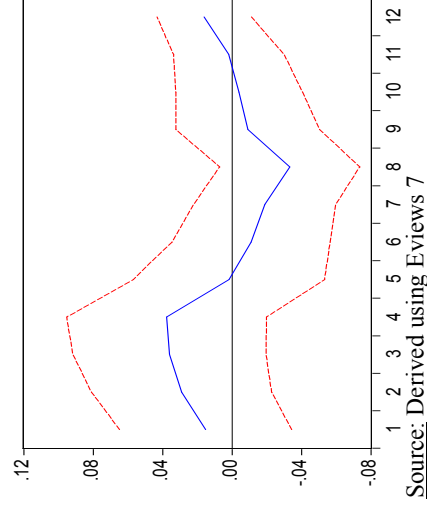
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Figure H.1.1.7: Mauritius

Response to Cholesky One S.D. Innovations ± 2 S.E.



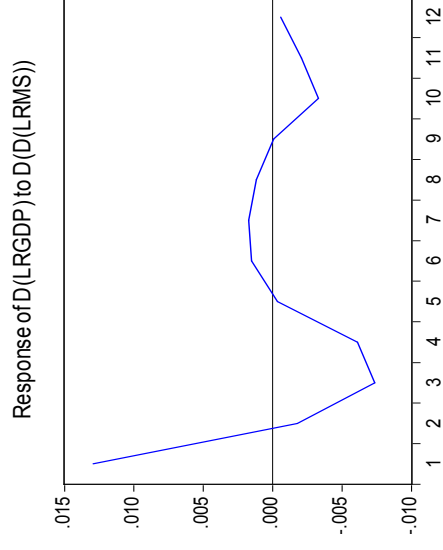
Response of LINF to D(D(LRMS))



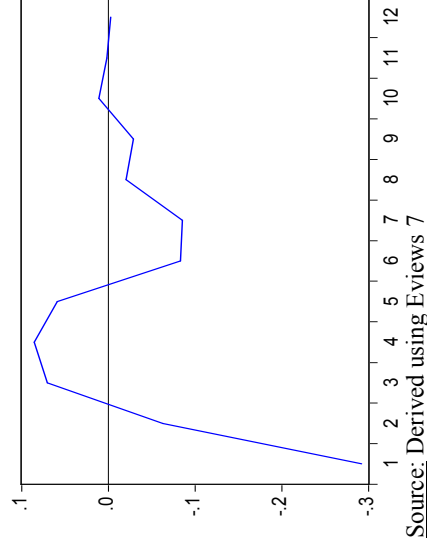
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Figure H.1.1.8: Mozambique

Response to Cholesky One S.D. Innovations



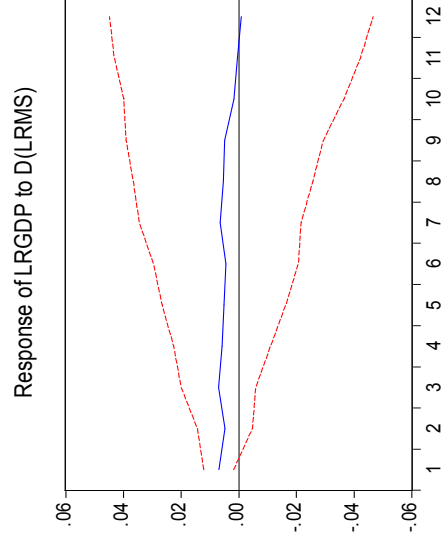
Response of D(LINF) to D(D(LRMS))



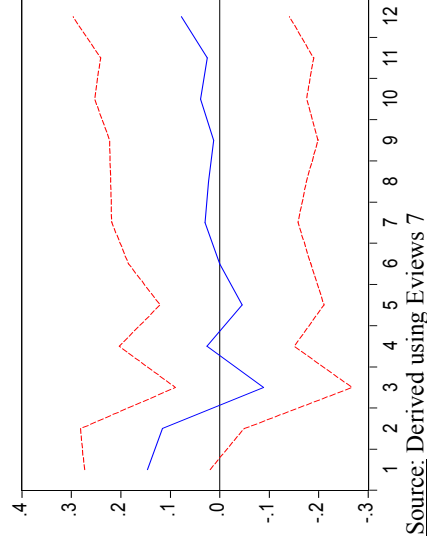
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Figure H.1.9: Namibia

Response to Cholesky One S.D. Innovations ± 2 S.E.



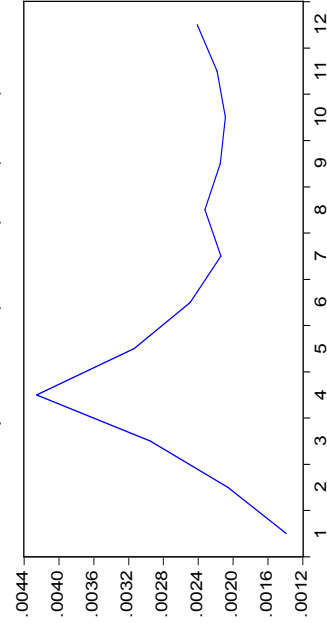
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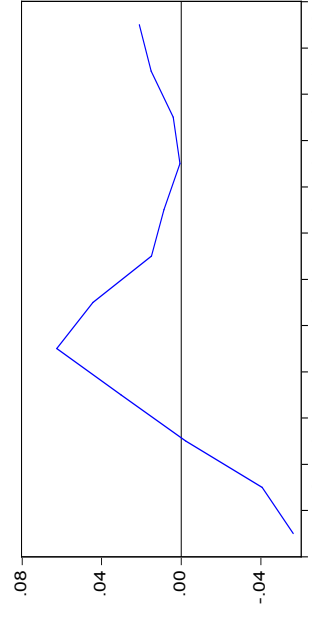
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Figure H.I.10: South Africa

Response to Cholesky One S.D. Innovations
Response of D(LRGDP) to D(LRMS)



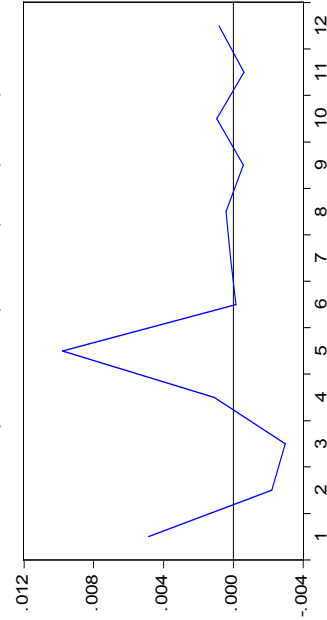
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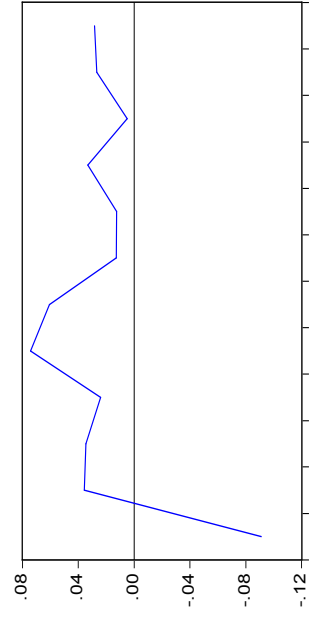
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Figure H.I.11: Swaziland

Response to Cholesky One S.D. Innovations
Response of D(LRGDP) to D(LRMS)



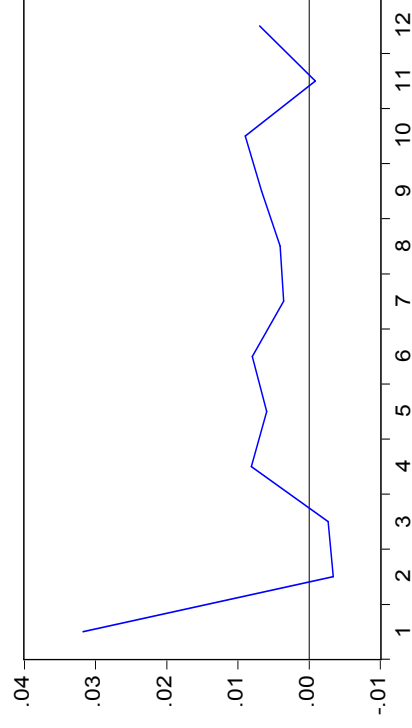
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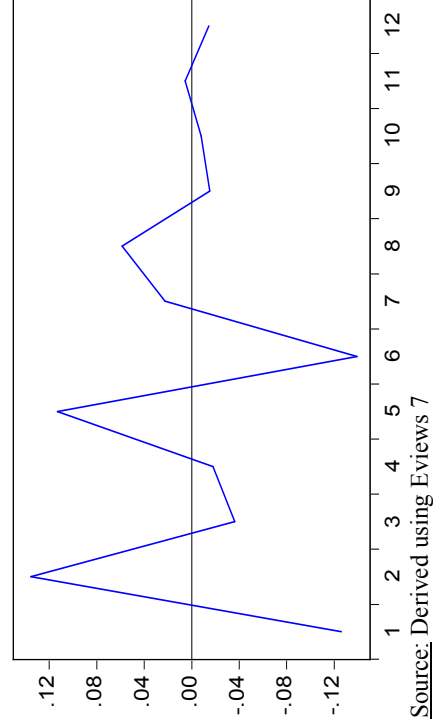
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Figure H.1.12: Tanzania

Response to Cholesky One S.D. Innovations
Response of D(LRGDP) to D(LRMS)



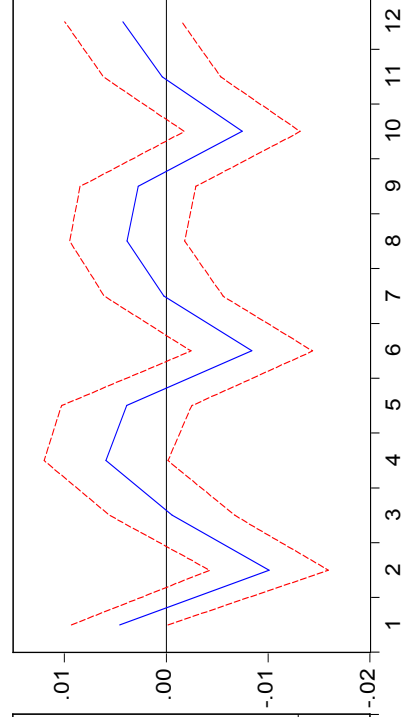
Response of D(D(LINF)) to D(LRMS)



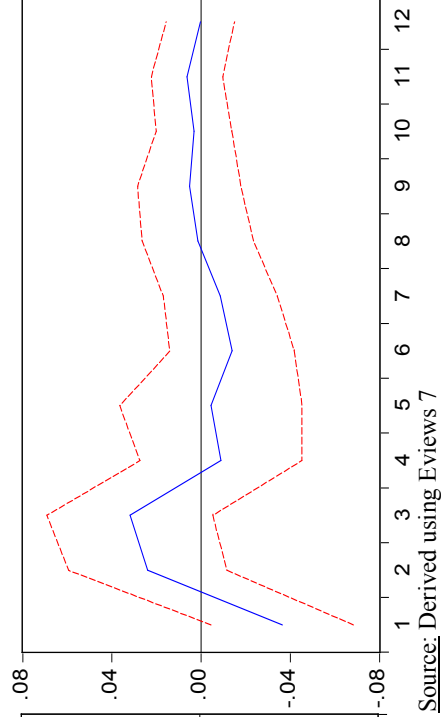
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Figure H.1.13: Zambia

Response to Cholesky One S.D. Innovations ± 2 S.E.
Response of D(D(LRGDP)) to D(LRMS)



Response of D(LINF) to D(LRMS)



Source: Derived using Eviews 7

H.2: Interest Rate Channel
Figure H.2.1: Angola

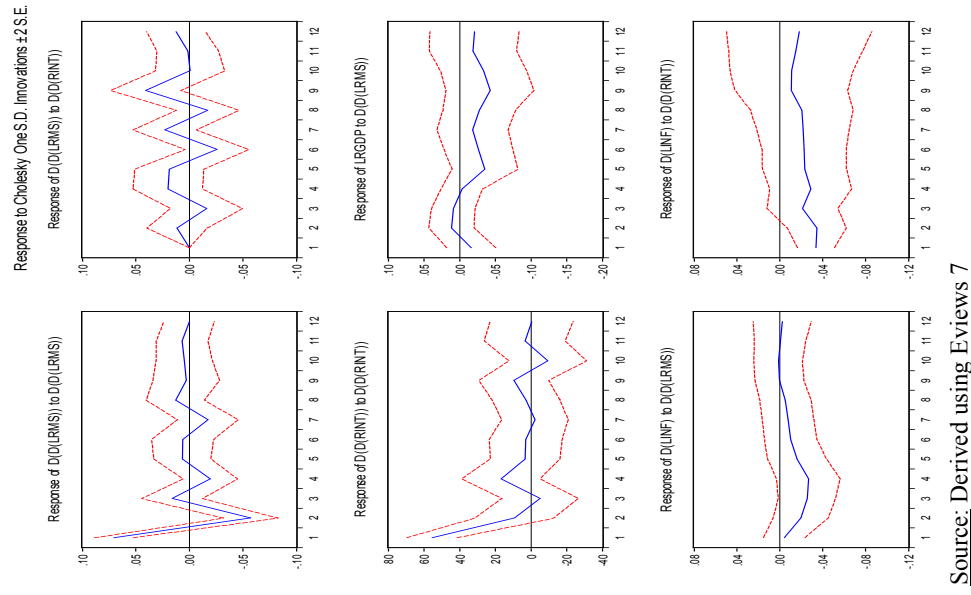


Figure H.2.2: Botswana

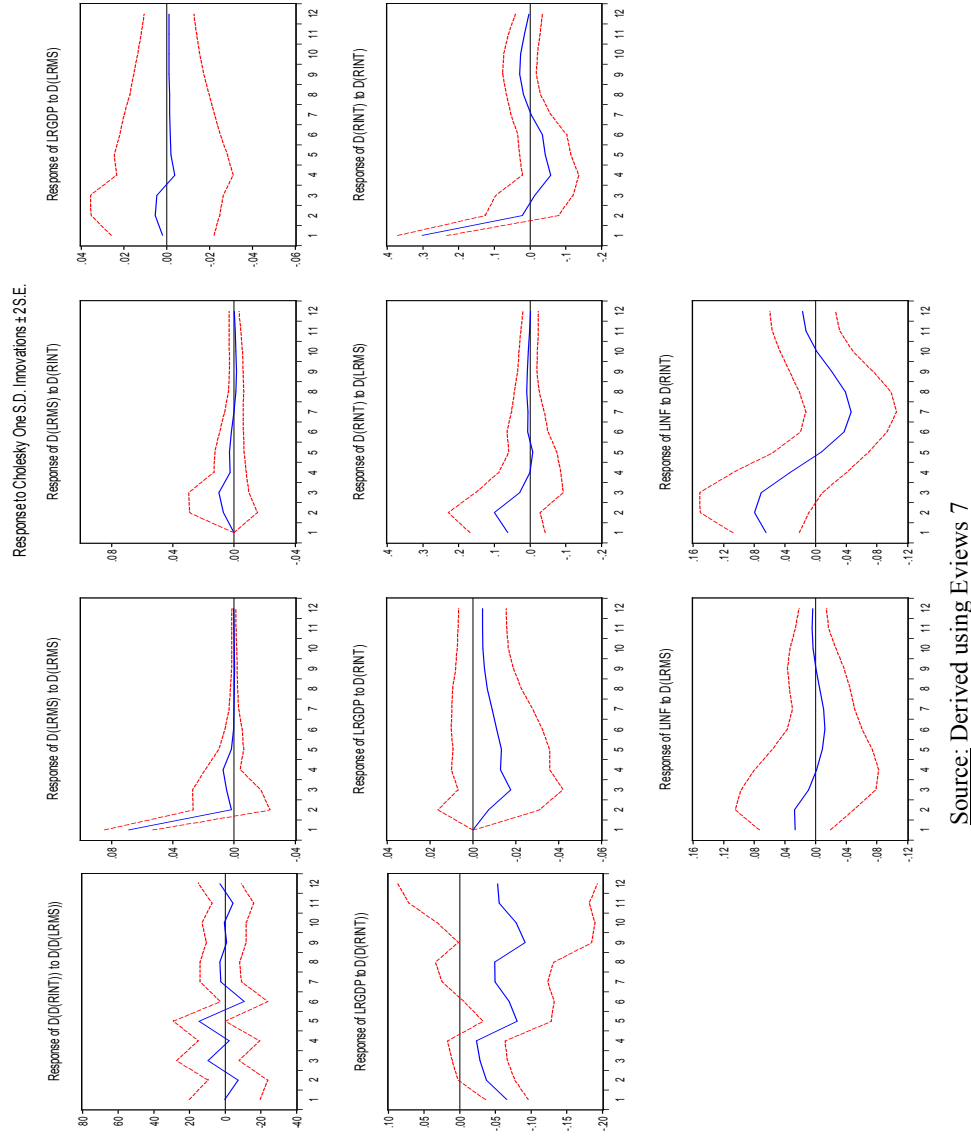
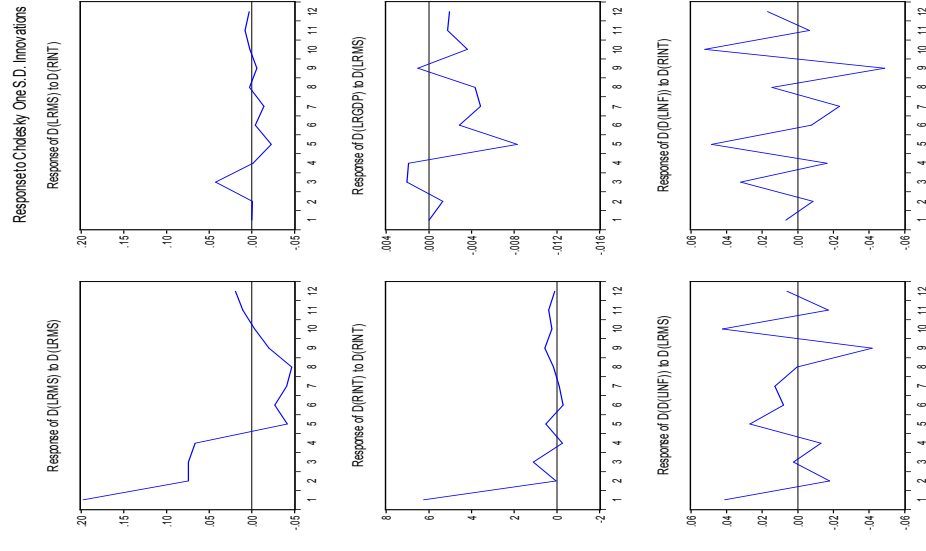
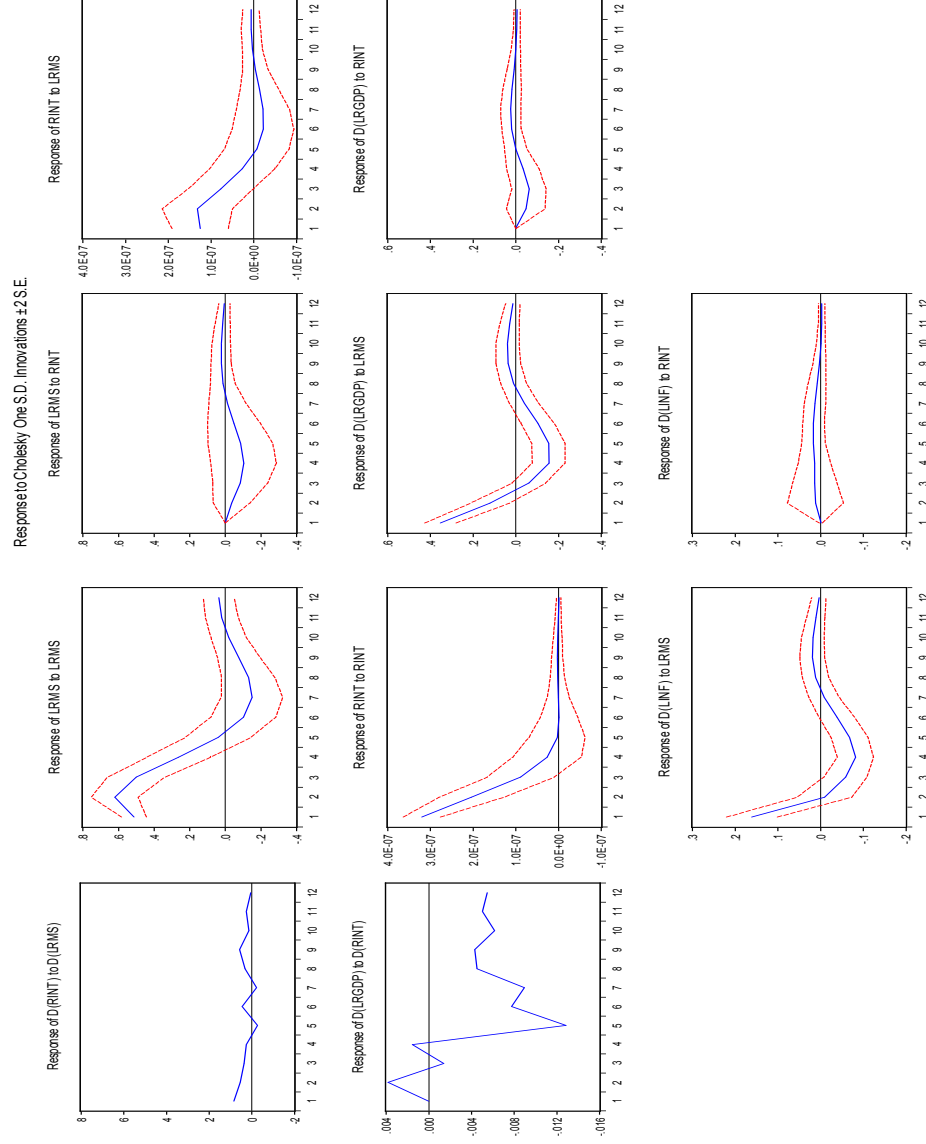


Figure H.2.3: Lesotho



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Figure H.2.4: Madagascar



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Figure H.2.5: Malawi

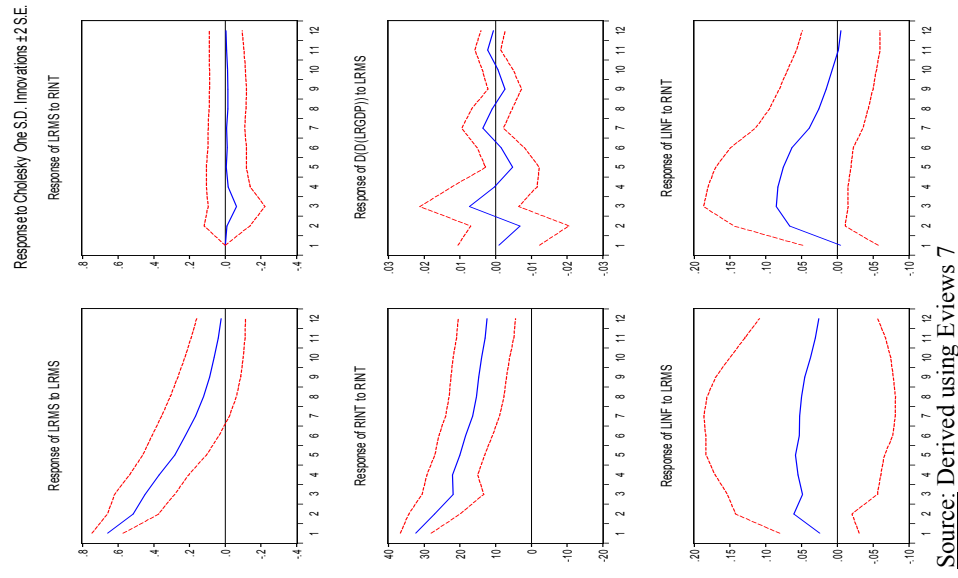


Figure H.2.6: Mauritius

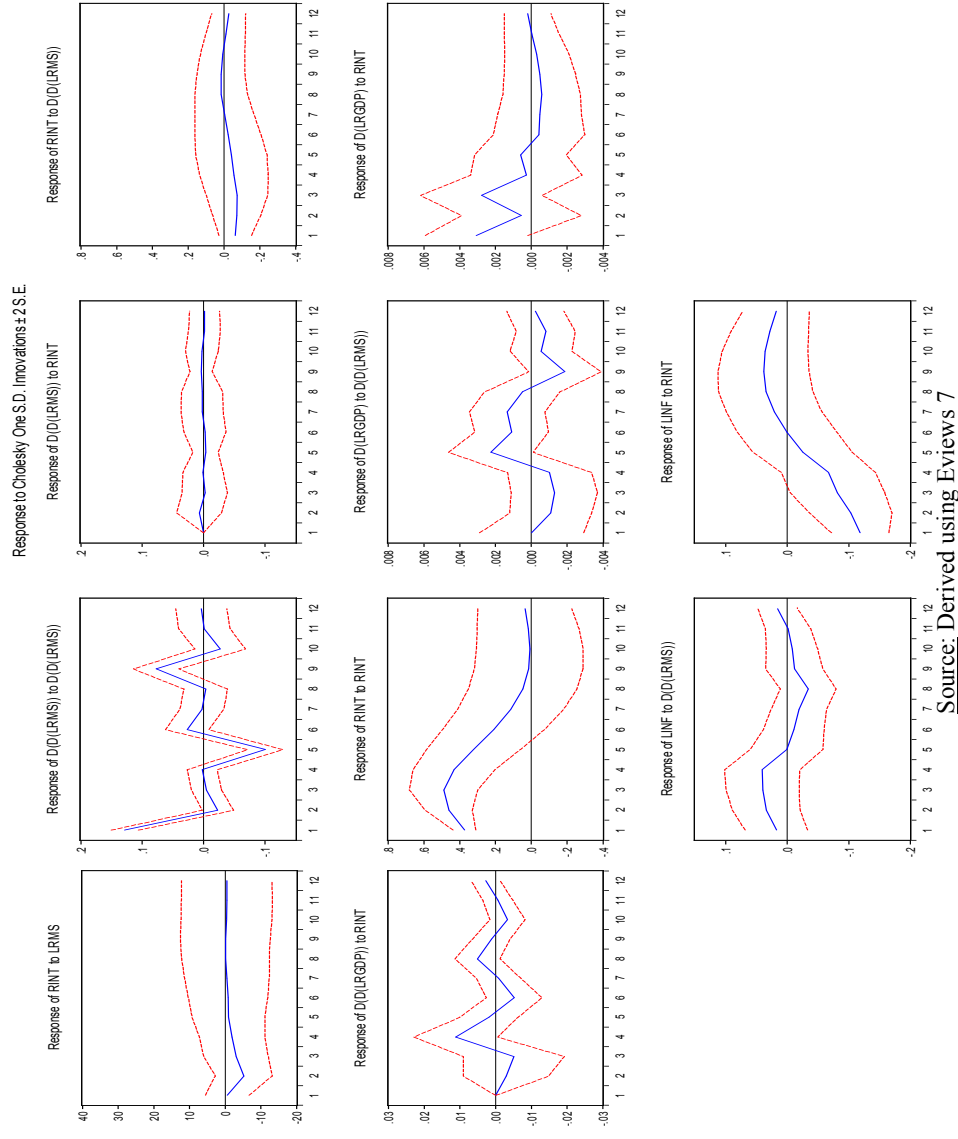
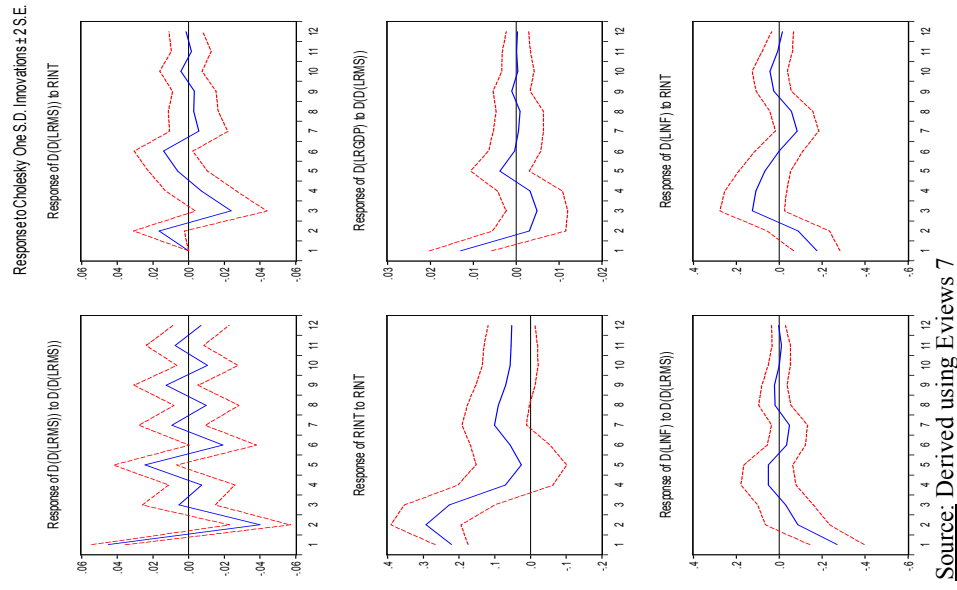
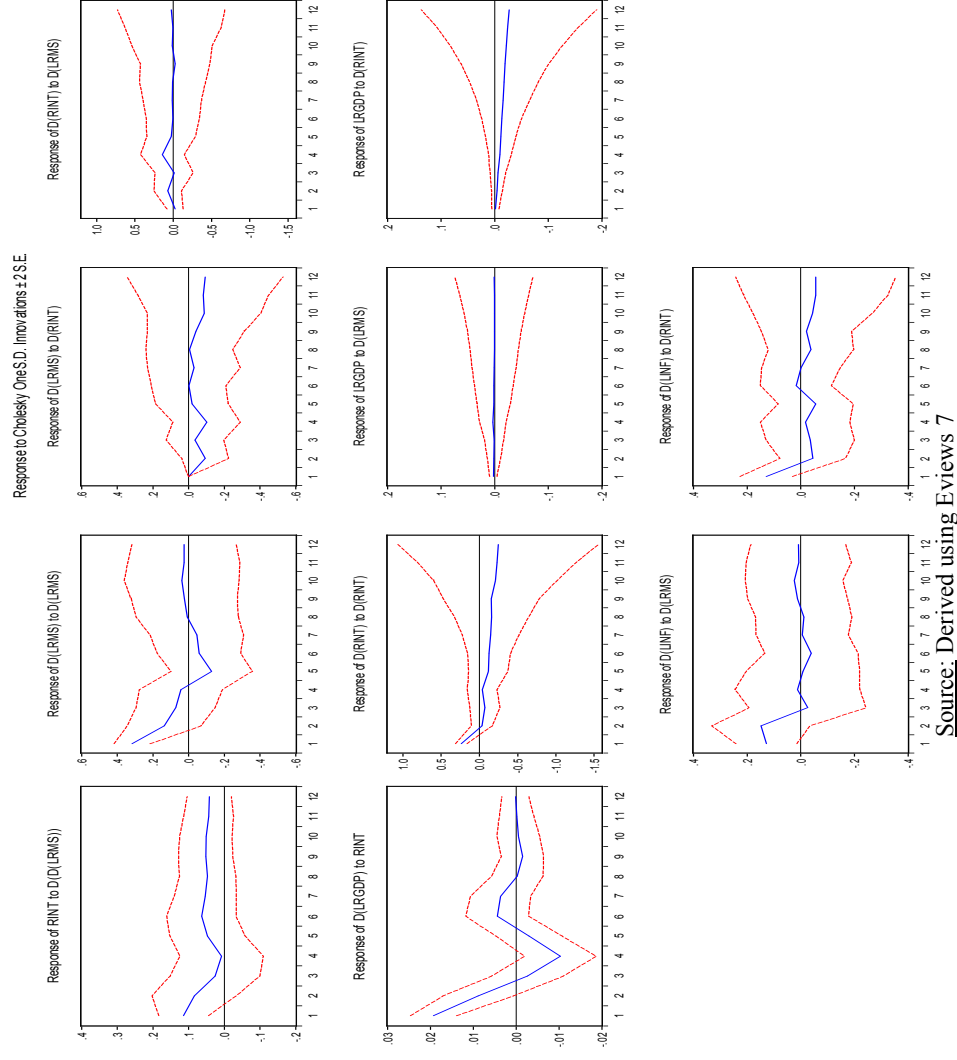


Figure H.2.7: Mozambique



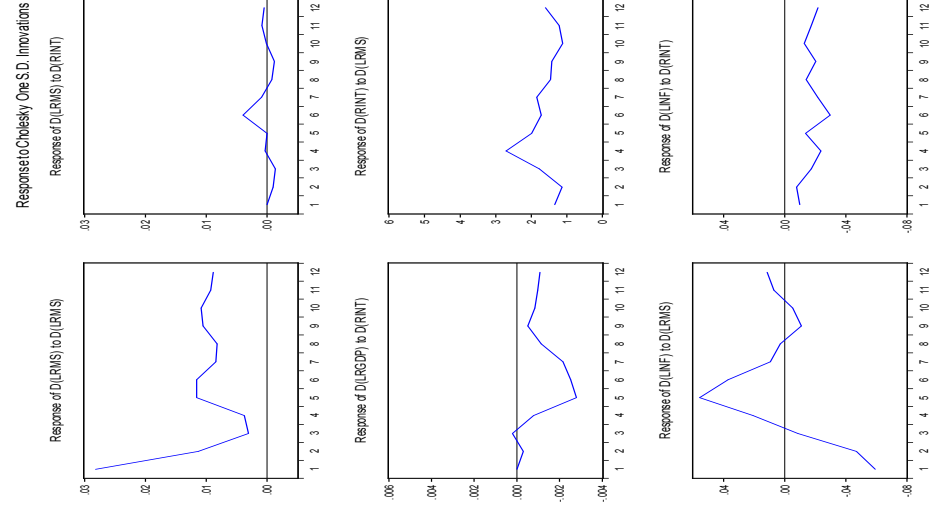
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Figure H.2.8: Namibia



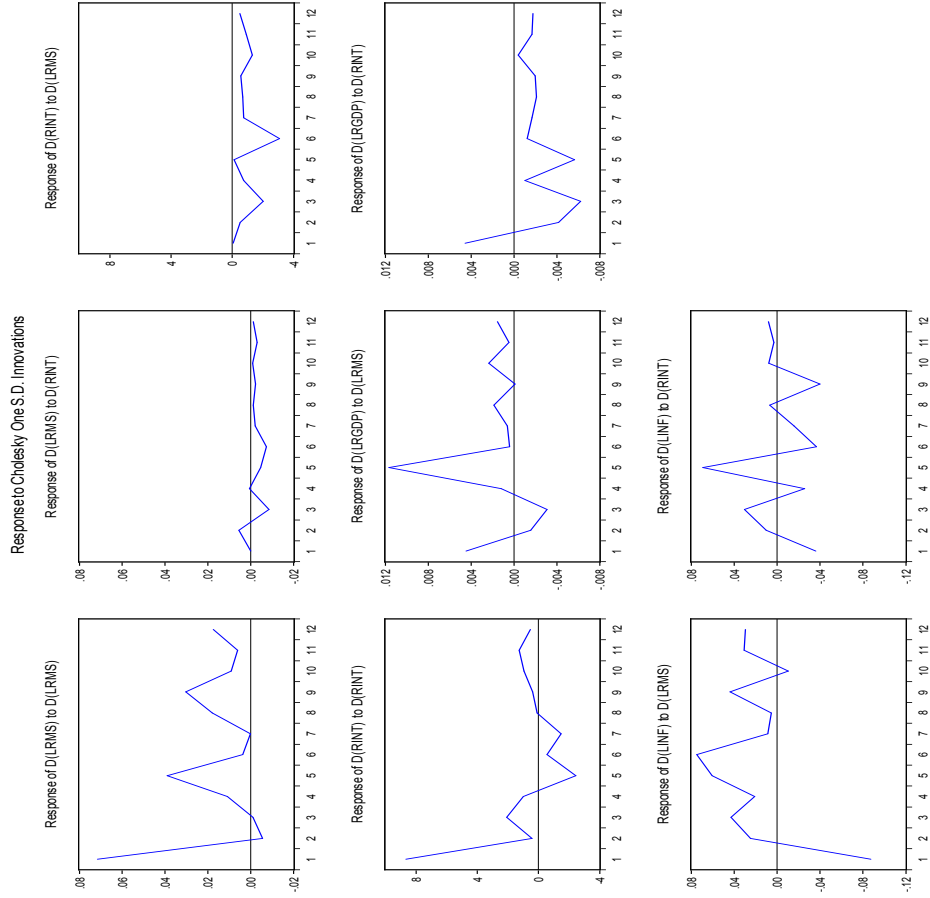
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Figure H.2.9: South Africa



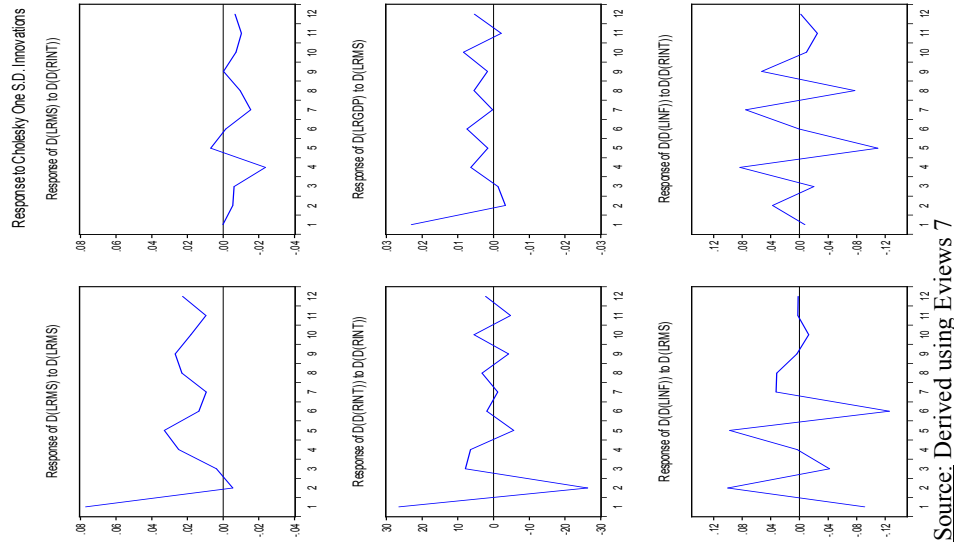
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Figure H.2.10: Swaziland



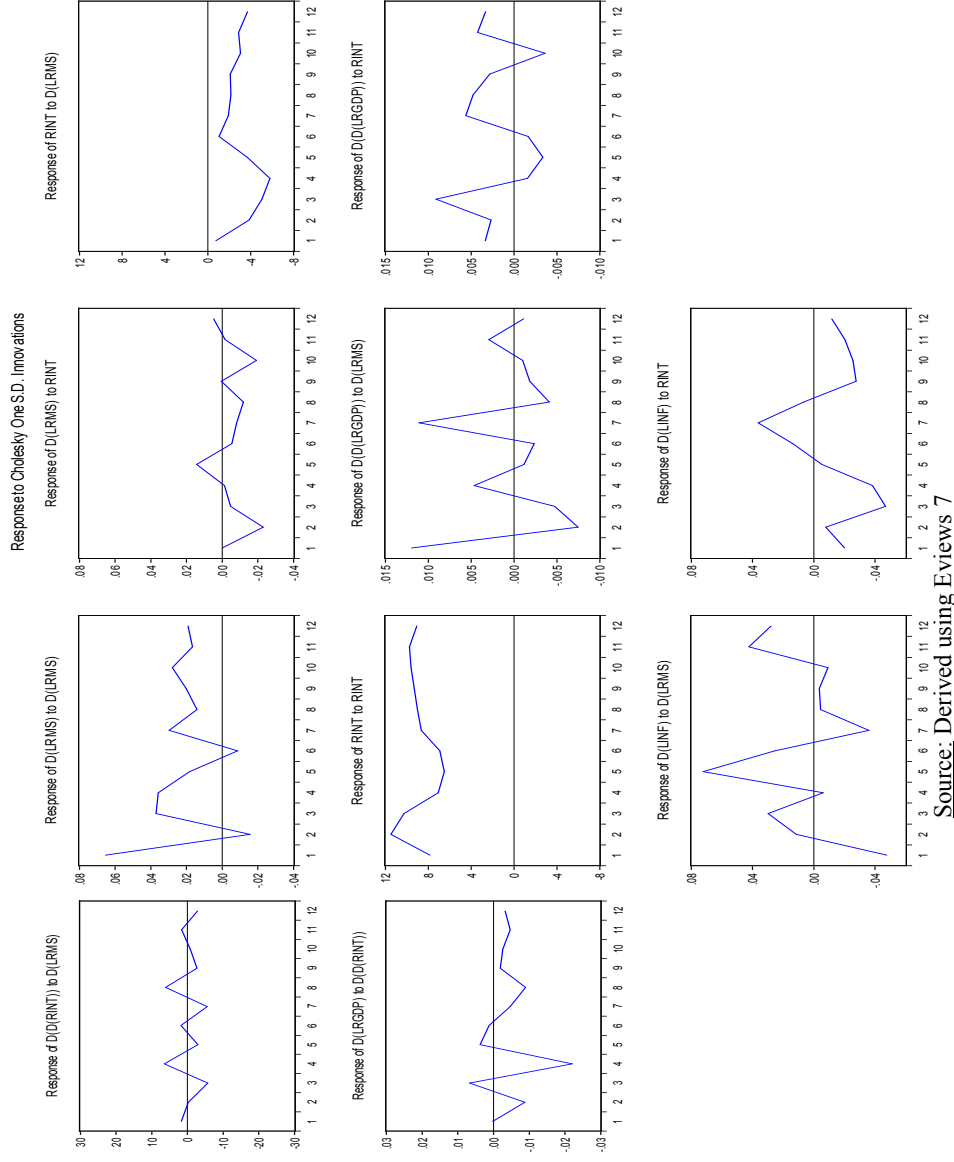
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Figure H.2.11: Tanzania



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Figure H.2.12: Zambia



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H.3: Exchange Rate Channel
Figure H.3.1: Angola

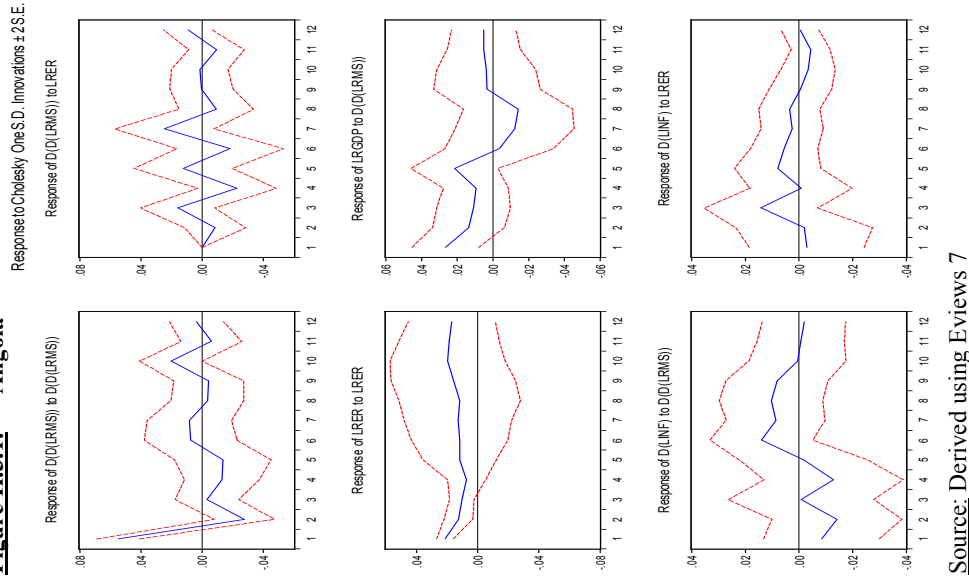


Figure H.3.2: Botswana

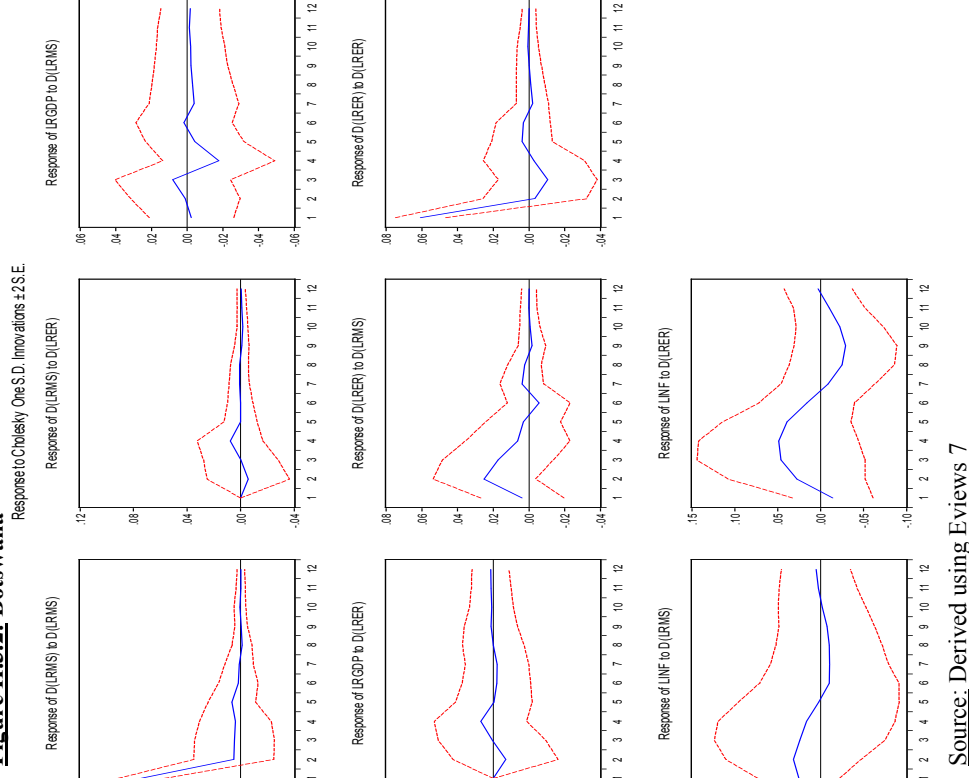


Figure H.3.3: The Democratic Republic of Congo

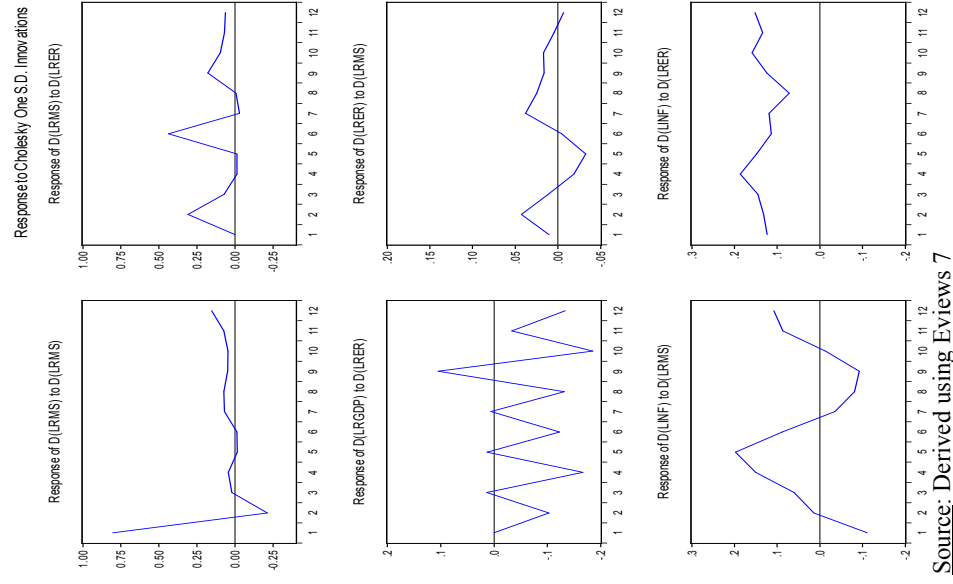


Figure H.3.4: Lesotho

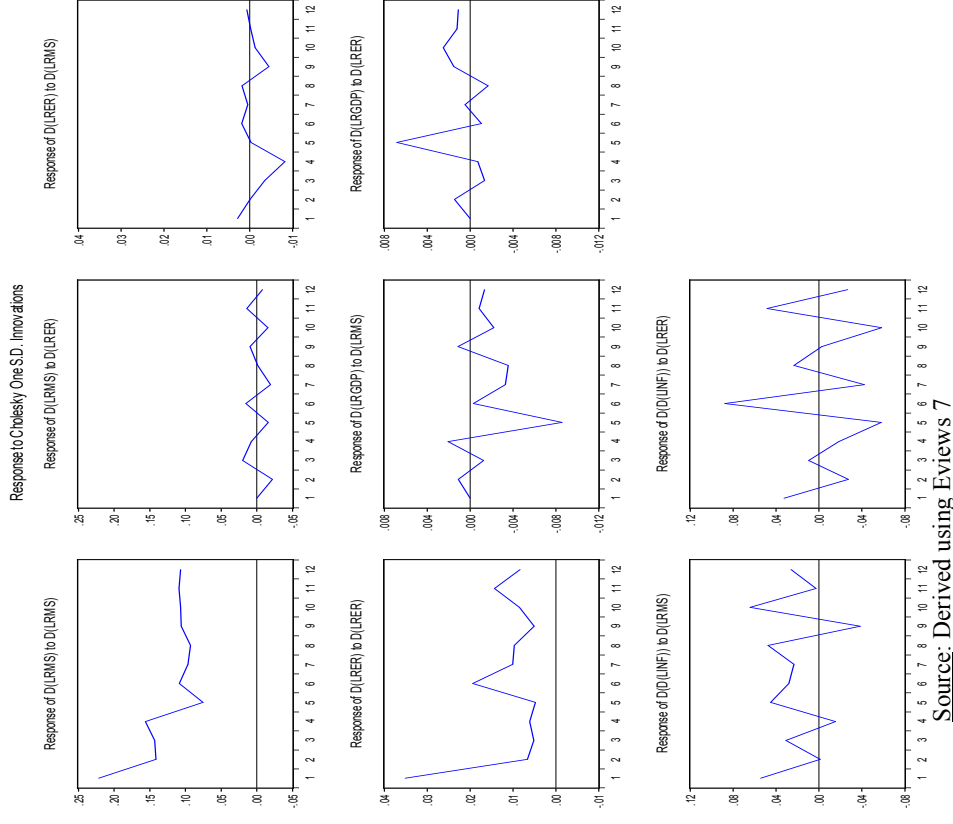


Figure H.3.5: Madagascar

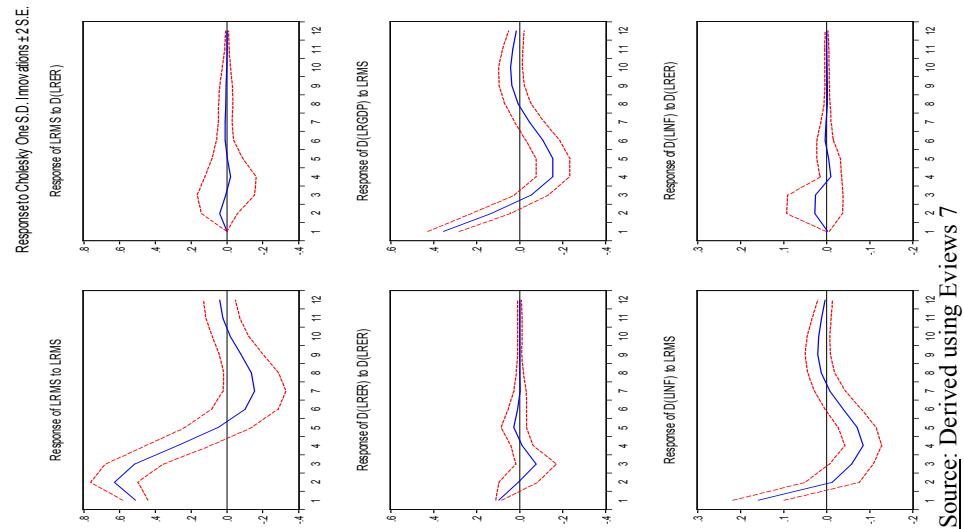


Figure H.3.6: Malawi

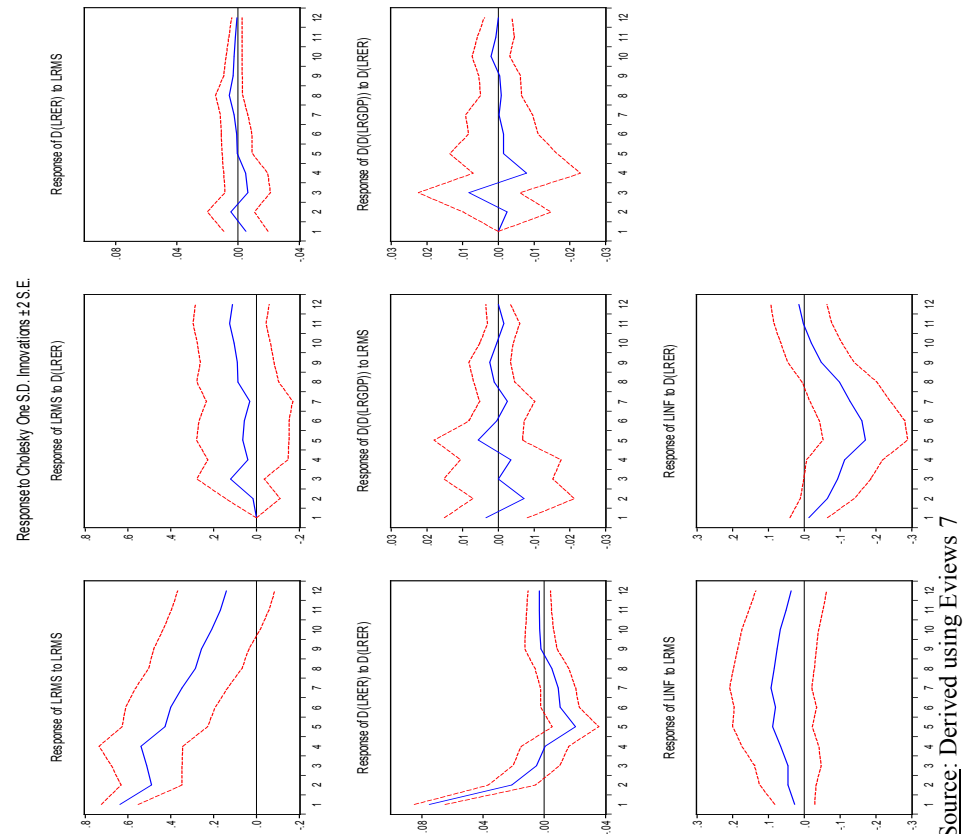


Figure H.3.7: Mauritius

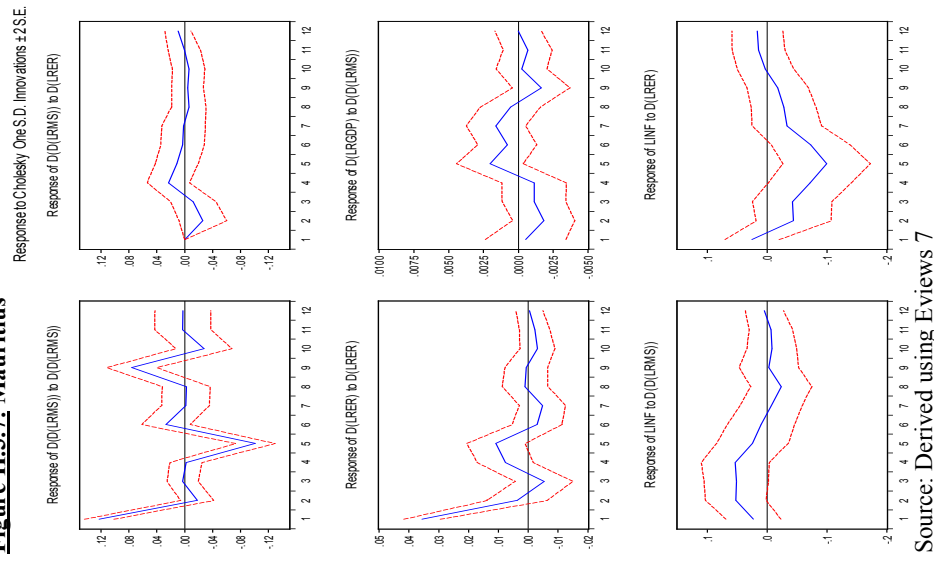


Figure H.3.8: Mozambique

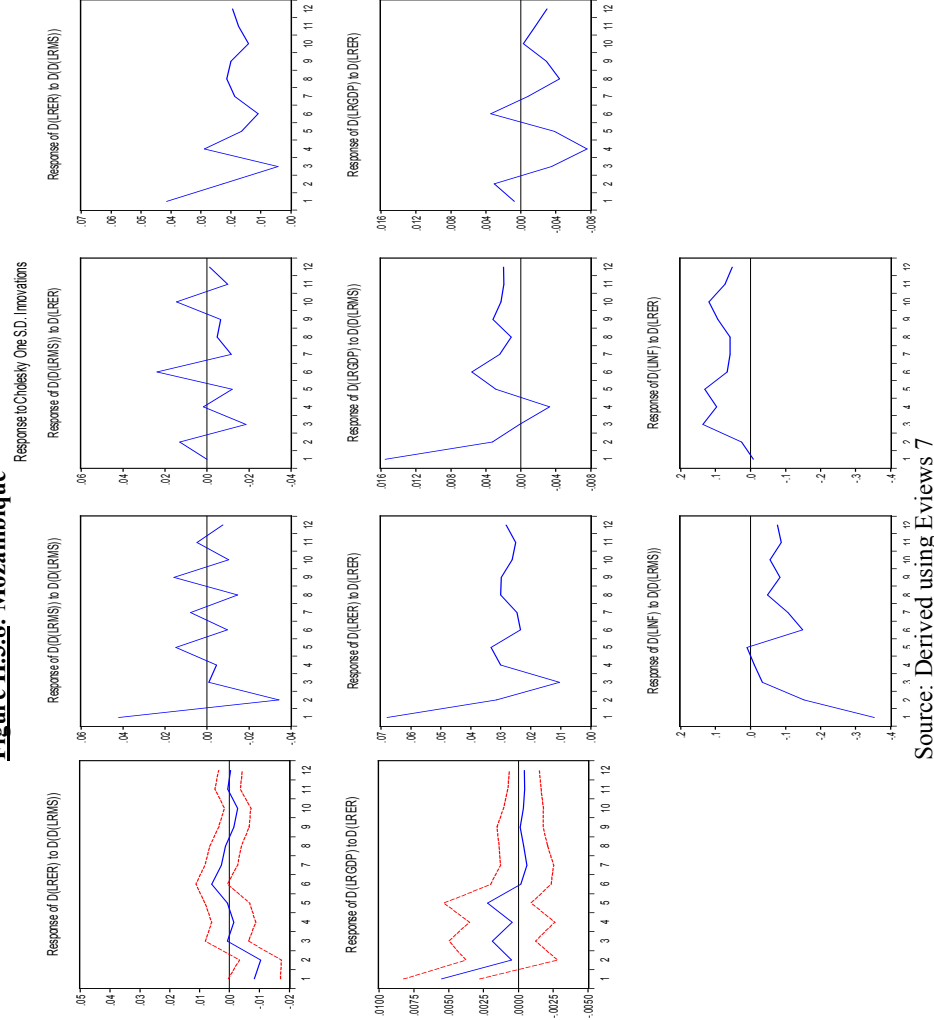
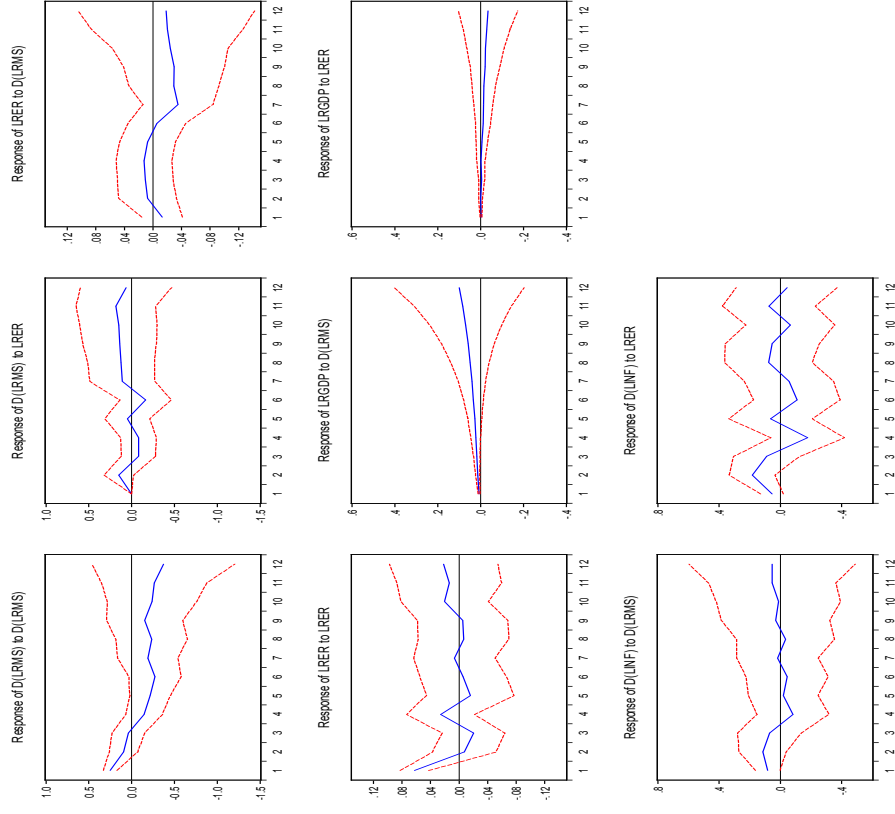


Figure H.3.9: Namibia

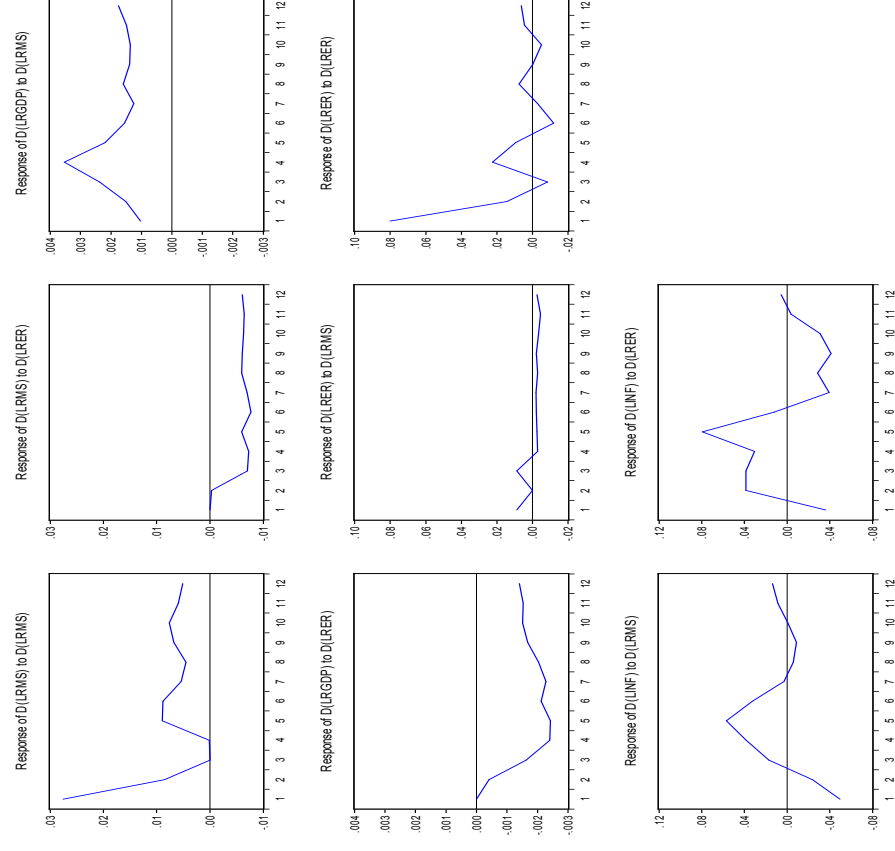
Response to Cholesky One S.D. Innovations ± 2 S.E.



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Figure H.3.10: South Africa

Response to Cholesky One S.D. Innovations



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Figure H.3.11: Swaziland

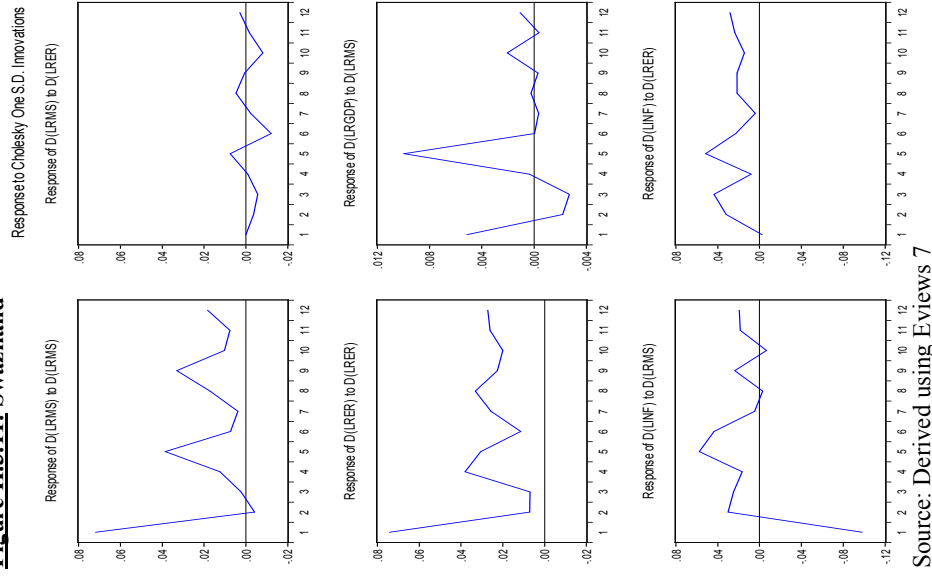


Figure H.3.12: Tanzania

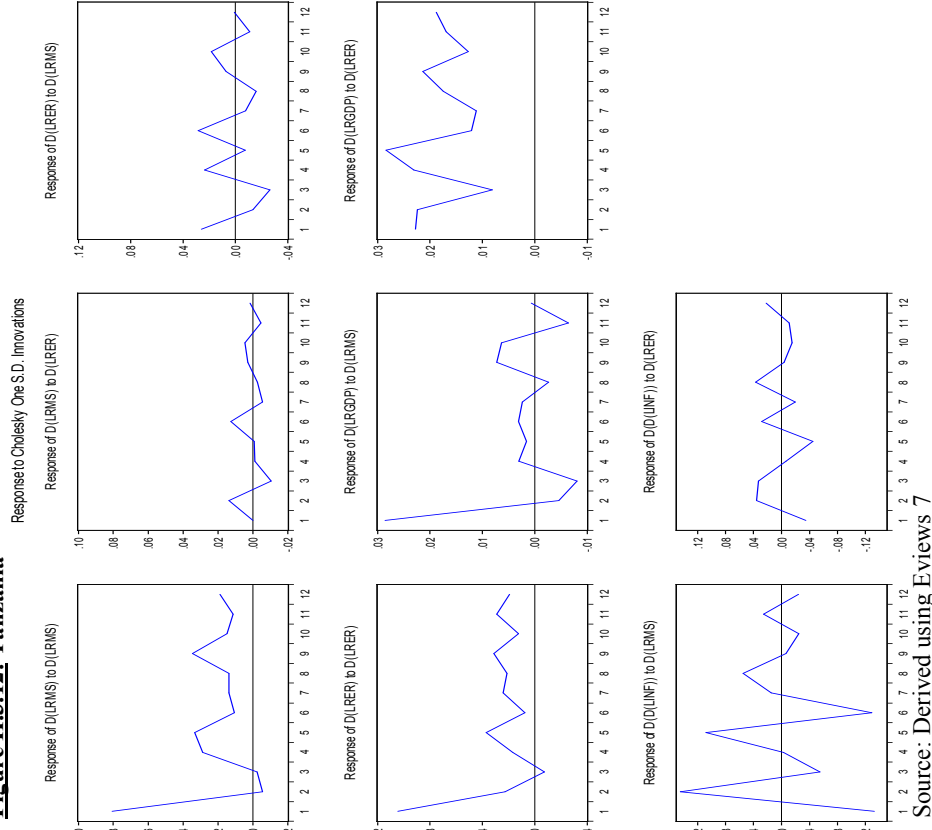
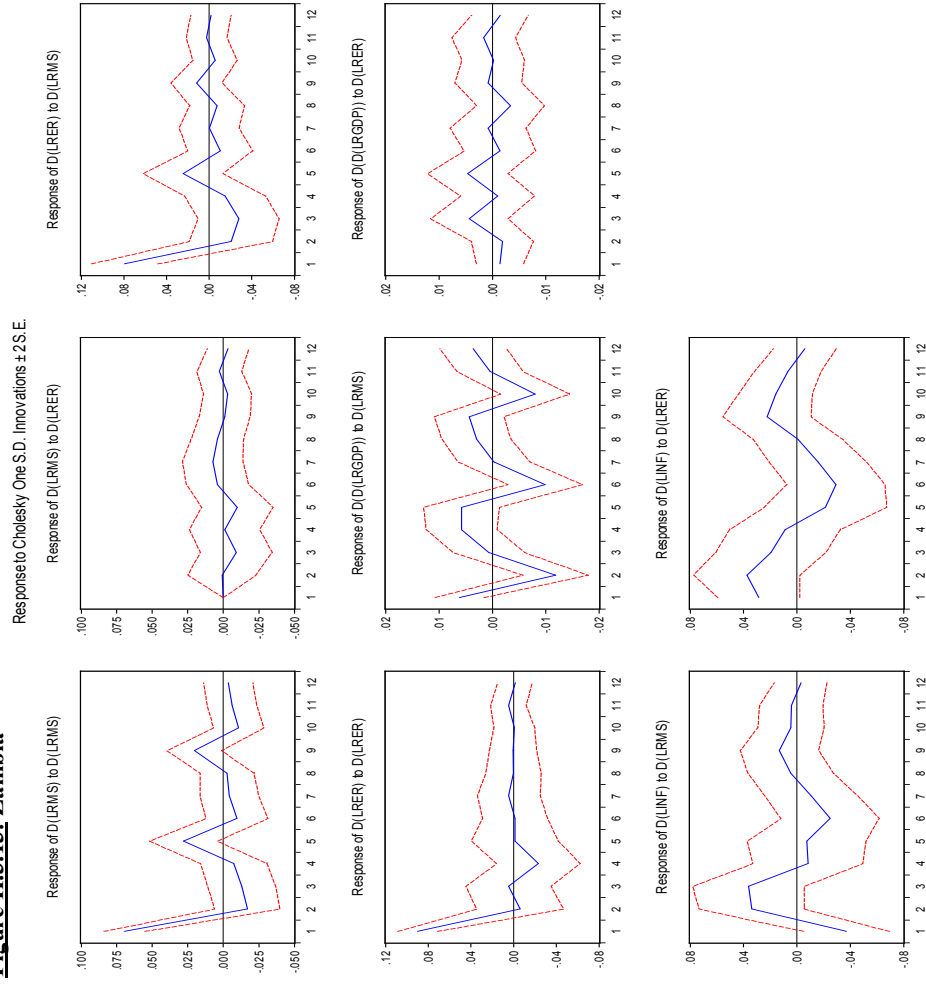


Figure H.3.13: Zambia



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H.4: Credit Channel

Figure H.4.1: Angola

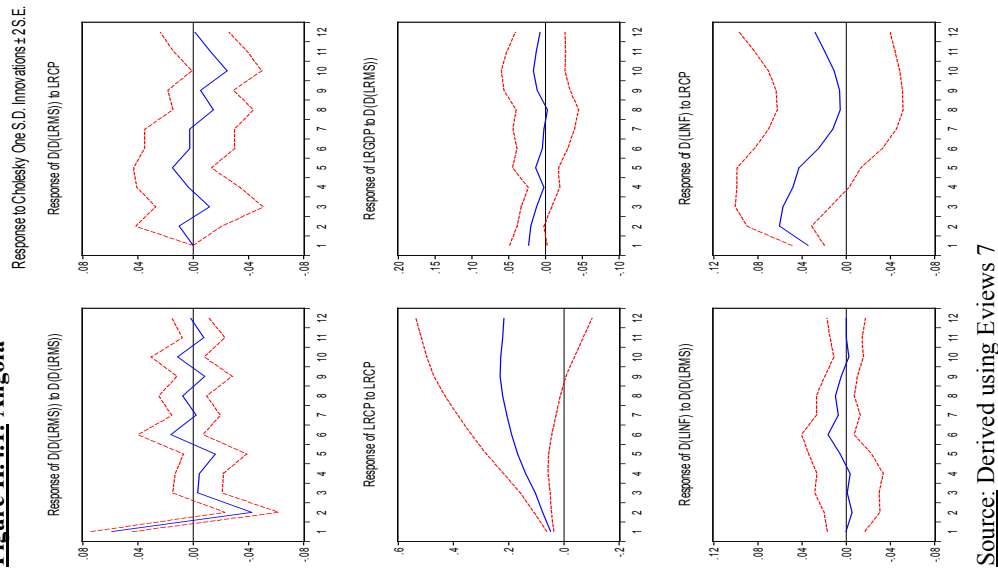


Figure H.4.2: Botswana

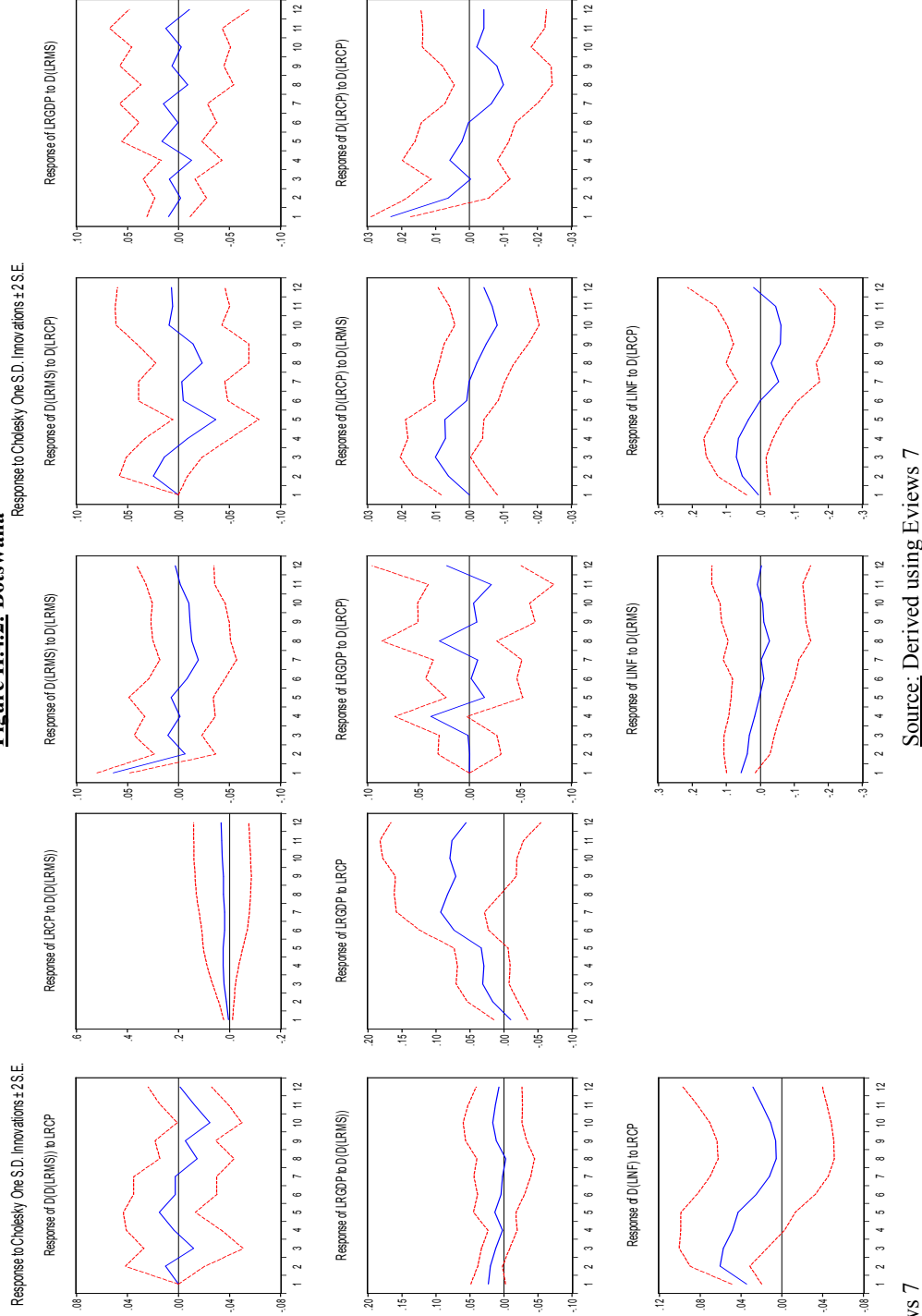
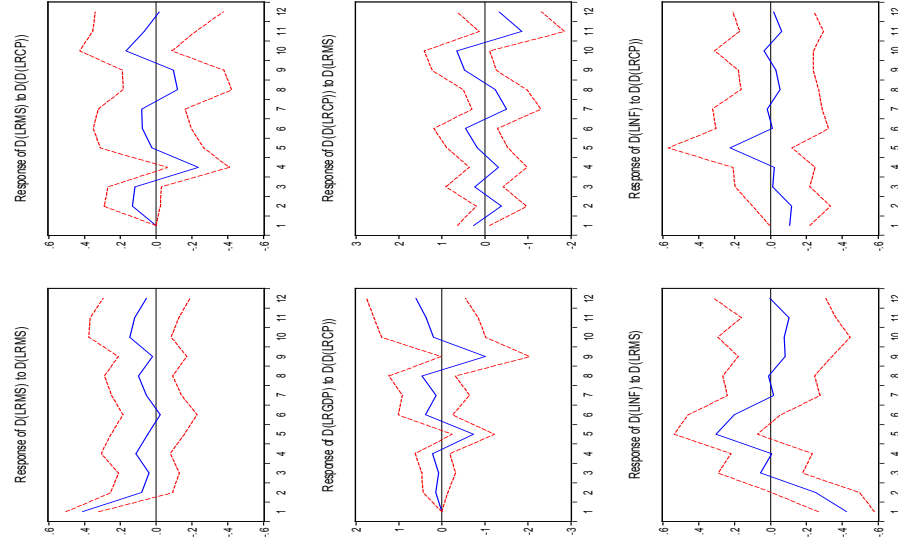


Figure H.4.3: The Democratic Republic of Congo

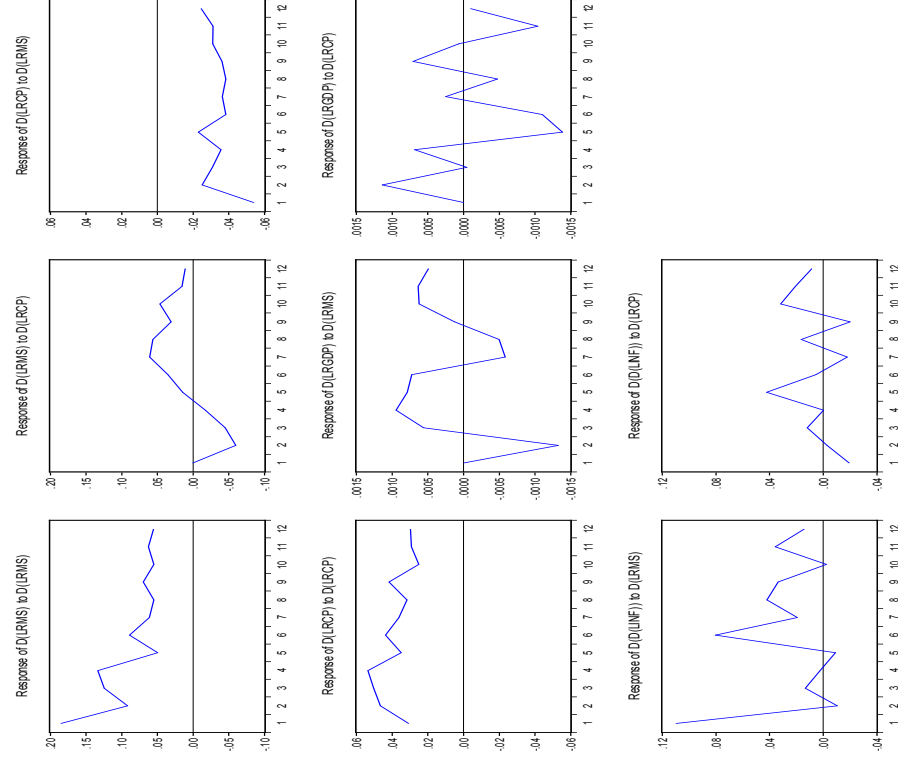
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Figure H.4.4: Lesotho

Response to Cholesky One S.D. Innovations



Source: Derived using Eviews 7

Figure H.4.5: Mauritius

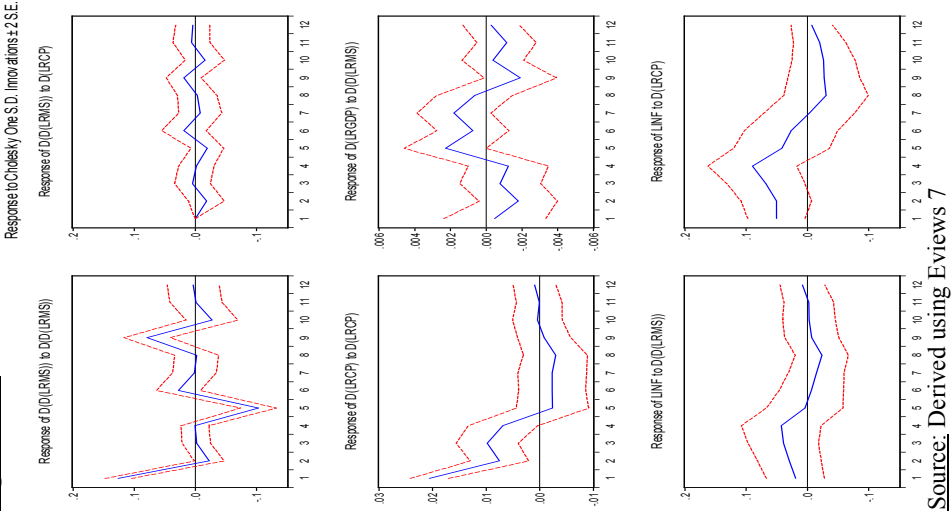


Figure H.4.6: Mozambique

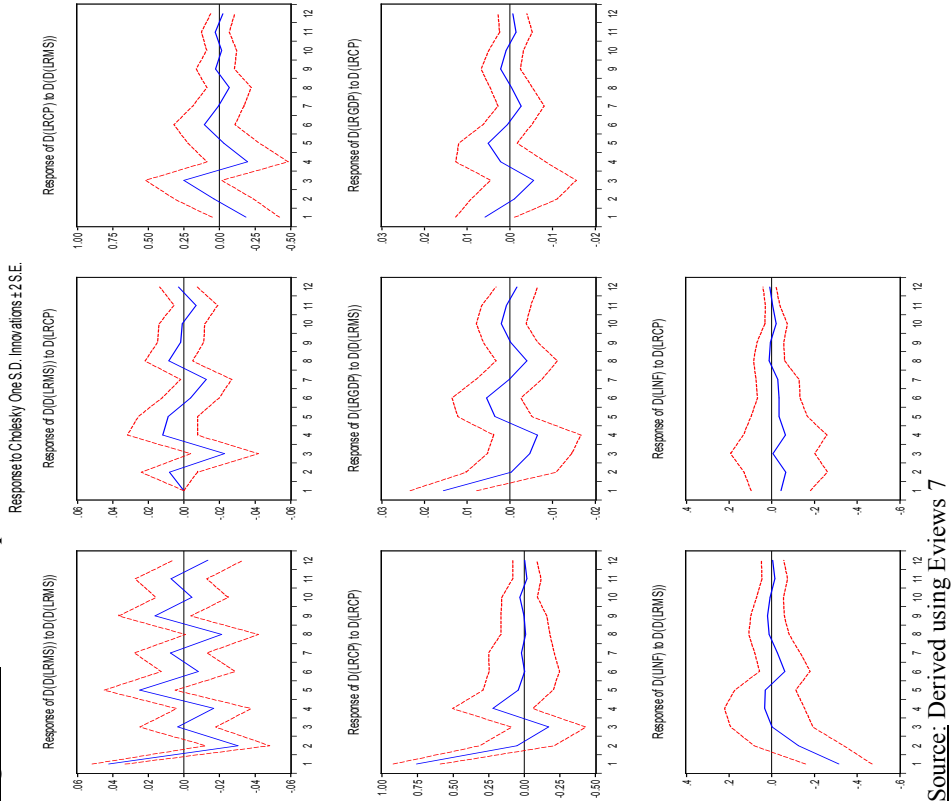


Figure H.4.9: South Africa

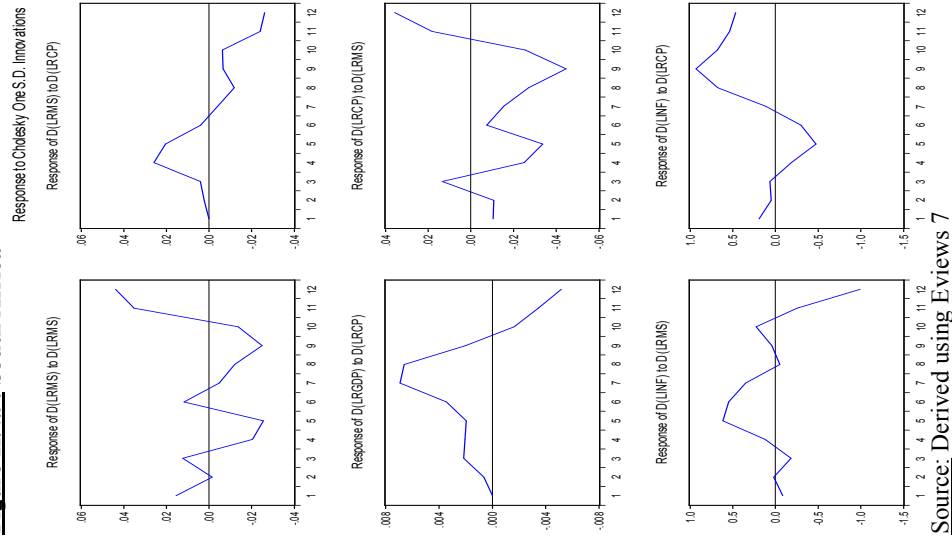
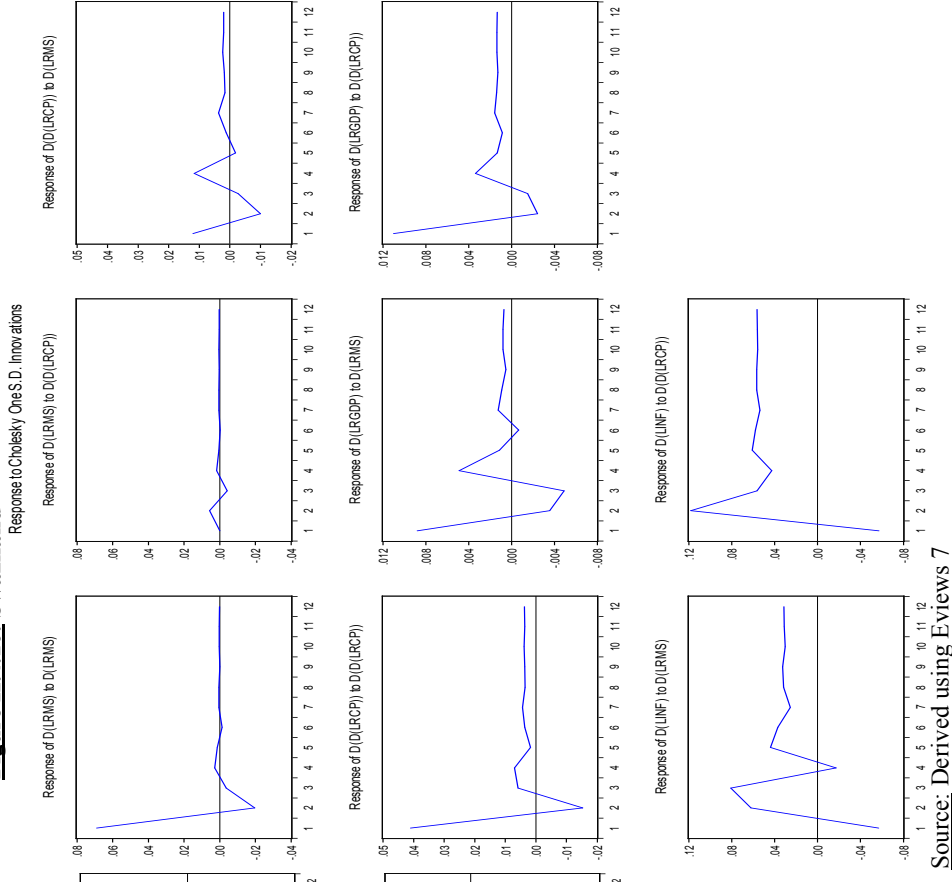


Figure H.4.10: Swaziland



APPENDIX I

ADDITIONAL INFORMATION FOR CHAPTER SEVEN

Table I.1: Summary of Monetary Policy Systems in the SADC Countries

Country	Monetary Policy Framework	Central Bank Independence	Objectives of Monetary Policy	Instruments of Monetary Policy	Role of Money Supply Aggregates in Monetary Policy
Angola	Other monetary program	- Central bank is independent - The Bank is mandated to grant credit to the government up to the amount of the government deficit as approved by the Parliament. In this case, the Treasury department of the Ministry of Finance issues Treasury bills for the amount required to be financed and remits them to the BNA.	The achievement of a stable national currency unit and price stability	- Direct Instruments: credit controls, interest rate ceilings, issuance of central bank bills and the sale of foreign currency for liquidity regulation - Indirect Instruments: reserve requirements, rediscount rate (periodically adjusted in line with inflation development)	- M₂ plays a major role in monetary policy and is a control variable in monetary programming, - Base Money is the operational aggregate and is the variable used to control money supply in monetary programming.
Botswana	Inflation targeting	- Central bank has considerable autonomy in formulating and implementing monetary policy. However, certain matters (e.g., major changes in the exchange rate and currency specifications) are reserved for decision by either designated Ministers or the State President - The Bank also plays an advisory role in fiscal policy. - The Bank is not allowed to make direct loans to the Government, but may grant temporary advances to the Government at an agreed rate of	The achievement of a sustainable, low and predictable inflation that will contribute to macroeconomic stability and attainment of a stable real effective exchange rate (REER) and, in turn, support diversified economic growth	- The Bank Repo rate (used to affect other market rates in the control of inflation) - Open market operations, which involve the purchase and sale of the Bank of Botswana Certificates (BoBCs), (used to affect the cost and quantity of loanable funds. - Reserve requirements are in place but are less binding as an	The Bank does not actively monitor monetary aggregates in formulating monetary policy; instead the Bank monitors the growth in domestic credit and government expenditure as intermediate targets.

Democratic Republic of Congo	Monetary aggregate	interest, which must be repaid within six months from the end of the financial year in which they were granted. Lacks independence (The Bank is an institution which is governed by public law with a legal status, mandated to define and implement the monetary policy of the country).	The maintenance of stable prices, so as to facilitate the stability of the internal and external value of the domestic currency. This in turn will pave the way to a sustainable and cumulative economic growth and the achievement of other macroeconomic objectives - Promoting and maintaining internal and external monetary stability and the proper functioning of a soundly based monetary and financial system; - Achieving and maintaining an adequate level of foreign currency reserves in order to support the peg of the Loti to the Rand; - The fostering of monetary, credit and financial conditions conducive to the orderly, balanced and sustained economic development of the country; - Maintaining an appropriate interest rate structure; - Facilitating economic activity in Lesotho and at the same time avoiding the adverse effects of inflation and a deteriorating external	instrument of monetary policy mainly due to the excess liquidity in the market. Indirect Instruments: the interest rate (used to control credit), and reserve requirements and "Treasury bills" operations (for refinance operations)	-
Lesotho	Follows monetary policy of South Africa as per CMA arrangement	- Lacks independence (The paid up capital of the Central Bank is subscribed and held exclusively by the government. However, the Central Bank has its own budget for purposes of its operations). - The Bank is mandated to deal with/transact in valuable objects of, and on behalf of, government; extend credit to government within stipulated terms and conditions; and serve as fiscal agent for the government within the ambits of its principal law.	- Promoting and maintaining internal and external monetary stability and the proper functioning of a soundly based monetary and financial system; - Achieving and maintaining an adequate level of foreign currency reserves in order to support the peg of the Loti to the Rand; - The fostering of monetary, credit and financial conditions conducive to the orderly, balanced and sustained economic development of the country; - Maintaining an appropriate interest rate structure; - Facilitating economic activity in Lesotho and at the same time avoiding the adverse effects of inflation and a deteriorating external	- Moral suasion; - Repurchase operations; - Open market operations; - Reserve requirements; - Lombard rate	Reserve money plays the main role in the conduct of monetary policy. (A target is set on reserve money and any deviation of actual reserve money from the target represents an excess or shortage of liquidity. Monetary policy treasury bills are issued on a bi-monthly basis based on liquidity conditions in the economy and maturing domestic debt).

Malawi	Monetary aggregate	- Central bank is fully independent - The central bank and Treasury consult on a regular basis about the formulation and implementation of fiscal policy. At his discretion, the Governor may inform the Ministry of Finance about developments in monetary policy; - The central bank may make short-term advances to the Government in respect of temporary shortfalls in budget revenues, provided that the total amount of advances shall not exceed 20% of the annual budgeted domestic revenues. (All advances are payable within four months of the end of the government's financial year in which the advances were made, and if after the end of the financial year such advances remain outstanding, the power of the Bank to grant further such advances shall not be exercisable until the outstanding advances have been repaid).	balance The promotion of economic growth, employment, stability in prices and to maintain a sustainable balance of payments position	- Liquidity reserve requirements (LRR); - Open market operations (OMO); - The bank rate	M ₂ plays a major role in monetary policy
Mauritius	Monetary aggregate	- Lacks Independence The central bank is the banker to government, the adviser on monetary and financial matters and the depository of the official foreign exchange reserves of Mauritius and of government funds; - Government may raise	- The main objective is the maintenance of price stability and the promotion of orderly and balanced economic development; - Other objectives include: - The regulation of credit and currency in the best interests of the economic	Indirect monetary management through the auctioning of Bank of Mauritius bills/notes, conduct of repurchase transactions and special deposit facilities	Broad Money Liabilities (M ₃) is one of the main indicators used to assess monetary conditions

		advances from the Bank to cover negative net cash flow of government at such rate as mutually agreed with the government. The total amount of such advances outstanding, together with the amount of government securities in the ownership of the Bank, other than under repurchase agreements, shall not exceed 10% of the government's revenue excluding grants and receipts of a capital nature for the current financial year.	development of Mauritius; - To ensure the stability and soundness of the financial system of Mauritius; - To act as the central bank for Mauritius		
Mozambique	IMF supported or other monetary program	Central bank is independent but is mandated to respect the economic policy defined by the government	The reduction of inflation	- Open Operations, - The central bank's reference interest rates (the Standing Lending Facility and the Deposit Lending Facility), - Reserve Requirement Ratio; and - Moral suasion	The reserve money plays the major role as an operational target and M ₃ as the intermediate target
Namibia	Follows monetary policy of South Africa as per CMA arrangement	- Central bank is independent. However, owing to the country's membership in the CMA, the scope for an independent monetary policy is very limited. - The Bank may grant advances to the Government on such terms and conditions as the Board and the Minister may agree upon, every such loan must be repaid within six months from the date on which	To support the fixed exchange rate between the Namibia dollar and the South African rand (this policy has been effective in attaining the ultimate monetary policy objective of price stability).	- The Repo Rate; - Reserve Requirements; and - Moral suasion	M ₂ aggregate is used for analytical purposes

South Africa	Inflation targeting	the loan in question was granted. - Central bank is independent. The Governor of the SARB, the Minister of Finance and officials of the National Treasury and the SARB meet regularly to co-ordinate monetary and fiscal policies - The SARB is not involved in development financing. However, it may grant an unsecured loan to the government under Section 10 (1)(f)(i) of the SARB Act.	To protect the value of the currency in the interest of balanced and sustainable economic growth in the country In pursuing its objective the SARB strives to achieve financial stability, i.e. price stability as well as stable conditions in the financial sector as a whole.	- Repos and reverse repos (repurchase agreements); - Spot and swap transactions in the foreign exchange market; - Changes in the minimum reserve balances that banking institutions must hold with the SARB; - Issuing of SARB debentures; - Sale of government bonds by the SARB; - Changes in the level of government deposits at the SARB and the Corporation for Public Deposits	Liquidity in the money market is influenced by numerous factors. Some liquidity factors, such as the amount of notes and coin in circulation and movements on the cash reserve accounts, are determined by market forces, while others are used by the SARB to manage the amount of liquidity in the market.
Swaziland	Follows monetary policy of South Africa as per CMA arrangement	- Central bank is independent. However, recommendation and clearance by the Finance Minister on such policies as exchange rate and staff salaries are sought before implementation. - The central bank does not directly extend any form of credit to the government, but on certain occasions, it does hold government securities and Treasury bills and also allows for limited overdrafts to	To promote monetary stability and a sound financial structure so as to foster financial conditions conducive to the orderly and balanced economic development of the country	- The discount rate; - Reserve and liquidity requirements; - Open market operations; and - Moral suasion	Money supply aggregates are underestimated due to the unknown volumes of South African rands in circulation. The use of money supply aggregates (M_1 and M_2) for monetary policy purposes are therefore inadequate, as the proportion of South African rands in circulation is believed to

		government.			be significant. The M_0 aggregate plays the main role and constitutes in currency circulation (about 55%) and bankers' deposits (about 45%).
Tanzania	Monetary aggregate	- Central bank is independent. - The Bank may make direct advances to the government for the purposes of offsetting fluctuations between receipts from the budgeted revenues and payments of the government, and - Purchase, hold and sell negotiable stocks, bonds or similar debt obligations or other securities issued by the government which shall bear interest at such market rate as determined by the Bank and which mature no later than twelve months from the date of issue.	The maintenance of price stability that is conducive to the attainment of macroeconomic stability and achievement of a sustainable rate of real economic growth	- The main instruments are open market operations, which involve the sale or purchase of securities (e.g. Treasury bills, Treasury bond) - Other instruments include foreign exchange market operations, the bank rate, standing facilities, statutory minimum reserve requirements and moral suasion	M_2 plays a major role in monetary policy

Source: SADC Bankers (2011).

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