

**POLICY ADJUSTMENT, CONVEGENCE AND MONETARY
INTEGRATION IN A COMMON MONETARY AREA.**

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DEDICATION

This dissertation is dedicated to God, my mother, and siblings

ABSTRACT

The study analysed the readiness of the Common Monetary Area (CMA) in moving towards a monetary union with intention being to provide preliminary indication as to whether they should continue to pursue the agenda or not. The aim of the study was achieved by evaluating the extent of convergence in the CMA in terms of the macroeconomic variables and assessing whether the CMA can constitute an optimum currency area. Macroeconomic convergence is critical for the CMA as they to look to make a move to another level of integration. There are various measures used to assess the possibility of the monetary union by evaluating the extent of convergence in the CMA and whether it can constitute optimum currency area. Descriptive statistic such a mean and standard deviation were of use to measure the extent of the convergence among the macroeconomic variables (inflation, budget deficit, government debt, foreign reserves, and GDP growth Trade openness (trade as percentage of GDP) and business cycle were utilized to evaluate the whether the CMA can constitute optimum currency or not.

The empirical results proved that convergence exist among macroeconomic variables. This is an indication that it would probably be advantageous for member countries to move to another greater level of integration, which will lead into faster growth due to the process of convergence, as well as the capacity to receive new technologies developed in the leading nations. The estimated ARDL model results also reveal that there exists monetary convergence in the CMA. The outcome is proven by the co-movement of inflation and interest rate.

To assess the viability of CMA forming an optimum currency area, the study relied upon the theoretical lenses of the OCA theory. This theory shows that the relations within the CMA satisfy the basic conditions required to shape an optimal currency area. The results reflect a certain level of disparity among CMA member states, implying that there is possibility of facing asymmetric shocks for the participating countries. However, such a situation does not imply that the CMA cannot form a monetary union; rather it means that alteration mechanism should be in position to be utilized as shock absorbers in cases where they encounter different shocks. This implies that there are more positive steps that need to be taken if the CMA is to thrive economically. The overall conclusion based on the empirical results is that the CMA is good phase to move toward a full-fledged monetary union and at a lesser cost. However, the disparity of the economic structures in the CMA means that in their move for a full monetary integration they must be patient and cautious as they work toward it

Keywords: Convergence, Optimum Currency Area, Monetary union, and Monetary Policy

DECLARATION

I, **Sambo Manelisi**, student number **25529889**, hereby declare that this dissertation is my own original work and all sources have been accurately acknowledged. This dissertation has not been previously in its entirety submitted and will not be offered at another Institution of higher education for the conferring of a related or any other degree award.

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Signature

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date

LIST OF ACRONYMS AND ABBREVIATIONS

ACF-	: Autocorrelation Function
ARDL-	: Autoregressive Distributed Lag
CAEMU	: Central African Economic and Monetary
CFA	: Colonies Francaises d’Afriques
CMA	: Common Monetary Area
CUSUM	: Cumulative Sum of Recursive Residuals
CUSUMQ	: Cumulative Sum of Squared Residuals.
EAC	: East African Community
EMU	: Economic Monetary Union
EU-	: European Union
GDP	: Gross Domestic Product
IMF	: International Monetary Fund
LNE	: Lesotho, Namibia and Eswatini

OCA	: Optimum Currency Area
MECC	: Macroeconomic Convergence Criteria
RMA	: Rand Monetary Area
SACMA	: South African Common Monetary Area
SACU-	: South African Custom Union
SADC	: South African Development Community
SARB	: South African Reserve Bank
WAEMU	: West African Economic and Monetary union

Table of Contents

ACKNOWLEDGEMENTS	i
ABSTRACT.....	iii
DECLARATION	v
LIST OF ACRONYMS AND ABBREVIATIONS.....	v
LIST OF TABLES.....	x
LIST OF FIGURES.....	x
CHAPTER 1: ORIENTATION OF THE STUDY	1
1.1 BACKGROUND OF THE STUDY	1
1.2 PROBLEM STATEMENT	3
1.3 AIM AND OBJECTIVES OF THE STUDY	4
1.4. RESEARCH QUESTIONS.....	4
1.6 ETHICAL CONSIDERATION.....	5
1.7 SIGNIFICANCE OF THE STUDY	5
1.8 DEPLOYMENT OF THE STUDY	6
CHAPTER 2: OVERVIEW OF THE SOUTH AFRICAN COMMON MONETARY AREA COUNTRIES.....	7
2.1 INTRODUCTION	7
2.2 THE HISTORY OF THE COMMON MONETARY AREA (CMA).....	7
2.3 OVERVIEW OF LNS ECONOMIES AND MACROECONOMIC CONVERGENCE VARIABLES	8
2.4 THE INFLUENCE OF SOUTH AFRICA’S MONETARY POLICY ON THE SMALLER LNS ECONOMIES.....	14
2.5. POLICY ADJUSTMENT IN THE CMA.....	14
2.5.1 POLICY ADJUSTMENT IN SOUTH AFRICA	14
2.5.2 POLICY ADJUSTMENT OF SMALL MEMBER COUNTRIES IN CMA ..	16
2.6. MONETARY MANAGEMENT IN CMA SMALL MEMBER COUNTRIES....	18
2.7 ECONOMIC INTEGRATION	19
2.7.1 OBJECTIVES OF ECONOMIC INTEGRATION.....	20
2.7.2 STAGES OF ECONOMIC INTEGRATION	20
2.8 ADVANTAGES AND DISADVANTAGES OF FORMING A MONETARY UNION.....	24
2.8.1 ADVANTAGES	24
2.8.2 DISADVANTAGES.....	25
2.9 THE EFFECTS OF MONETARY INTEGRATION ON SHOCK SYMMETRY	26

2.10 THE RAND AS THE ANCHOR CURRENCY OF THE CMA: EXCHANGE RATE DYNAMICS IN SOUTH AFRICA	27
2.11 MACROECONOMIC CONVERGENCE	30
2.11.1 CONVERGENCE CRITERIA.....	30
2.12 CONCLUSION	34
CHAPTER 3. THEORETICAL AND EMPIRICAL LITERATURE REVIEW OF MONETARY INTEGRATION	35
3.1 INTRODUCTION	35
3.2 THE OPTIMUM CURRENCY AREA THEORY	35
3.3 THEORETICAL ADVANCEMENT OF THE OCA THEORY	36
3.3.1 LABOUR AND FACTOR MOBILITY	36
3.3.2 DEGREE OF OPENNESS.....	38
3.3.3 FISCAL INTEGRATION.....	39
3.3.4 GENERALIZED PURCHASING POWER PARITY (GPPP)	39
3.3.5 BUSINESS CYCLE SYNCHRONIZATION.....	40
3.4. THE WEAKNESS AND LIMITATIONS OF OCA	41
3.5 OCA THEORY TODAY: CHALLENGES AND APPLICABILITY	42
3.6 ENDOGENEITY OF OCA CRITERIA.....	44
3.6.1 THE LUCAS CRITIQUE	46
3.7. REVIEW OF THE EMPIRICAL LITERATURE.....	47
3.8 CONCLUSION	52
CHAPTER 4. RESEARCH DESIGN AND METHODOLOGY	53
4.1 INTRODUCTION	53
4.2 METHODOLOGY ON MACROECONOMIC CONVERGENCE CRITERIA ..	53
4.3 ECONOMIC MODEL SPECIFICATION	54
4.4 MOTIVATIONS FOR DATA AND SELECTION OF VARIABLES	54
4.4.1 DESCRIPTIVE ANALYSIS.....	55
4.4.2 MEASUREMENT OF CENTRAL TENDENCY MECC VARIABLES	56
4.4.3 MEASUREMENT OF VARIABILITY IN MACROECONOMIC CONVERGENCE VARIABLES	56
4.5 METHOD OF ESTIMATION.....	56
4.5.1 UNIT ROOT TEST	57
4.5.2 COINTEGRATION TEST	59
4.5.3 DIAGNOSTIC TEST	62
4.6 METHODOLOGY ON THE ASSESSMENT OF OCA.....	66

4.6.1 DATA AND SELECTION OF OCA VARIABLES	66
4.6.2 DESCRIPTIVE ANALYSIS FOR THE DEGREE OF OPENNESS	66
4.6.3. EVALUATION OF BUSINESS CYCLE SYNCHRONIZATION	67
5.1 INTRODUCTION	69
5.2 MACROECONOMIC CONVERGENCE CRITERIA ANALYSIS	69
5.2.1 ACHIEVEMENTS OF MACROECONOMIC VARIABLES	69
5.3 UNIT ROOT RESULTS	74
5.4 THE AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) MODEL RESULTS: LONG-RUN AND SHORT-RUN IMPACTS	77
5.4.1 ARDL BOUND TEST RESULTS	78
5.5 ERROR CORRECTION MODEL	79
5.6 DIAGNOSTICS TEST	80
5.6. 1 STABILITY TESTS	81
5.7 OPTIMUM CURRENCY AREA ANALYSIS.....	84
5.8 SYNCHRONIZATION OF THE BUSINESS CYCLE IN CMA.....	85
5.9 CONCLUSION	88
CHAPTER 6: POLICY RECOMMENDATION AND CONCLUSION	88
6.1 INTRODUCTION	89
6.2 SUMMARY OF THE STUDY	89
6.3 KEY FINDINGS	90
6.4 POLICY RECOMMENDATIONS	92
6.5. LIMITATION OF THE STUDY AND AREAS FURTHER RESEARCH	92
7 REFERENCES	93
8 APPENDIX.....	Error! Bookmark not defined.

LIST OF TABLES

Table 2 1: Components of monetary unions	13
Table 4.1: Compact version of Macroeconomic convergence criteria (MECC) and goals.....	54
Table 4.2: Data and selection of variables for macroeconomic economic convergence criteria	55
Table 4. 3: Data and selection of variables	66
Table 5. 1: Inflation rates	70
Table 5. 2: Budget deficit as a percentage of GDP	71
Table 5. 3: GDP growth rate (1998-2018)	72
Table 5. 4: General government gross debt as a percentage of GDP	73
Table 5. 5: Foreign reserve targets in months of imports	74
Table 5. 6: Augmented Dickey fuller (ADF) unit root results of interest rate and inflation in CMA Countries	75
Table 5.7: Phillip-Peron (P-P) unit root results of interest rate and Inflation in CMA Countries	76
Table 5. 8 : The ARDL model selected for interest rate	77
Table 5. 9: The ARDL model selected for Inflation	77
Table 5. 10: Inflation.	78
Table 5. 11 : Interest rate.	79
Table 5. 12: Error correction model results of Inflation.....	79
Table 5. 13: Error correction model results of the interest rate.	80
Table 5. 14: Breuch-Pagan LM test for serial correlation for inflation (1) and interest rate (2)	80
Table 5. 15: Breuch- Pagan heteroskedasticity inflation (1) and interest rate (2)	81
Table 5. 16: Normality test	81
Table 5. 17: Trade openness (1998-2017)	85
Table 5. 18: Business cycle synchronization CMA	86

LIST OF FIGURES

Figure 2. 1: Stages of economic integration	20
Figure 5. 1: Cusum test for inflation	82
Figure 5. 2: Cusum Q for inflation	83
Figure 5. 3: Cusum test for interest rate	84
Figure 5. 4: CUSUM Q for interest rate	84
Figure 5. 5: Business cycle synchronization CMA	87
Figure 5. 6: Business cycle synchronization CMA	88

CHAPTER 1: ORIENTATION OF THE STUDY

1.1 BACKGROUND OF THE STUDY

Regional convergence has, for quite a while now, been viewed as a vital and fruitful way of economic growth and development. Regional integration in the region of Southern Africa is required and needed, with the expectation that it will help to improve the growth of the economy in the region. The predominant focal point of the present studies on African economic integration is the evaluation of the cost and benefits of monetary unification in Southern Africa.

The desire in assessing a monetary unification in Southern Africa springs from various factors. Firstly, it is based on development into Africa's expanded solidarity (Cobham and Robson, 1994). The monetary union is sometimes viewed as a sign of power and several of its supporters truly believe that it will assist in endorsing policy integration. Culmination at the Pan African monetary unions are one of the upshots of the emergence of regional blocks in Africa.

Secondly, the European experience of fiscal association, which is seen to have been advantageous for the participating member countries has in monetary unions, animated interest in regions that are within Europe, as well as Africa (Masson and Pattillo, 2005; Jefferis, 2007). Thirdly, the latest academic work on the advantages along with the expenses of common-currency regions proposes that the selection of a common currency can enhance the basic attributes of the participating nations. This also expands the integration of trade and business cycle correlation and upgrading the dependability of macroeconomic arrangements (Frankel and Rose, 1998).

According to Khamfula (2006:107) "economic integration is defined as an attempt to connect the economies of two or more countries, with some geographical proximity, through the removal of economic barriers, aimed at raising the living standards of the participating countries". The monetary approach gives one of the instruments through which a sovereign state can coordinate its economic path. The harmonization of monetary policies among geographically related members through an arrangement like the Southern African Common Monetary Area (SACMA) could be required to lessen price fluctuations and vulnerability. SACMA is often classified as the Rand Monetary Area (RMA) and it has been in existence since the year 1974. SACMA consist of four Countries: Namibia, South Africa, Eswatini and Lesotho. The Multilateral Monetary Agreement of 1974 has been governing the SACMA, it

was revised in 1986. All countries that are part of SACMA maintain currencies in balance with the rand and have the freedom of acquiring the South African capital and money markets. The countries share an international reserves pool, apply a shared foreign policy to the outside world and guarantee that the currency is managed by the South African Reserve Bank (SARB).

In 1986 on the 1st April, the Trilateral Monetary Agreement within South Africa, Eswatini and Lesotho took effect, initiating the Common Monetary Area (CMA). After 1986, in the following decades, major changes took place both within and outside of CMA. Namibia joined the CMA, apartheid in South Africa and the global environment's drastic development affected the members of the CMA's trade and financial flow (Jian-Ye Wang, 2007).

Throughout the previous years, the countries involved in the CMA combined the policies of monetary and exchange rate. South Africa, as the most powerful economy in the CMA has been in charge of dictating the tempo and the changing of policies in the structure. The LNE countries (Lesotho, Namibia, and Eswatini) were hindered the option to practice any monetary policy by the arrangement. The approach was inspired by the fact that if the exchange rates of the member states are tied to the South African currency and the country follows stable and low inflation rate, the effect of that arrangement would be imparted immediately to the LNE economies and they would enjoy growth.

There is concurrence that throughout the CMA's period of arrangement, it has led to the benefits of cheaper prices, reduced trading costs on the economy, and a sizable expansion in the capacity of trade and finance of cross-border transactions (Nielsen, 2005). Nonetheless, the loss of autonomous monetary policy decision-making has challenged the arrangement of LNS economies. Even as countries step towards deeper integration in this course of action, it is important to concentrate their monetary policy on their domestic forces that resonate in the thoughts of LNE policymakers. The LNE countries are compelled to acknowledge the strategy adopted by the dominating country i.e., South Africa. The convergence of regions can be a key power for manageable advancement. It can advance economic growth, reduce poverty, encourage social improvement, or preserve the environment. However, it can likewise have negative economic and social effects, remarkably, such as when the domestic regulatory system is lacking or not effectively executed.

In forming a monetary union, a commitment mechanism is the issue. Member countries focus on cooperating while setting up a money related union, which raises the question of an engagement method which is a rare position for the monetary union's establishment.

1.2 PROBLEM STATEMENT

Setting up a monetary union is a very consequential attempt that requires earnest and intentional contemplation. The pay-off to the countries involved might be ruinous and more likely to degrade the socio-economic people's status if it is not founded on sound economics, which is why strong contemplation to such a crucial decision must be given. A proposal with aforesaid boundless economic and political consequences ought to give a thorough evaluation of the advantages and disadvantages of a union (Masson and Pattillo, 2004). As it has been described above that monetary union is a decision that must be taken into serious contemplation and that it deeply affects the participating countries. Under a currency union, nations abandon the autonomy of individual monetary and exchange rate policies. For the entire association, central bank is responsible for directing monetary policy depending on the financial condition of the economy.

The CMA is a non-full monetary union, and the monetary policy established in South Africa considers the internal factors that are distributed across the region. The challenge faced by member countries participating in the CMA is the extent of diversity among the group countries; this is reflected by some of the economic and social measures such as GDP, income level, GDP per capita, population and the poverty line. The current structure portrays a centralization of economic development about the economy of SA, even though there are few instruments established that are intending to recompense the smaller economies for a monetary divergence (Gibb, 2007). Likewise, as opposed to a traditional currency board setup, the members of CMA all have their central banks that carry out functions, for example loaning to their governments if needs emerge (Tjirongo, 1995). Right now, the SARB makes policy decisions that are tackling predicaments in the South African economy but not much those of the region (CMA) as a whole. Therefore, because the LNE countries are small economies, combating this disparity among the member countries requires both institutional building and sharing. One could view the CMA as a blend of both currency areas and currency board, despite the fact the rand is still the core currency, member states failed to make a permanent vow to support a specified parity (Grandes, 2003). Smaller members' currencies of the union are not permanently bound to the rand, so the members can diverge from the peg and therefore, it is contended that the CMA is

not an absolute monetary union, regardless of the fact it is a currency committee because foreign assets endorse the printing of domestic currency and provided that public debt monetization is prohibited. Besides, there is the stabilisation method aimed at helping economies in case of asymmetric shocks and there is no areal supervision of domestic fiscal and arrangement of policies. The study seeks to investigate whether the CMA is ready to step into a fully-fledged monetary union and evaluate whether it will be beneficial or detrimental to the countries participating in contrast to the current arrangement. Although not enthusiastic, SARB's Governor said very clearly that they might consider whether a step into a multilateral monetary union is feasible (Masson and Pattillo, 2004). With great concern, the smaller members have stated that they have highly restricted power in assuming any influence on the area's monetary policy. The CMA's monetary policy is set by the SARB focusing almost entirely on South Africa's domestic goals as if the arrangement serves the superior member's interests only. The smaller countries have brought this up in various instances and continue to bring up methods to guarantee influential cooperation in monetary policy governance. The advancement into a full monetary union is seen as a crucial step for a stronger convergence of monetary policy in the area. Moreover, a move of this nature is viewed as a way of causing enhanced reactions to both supply and demand shocks in member states.

1.3 AIM AND OBJECTIVES OF THE STUDY

Main Objective

The study aims to investigate the readiness of the CMA in moving towards a fully-fledged monetary union. The general objectives will be attained through the following specific objectives:

- To evaluate the extent of convergence in the CMA in terms of macroeconomic variables.
- To analyses whether the CMA member countries meet the requirements of the optimum currency area.

1.4. RESEARCH QUESTIONS.

- Does the level of convergence among CMA macroeconomic variables warrant a full-fledged monetary union?
- Do SACMA member countries meet the requirements of the optimum currency area?

1.5 RESEARCH METHODOLOGY.

The research method that was made use of in this examination was literature-based as its primary objective was to utilize the theory of optimum currency areas (OCA) to assess whether the SACMA should form an OCA or not. Resources, for example, relevant academic journals, published reports, textbooks, the internet, and past findings have been put to good use on this topic area. The theory of optimum currency areas suggests that the stronger the association between nations, the more desirable it is for those nations to embrace the common currency and monetary policy. This is the level of monetary convergence among the prospective member nations of a currency area. A cluster of nations is bound to comprise a reasonable monetary union if the business cycles of those countries are strongly connected (Frankel and Rose, 1998). The methodological approach utilized in this investigation consist of quantitative analysis. In researching the possibility of a common currency in SACMA, the study examined convergence among key macroeconomic variables; inflation, budget deficit, foreign resources, and GDP growth (foreign reserves). An econometric analysis applied is the descriptive statistic to test the possibility of a complete monetary union in the CMA. The most widely recognized correlation coefficient - the Pearson product-moment connection coefficient (r) – was utilized to test whether the CMA can constitute an optimum currency area (OCA). The dynamic ARDL was selected to analyse the short and long-run relationships. The time frame was from 1988 to 2018, since the data was dependable during this period. Because of data constraints for sampled countries, our sample observations in does not fully cover the entire time frame of the study.

1.6 ETHICAL CONSIDERATION

The standard of ethics was taken into consideration and was obtained from the university. This study focuses on secondary information that is accessible to the public.

1.7 SIGNIFICANCE OF THE STUDY

The underlying aspect of the study is to advance the importance of the monetary union in the CMA and its contribution to the participating economies. The results will assist in illuminating policymakers in their decisions by achieving a long-lasting acceptance and recognition of the probability of the full monetary integration of the SACMA because this is a set of decisions that affect millions of people throughout participating member countries. The dissertation will boost and enhance the growing literature within SACMA as stepping towards achieving a full

monetary union within the region. The broader objective is a monetary union in Africa. The study will also be of great use to academics, monetary economists, African policymakers and any other individual involved in the area of monetary arrangement and policy (Ade, 2008).

1.8 DEPLOYMENT OF THE STUDY

This study comprises of six chapters:

Chapter 1: This presents the introduction of the study presents introduction to the study. It describes the formulation of the problem statement and objectives of the study.

Chapter 2: This chapter provide a detailed overview focusing on CMA, monetary union and economic integration.

Chapter 3: This chapter provide a detailed literature review on CMA, focusing on the monetary union; reference will be made to the financial economic integration in the CMA, the efforts of economic integration and OCA theory.

Chapter 4: This chapter presents a comprehensive account of the research methodology and analysis utilized in conducting the study.

Chapter 5: An analysis and interpretation of the empirical research findings are presented in this chapter

Chapter 6 This chapter presents the conclusion and recommendations of the research study. Recommendations are offered to decision-makers.

CHAPTER 2: OVERVIEW OF THE SOUTH AFRICAN COMMON MONETARY AREA COUNTRIES

2.1 INTRODUCTION

This chapter aims to provide a general overview of the CMA countries. The section is set out as follows; section 2.2 discusses the history of the CMA. Section 2.3 presents an Overview of the LNE economies. Section 2.4 discusses the influence of South Africa's monetary policy on the LNE economies. Section 2.5 discusses policy adjustment in the CMA. Section 2.6 explains the monetary management in CMA's smaller member countries. Section 2.7 explains economic integration. Section 2.8 discusses the advantages and disadvantages of forming a monetary union. Section 2.9 briefly explains the effects of monetary integration on shock symmetry. 2.10 The rand is discussed as the CMA's anchor currency: exchange rate dynamics in South Africa. Section 2.11 briefly explains macroeconomic convergence. And the last section is the conclusion of the chapter.

2.2 THE HISTORY OF THE COMMON MONETARY AREA (CMA).

CMA over time has experienced different stages as one of the oldest structures to have survived in CFA (*Colonies françaises d'Afrique*) franc zone, together with the financial cooperation. Initially, the pound, circulated in Botswana, Lesotho, and Eswatini under British rule, followed by the South Africa rand and this is before these countries obtained independence from Britain, the root of Southern Africa's common monetary area. An advanced form of economic integration is described as an endeavour to partner governments of two or more nations, with geographical proximity, by excluding economic barriers, focused on improving the living standards of the cooperating countries. The arrangement of the CMA has its origins in the *de facto* currency union. In 1921, after the SARB was established it turned out that the South African currency (in the early stages it was the pound, then in 1961 changed to rand) was initially the only exchange medium, the legal currency in South Africa, Bechuanaland (now Botswana), Lesotho, Namibia and Eswatini. There were no internal barriers to funds manoeuvring inside the region and virtually all external transactions were driven by South African banks and regulated by South African trade restrictions. This situation persisted after Botswana, Lesotho, and Eswatini obtained freedom (politically) in the 1960s. The currency union was officially founded on December 5 in 1974 tagging along with the signing of the treaty on the Rand Monetary Area (RMA).

However, in 1975 Botswana chose to pull out from the RMA. In 1986, the CMA of South Africa, Lesotho, and Eswatini was established after the RMA agreement was revised. Lesotho and Eswatini, under the terms of the CMA treaty they are given the privilege to issue their national currencies. In 1974 Eswatini issued its currency, the Lilangeni, and in 1980 it was accompanied by Lesotho launching their own, the Loti. In 1990, Namibia gained independence and in 1992 became part of the CMA and in the next year issued its national currency named Namibian dollar. The national currencies of the LNE nations have been pegged standard to the rand since their establishment. By issuing their currencies the LNE nations became responsible though to a constrained degree for their monetary access concerning the South African foreign exchange market (Wang *et al*, 2007).

2.3 OVERVIEW OF LNS ECONOMIES AND MACROECONOMIC CONVERGENCE VARIABLES

South Africa: South Africa is the supreme and dominant economy within the grouping. It accounts for over 80% of gross domestic product (GDP) of SACMA. The SARB is instrumental in the formulations of monetary policy, which influences all other SACMA countries. Despite the economic predominance of South Africa in SACMA, its significant trading partners are the UK, EU and USA which are not part of the SACMA. Other members of SACMA have not possessed the capacity to increase their trade with South Africa despite the advantageous trade inside the SACMA. This situation brings into question the connection between trade and monetary integration (Khamfula, 2006).

Lesotho: The monetary policy of Lesotho is very closely connected to that of South Africa. As in South Africa, the interest rate, the monetary, and credit policies pointed at reapportioning financial assets from the public to the private sector, enhancing efficiency in the financial system and capital markets. As most goods and services imported by Lesotho are directly from South Africa, the inflation rate of Lesotho closely follows trends in South Africa. The Monetary shocks of the economy are without deviation conveyed to the financial system of Lesotho because the Loti (Lesotho currency) is directly pegged to the rand of South Africa. Even though it is not a legitimate tender, the rand still circulates openly in Lesotho. The country has no exchange rate policy that is free from outside control of SACMA. The Loti experienced depreciation that was experienced by the rand between 1996 and 2002.

Lesotho's economy has been performing quite well, at a growth rate over that of South Africa. Between 1993 and 1996, the real GDP growth averaged 9.4%. Such an outstanding positive economic growth could be partly ascribed to the construction of the Lesotho Highland Water Project, expanding exports and higher manufacturing production. The country once had an economic upheaval, tagging along with it a widespread looting and civil disorder in response to the outcome of the elections. The economy was unpropitiously affected, and real GDP growth diminished sharply. Even though political sanity was re-established, the subsequent economic growth has not recovered to the previous level.

Namibia: Because of its administration by South Africa, Namibia was consequently a member of SACMA before independence. The new post-independence government chose to stay in SACMA and to keep up the utilization of the South African rand until the Namibia Dollar was presented in September 1993. Unlike Botswana, which chose to leave SACMA arrangements in 1976, Namibia has, up until this point, chosen not to seek after its exchange rate policy. The Namibia Dollar, like the Lilangeni (Eswatini) and the Loti (Lesotho), has remained at par with the rand and there is no likelihood of changing.

The rand has stood as legal tender for a transitional period, but the governor of the Namibian national bank stated that the use of South African banknotes and coins will be phased out gradually. The influence of the SARB continues to be reflected in the foreign exchange regulations and monetary policy of Namibia. Throughout the first five years of independence, the economic growth rate of Namibia averaged close to five percent. Earnings led this growth from the fast-growing offshore diamond, fishing, and tourism. Inflation was stable, but double-digit figures at an average of 12%. This sound macro-economic stability empowered Namibia to fit into the arrangement of SACMA, because of the realities on the ground. Despite that between 1995 and 1999, there was an economic decline, in the country. Real GDP averaged to only 2% and the exchange rate declined by more than 20% against the US Dollar. Macroeconomic fluctuations of such magnitude raise many questions. In this context, to which Namibia is a member, how is it (Namibia) going to rectify its economic downturn? Did the Namibian experience affect other SACMA countries? Would the impacts have been different if Namibia were not part of the SACMA?

Eswatini: The ultimate and optimum goal of the Eswatini monetary policy is achieving full employment, price stability, sustained economic growth and balance of payments equilibrium (Eswatini Central Bank order), the country's historical membership to SACMA have greatly affected the monetary policy of Eswatini. Should circumstance pressurise, the country has the freedom to break the connection of lilangeni from the rand. Moreover, Eswatini did find it in the best interest to sustain the peg with the rand. The part that might be disadvantageous in the pegging of the lilangeni with the rand is that any change taking place in the international exchange rate of the rand will culminate in a similar pattern of the lilangeni. Just like other small SACMA countries, the South African policy announcement greatly influences the policies pursued by Eswatini. Eswatini has strong trade links with South Africa; 50% of Eswatini exports are destined to South Africa and 80% of its imports originate from the same country. Because of the currency parity, the exchange between South Africa and Eswatini happens without vulnerability and costs that could emerge from exchange rate imbalance and speculation. One of the key edges for Eswatini belonging to SACMA is that the arrangement liberates the country from the need to settle on choices regarding monetary integration and exchange rate arrangements, enabling it to focus to a great extent on pressing fiscal tasks. Such an arrangement, however, limits Eswatini's ability from influencing monetary policy or tackle the unique shocks they face as a country. Given the membership to SACMA, Eswatini has limited scope to determine interest rate different from that of other SACMA countries, led by South Africa.

Features of the CMA.

- Smaller participants' currencies are fixed to the South African currency on a one-to-one basis. The exchange rate inside the CMA is not unalterably fixed. There is a cutting of transaction cost between the participants and the removal of exchange rate risks because of the parity.
- Participating nations issuing their currencies, which is legal tender in the issuing nation. The member countries' currencies are only legal in their nations but not in South Africa, however, the money circulates within South African border areas. As stated in their bilateral agreement, the issue of note for Lesotho and Namibia ought to be endorsed 100% by foreign reserves to guarantee order in the CMA. Reserves may consist of central bank rand deposits, special rand-denominated deposit accounts held with SARB and South African government stock. The smaller members oversee their

monetary policy and regulation of their commercial banks. South Africa's privilege is to manage the rand currency, gold, and foreign exchange reserves of the CMA

- Free circulation of funds for current and capital account transactions in the area except for where Lesotho, Namibia and Eswatini need funds for recommended financial institution investment or liquidity purposes. This exception allows these countries to control the stream of funds to South Africa where returns are higher.
- Smaller members additionally approach the South African capital and money markets through prescribed investment or approved securities that South African institutions can hold. This sort of access was expected to make more benefit for the development purposes of the minor members.
- "Independent authorization of gold and foreign exchange transactions and dealers by individual members, according to the set of regulations inside the CMA. Gold and foreign exchange holdings by individuals are liable to a surrender requirement in the area. Non-residents of CMA and current international transactions face no exchange" (Dlamini, 2011:9).
- Payments of compensatory for seigniorage relinquished by utilising the rand, applying a set of up equation in the treaty of the CMA. This equation was proportional to the product of 66% on the yearly output of most of the late issued long-term South Africa government bond and the magnitude of the forecasted to be going around in each of the smallest country. In 1986 Eswatini never again acknowledged the rand as legal tender, even though it was still circulating in the country.
- The rand as legal tender, while the rand kept on to going around in the country, and accordingly was again qualified to form the compensation. Suspension of the rand's lawful status also implied that Eswatini never again expected to have 100% support for any currency issued accordingly, allowing the country additional scope in its reserve's

management. Be that as it may, the state re-established the rand's legitimate status in 2003, highlighting in a way the value of the revenue for the smaller members.

- “Reconciliation of monetary and foreign exchange policies through a CMA commission consultative process. The commission meets every year but can also gather at the plea of any member to consider matters emerging including any adjustment in the conduct of monetary policy by any part in the area. Central bank Governors also meet quarterly ahead of the South African Reserve Bank Monetary Policy Committee meeting. In any case, the impact on policy formulation by smaller members is limited as the constitution of South Africa does not permit non-South Africa to be part of the monetary policy decision-making process” (Dlamini, 2011:10).

Wang et al. (2007) affirm that specific parts of the CMA are outstanding in comparison to those of alternative monetary integration in the resulting subsequent ways: firstly, the CMA is mainly controlled by South Africa that represents over 90% of the region's gross domestic product. Secondly, the CMA is not a complete financial union as there is no common financial institution, domestic review of the reserves pool, and review of regional business enterprise and structural policies. The rand is the main currency approved in the region and conversion from currency to the next is at zero cost allowing the currencies to be flawless and ideal substitute. Thirdly, the current exchange rate method of the minor nations reflects that of the currency board even though smaller countries are forbidden to be in control of local resources as the situation would be under a currency board. Moreover, the parity is not irreversible and there is no provision for exchange rate peg's mutual aid should it go under pressure. Fourthly, the CMA depends on SACU, a free trade area that involves the capital mobility high note, making it like the Euro area. At last, there is no existence of fiscal transfer between nations to help manage with asymmetric shocks in case they emerge.

In an endorsement of the examination referred to above, Grandes (2003) contends that to be sure the CMA is a combination of monetary union and currency board. The rand is the predominant currency, be that as it may, countries did not make an unalterable dedication in sustaining their given parity. Foreign asserts support issuing of domestic currency and monetization of fiscal deficits are not permitted making it a currency board. Therefore, the CMA is diverse and very versatile, factors that have probably supported its life span throughout the years Masson and Pattilo (2004). They also contend that the comparative size of member

states means that monetary policy commitments with the stronger participant, an element that has played a part in its existence. Wang et al. (2007) contend that CMA's existence can also be ascribed to other things, such as historical factors and politics. In this way, the literature often alludes to the obligation of an authoritative force as a compulsory component for the progress of monetary union.

Table 2 1: Components of monetary unions

	WAEMU	CAEMC	Euro Area	CMA
Membership	8	6	12	4
Single currency?	Yes	Yes	Yes	No, but the <i>de facto</i> common currency
Common central bank?	Yes	Yes	Yes	No, but SARB has immense influence
Common pool of reserves	Yes	Yes	Yes	No
Regional surveillance of fiscal policy	Yes	Yes	Yes	No
Free trade area	No	No	Yes	Yes
Degree of capital mobility within the region	Low	Low	High	High
External exchange rate anchor?	Yes, peg Euro	Yes, peg Euro	No	No

Note WAEMU=West African Economic and Monetary Union; CAEMU= Central African Economics and Monetary Union; SARB=South African Reserve Bank. Source: Wang et al. (2007)

Table 2.1 briefly summarize the key components of four distinct monetary unions and demonstrate how the CMA varies from the existing monetary unions. Every nation with CMA has its national bank, meaning there is no common currency; however, in the smaller countries, the rand is the legal tender. Be that as it may, currencies of the smaller countries are not tender in South Africa. The monetary policy set by SARB in South Africa applies to the entire area, however, there is no common central bank. This is the main reason currencies of the smaller nations are at par with the South African currency.

2.4 THE INFLUENCE OF SOUTH AFRICA'S MONETARY POLICY ON THE SMALLER LNS ECONOMIES

CMA member countries, Namibia, Lesotho, South Africa and Eswatini have aligned their exchange rate and monetary policies over the previous decades. The authoritative and dominant economy of the grouping; South Africa, during the arrangement, was in charge of dictating the tempo and the conditions for a change of policy system has denied any discretionary monetary policy to the LNE countries. Nonetheless, the monetary policy with the domestic economy in South Africa is the key objective and, to a lesser extent, the economy (Ikhide, 2010). There is an understanding that the CMA system has resulted from an advantage in the due to reduced prices, reduction of trading costs and a large increase in the volume of trade and cross-border financial transactions (Guma 1985, Tjirongo 1998, Abedian and Matshego 2003). Although the LNE, in this monetary arrangement, are burdened with one thing which is the loss of the autonomous monetary policy. At the basic level, the costs of the misfortune of independence in the monetary policy conceptualisation are more noteworthy, the less associated the aggravation of the country is with the anchor country.

One major case that ought to be carefully considered is the character of capital flow within these countries. The flow of capital is without any cost within the CMA countries, this mainly between the smaller members and the leading economy, mostly in a single direction (Ikhide, 2010). Given the arrangement of the CMA's fixed exchange rate, it is hesitant that the CMA member countries can embrace autonomous monetary policy even with free capital streams. Notwithstanding the views that were commonly accepted regarding monetary policy's desirability of monetary policy that gave their attention to domestic development, hitherto; actual evidence known to policymakers is very little in the CMA member countries with regards to the impact of the monetary policy approach of South Africa's on macroeconomic factors in their distinct economies. Also, any contention of a pull-out of these countries from this arrangement because of the failure to attempt independent monetary policy ought to be founded on a shown negative effect of South Africa's disinflation scenes on them.

2.5. POLICY ADJUSTMENT IN THE CMA.

2.5.1 POLICY ADJUSTMENT IN SOUTH AFRICA.

Two major outer advancements have profoundly affected the economy of South Africa during the most recent decade. The deletion of financial penalties in the mid-1990s achieved more noteworthy connection with the rest of the world, statistical evidence shows that there is an

improvement on gross capital inflows and outflow, from beneath 5 percent of GDP in 1993-94 to 15-20 percent in 1997-99 and 2003 was more than 25 percent (Hviding, 2005). Furthermore, the South African key export product prices around the world have been on an upward pattern over recent years, influencing the nation's underlying equilibrium real exchange rate. Owing to some extent to the external development, but also apartheid's historical legacies, for example, weak public finances, low international reserves, and consistently high inflation and interest rates, the years 1994, 1996, 1998 and 2001 are the periods when South Africa experienced abnormal serious balances of payment pressure or currency emergencies

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Integral to South Africa's adjustment technique was the push to reinforce the finances of the state. The state tried to better the regulation of tax collection by constituting an independent revenue authority. The positive outcome in tax base widening enabled the implementation of company and personal income tax rates. Attempts were additionally executed to expand social spending at a deliberate and economical speed and bring more prominent clarity and answerability into expenditure management. In 1998/99 the state made unequivocal steps into combating the lingering wage pressure, unilaterally constraining civil service wage increments to beneath legally binding arrangements. "The government additionally sent teams to provincial and municipal financial departments to help improve checking and control of spending. By 2002/03, government debt had been brought down to about 1% of GDP, from a high point of about 9% in 1993/94 (Horton, 2005; Nowak, 2005). The hard fiscal adjustment bolstered measures to lessen inflation and lower the real interest rate, reinvigorating domestic investment." (Wang et al., 2007)

The reserve bank of South Africa, over years, steered from a set charge per unit to a financial policy that addicted to free float of the rand and inflation targeting. To support the quality of financial policy and anchor inflation forecasting, an inflation target of 3-6 percent that was supposed to be accomplished in 2002 was in place in the year 2000. In opposition to the frequent involvement within the interchange market funded by huge borrowing in previous currency difficulties, in managing the weighty charge per unit pressures in 2001, the SARB let the charge per unit change. It has not sold foreign currency, keeping itself to interchange purchases to unwind the open forward position (in effect, introduction to exchange rate risks), and when that was accomplished, then a restoration of international reserves begun (Aron & Muellbauer, 2007; Bhundia & Ricci, 2005)

The flexibility of the Exchange rate has worked out well for South Africa. An even more flowing exchange rate to adapt late years to changes in trade and solid capital inflow and allowed monetary policy to concentrate effectively on keeping inflation within the objective (3-6 percent) of the system. Between 2002 and 2004 the rand appreciated opposite the US dollar, expansion was right inside the 3-6 percent objective, the Johannesburg stock exchange escalated, and despite the instability of the high exchange rate than in the mid-1990s, the real GDP and exports of South Africa developed considerably. By mid-1998, as a ratio to momentary debt, the official reserves ascended to 180 percent coming from 25 percent at the end of 1998. The fortified reserve status invigorated faith and trust in the economic policies of the government, brought down the transmission of long-term debt, and diminished the nation's powerlessness to external shocks.

2.5.2 POLICY ADJUSTMENT OF SMALL MEMBER COUNTRIES IN CMA.

Over the previous decade, LNE countries have confronted completely different shocks. As each one of the three (3) very small nations peg their currency to the rand at par and a major part of their export is to promote sectors that are not within the CMA,

The rand exchange rate movement has greatly affected these nations. Throughout 2002-2004, the nominal movement of the rand exchange rates has majorly affected these nations' external aggressiveness. From 2002 throughout to 2004, the nominal rand appreciation against the US dollar was around forty percent, a couple of 13-25 percent of terribly effective transportation within the LNE nations. However, mirroring the various trade and production arrangements, terms of trade developments fluctuated. Additionally, these nations have required adapting completely to shocks that are different, as an example, the continuing drought that has impacted Eswatini and Lesotho. Fiscal policy is the instrument of choice for macroeconomic improvement in the small members of the CMA. With the CMA giving a unified system for the monetary and exchange scale approaches to accomplish sustainable growth and outside competitive, these nations need to depend vigorously on framework refinement.

When it comes to Lesotho, they face different shocks, because of the decline in mining professions in South Africa, a rapid decline in workers' GDP remittances disrupted the economic performance in 1996-2002. Without a substantial South African investment in the Lesotho Highlands Water Project, which reduces in part the unpleasant effects of the shocks. Since 2000; export clothing to the United States under the US African Growth and

Opportunity Act has turned into the driving force of economic expansion and accounting for 70% of exports in 2002-2004. Nonetheless, the appreciation of the real exchange rate in the year 2002-2004 and the removal by industrial nations of textile quotas in year 2005 wrecked manufacturing (adding clothes) and activities that are associated. The impacts of these shocks in the clothing industry were especially evident in the year 2004/05, bringing about factory terminations and the losses of around 20% of employment in the industry. At the same time, agricultural production deteriorated because of a three-year dry spell and such long-standing systemic deficiencies as soil disintegration, water shortcut in the lowlands, and lack of agrofinancing.

In reaction to the shocks of its material sector, its implementation of an inexpensive economic policy by Lesotho. Local (non-SACU) revenue collection with the implementation of the Lesotho Revenue Authority, nevertheless the downturn in economic operation. Current expenses were included, especially salaries and wages, although extra SACU revenues were collected in 2004/05 through to 2005/06, the state spared some portion of the payment and post-paid high interest outside debts. The general commercial enterprise balance (counting grants) has been in excess over the recent protracted time since 2003/04. With the invigorating of the nation's commercial enterprise position, the paid off the general state debt to-GDP magnitude relation, and therefore, as of end-2005/06 the nation sustained a high state of international reserves, a perfect match for more than four months of imports.

Concerning Namibia, the increase in the value of the Namibian Dollar, coupled with rand, affected the industry of commercial agriculture and fishing. Nevertheless, solid growth in the in-diamond output and export and different minerals seemed to have outweighed the unfavourable impact on the economy, which represented 60% of complete exports in 2004/05. Even so, the decline of the terms of trade 2003 brought down GDP growth and government income, adding to the broadening of the financial shortfall. The subsequent exacerbation of the government's net position at the national bank prompted a decrease in official reserves.

With a huge benefit in SACU collections and rising profits for diamonds in the coming, the government of Namibia pointedly diminished its fiscal deficit in the next years. The shortage dropped by close to 0.8 percent of GDP in 2005/06 and by about 7 percentage points of GDP in two years. Towards the beginning of 2005, the national bank gained stretching out loans to commercial banks quicker than the rise of the monetary base. "Namibia has delighted in record exports, solid external current account surpluses, and moderate swelling. However, continued

outflow of capital to South African monetary markets have kept international reserves low. While reserves were bigger than the monetary base, they were low concerning imports and short-term debt. The import front of authority reserves declined around 2002-2004 and stayed beneath two months of imports by end-2005” (Wang et al., 2007: 37).

2.6. MONETARY MANAGEMENT IN CMA SMALL MEMBER COUNTRIES

Even though the major monetary policy objective of the LNE countries continues to guarantee that the South African rand exchange rate relation is preserved through adequate foreign exchange reserves and that interest rates are held at a standard that prevents any deviation to the fixed exchange rate, in the LNE, central banks have formulated several schemes to impact the decisions of monetary policy in their appropriate domain. In Namibia for example, to the liquid asset prerequisite, the national bank uses the commercial banks' loan and deposit facilities as functional monetary policy devices. The lending institution gives commercial banks room to withdraw their account along with the Namibian bank making use of other short-term streams of market convenience funds, in this way the bank rate is firmly attached to the repo rate of South Africa. Namibia has also set up a system of monitoring and calculating liquidity to affect the liquidity of the short-term when the situations so require.

In Eswatini, while its goal to maintain a low-interest rate gap with South Africa again, not forgetting the goal to prevent the flow of unfavourable capital. Direct interest rate regulation is likewise utilized as a part of a small number of events to protect the domestic economy from monetary policy activities targeting South Africa's particular factors. Eswatini is a distinct nation within the three smaller CMA member countries' economies because it prevents the rand from moving within its area apparently to allow it some flexibility in management of finances. The rand is prohibited to flow in their domain. This in essence undermine the value of money supply for monetary management reasons. The interest rate in Eswatini mainly tracks that of South Africa. Thus, the central bank's operative tool to affect interest rate is the discount rate, in any case, this to a great extent, takes its command from the South African repo rate. In any case, with abundant liquidity in the local banking framework and constrained investment channel of abundant liquidity, generally, banks have fixed their focus on the markets of South Africa to deal with or handle their liquidity.

Lesotho's efforts at deciding the level of interest rate in connection to South Africa have experienced a few phases. The lowest rate to be paid on reserve funds was set by the central

bank before 1998 and the prime lending rate in South Africa was set at a rate comparatively low than that of its own. This interest rate managerial juristic has been eliminated. The legal reserve requirements were brought down to support banks in lending to their clients. The minimum requirement for the local assets was put aside or paused due to their unproductivity. Commercial banks would choose the central bank to deposit with rather than expanding credit. Lesotho's Central Bank endeavoured some management of liquidity by introducing Treasury bill auction as a way of reducing surplus liquidity in the domestic economy. As far as treasury bills are concerned, despite giving chances to removing overabundance liquidity from the framework, current domestic investment incentives are supposed to be provided to banks that discourage outflows of capital seeking greater returns and drain foreign exchange reserves.

The moment excessive liquidity is sucked up by the open market transactions, inside the inter-bank market, banks may fund their needs and confront the central bank as loan specialist of final resort. In principle, interest rates for Commercial bank will respond to changes in repo rate (Ikhide, 2010). The outcome of these adjustments was not positive. In Lesotho like in other LNE countries, the lending rates are still higher than the one in South Africa. Then again, the deposits rate in South Africa is at a higher level than in the CMA smaller member countries, with the outcome that deposits largely flow to South Africa. There has been no success in adjusting the focus of domestic monetary policy to domestic developments in the LNE. Vast differentials of interest rate and aggravated outflows of capital at circumstances keep on being the roots of dissatisfaction to the national bank (Abedian and Matshego, 2003).

2.7 ECONOMIC INTEGRATION.

As stated by Pelkmans (1997), economic integration is “the elimination of economic frontiers between two or more economies”. Pelkmans (1997) continues to describe economic barriers such as any other division over which the direct or indirect mobility of goods, services, growth factors and flows of communication is relatively low. The growing integration of economies between the countries is coordinated by communication, transportation, as well as more flow of goods, services, capital, and labour (Van Der Merwe & Mollentze, 2010).

According to Maruping (2005), the ideal target for the integration of countries to form a region is to integrate some, if not all areas of economies involved. Maruping (2005) additionally expounds that this main target typically involves straight forward collaboration and

harmonization of sectors of the economy amongst several countries with a view to full integration of their economies.

2.7.1 OBJECTIVES OF ECONOMIC INTEGRATION

The history of regional harmonization in Africa demonstrates that the purpose of incorporating has been developing after some time. These have moved from the underlying focus on the political decolonization of Africa to the present emphasis on socio-economic integration in the post-independence period for more grounded dealings for reciprocal advantage as escalated growth and development (Maruping, 2005).

2.7.2 STAGES OF ECONOMIC INTEGRATION

Economic integration takes varied shapes and is executed at various phases based upon the circumstance among the countries or regions. The heterogeneous varieties of economic integration may be classified into a preferential trade area, a free trade area or a customs union basic common market and an economic union with a financial union because of the progressive levels of economic integration (Tavlas, 2008; Van Der Merwe & Mollentze, 2010). Figure 2.1 shows the various stages of economic integration.



Figure 2. 1: Stages of economic integration

2.7.2.1 PREFERENTIAL TRADE AGREEMENT (PTA)

PTA is the timely phase integration of economies among member countries. It alludes to a course of action where lower tariffs or other dealings apply between member countries. The

reason for this organization is the British Commonwealth Preference scheme, which the United Kingdom (UK) arranged with members and former members of its British Empire ahead of the schedule in 1932 (Van Der Merwe & Mollentze, 2010).

2.7.2.2 FREE TRADE AREA (FTA)

FTA is a phase where no blocks like import tariffs and quotas are put into effect on trade amid members; yet every member has its confinements with non-member Countries (Pelkmans, 1997; Van Der Merwe; & Mollentze, 2010). In such a course of action, all arrangements are influenced and less demanding, entry to the market is quicker also more cost proficient (Bothma & Burgess, 2011).

2.7.2.3 CUSTOMS UNION (CU)

The creation of a CU is one key technique of attaining regional economic block. A CU has no barriers between individuals in the association, just like the FTA, yet members, for the most part are forced to put in similar outside tariffs to countries that are non-member (Van Der Merwe & Mollentze, 2010). The lowered barrier between the union members invigorates inter-bloc trade (advantage), yet it lowers the share of the trade with non-union countries (disadvantages). A CU is, therefore, an aid to the integration of economies in the union, despite that, it might be destructive in the liberalization of trade on a global scale (Penketh, 1992).

2.7.2.4 COMMON MARKET (CM)

No restrictions among participating members and a common tariff framework with non-member states typify a similar market. Moreover, it promotes free-trade duties and nonrestricted labour and capital among its members (Pelkmans, 1997; Van Der Merwe & Mollentze, 2010).

2.7.2.5 ECONOMIC UNION (EU)

The economic union is the most advanced and peak phase of economic integration. As a propelled part of the integration, it has the attributes of a typical market, however. What is more, it is that unavoidably members correlate their fiscal and financial policy or apply an equivalent business enterprise and financial policies in their various countries (Redda, 2016). The beginning stage within the economic integration method is commonly an FTA, trailed by a CU, a typical market then the combination of financial and monetary issues to determine an economic union (Hartzenberg, 2011). Within the final part of union of economies, countries embrace one currency and customary financial institution just like the monetary unit zone. This

follows if these countries continue to have complete economic and political union as Edmunds and Marthinsen (2003) counsel.

It is a given that the South African economy overwhelmingly dictates the performance of trade in the monetary area. All the member states are heavily relying on South African imported products (Nainda, 2014). That was the constantly noted template, which underpins early proof by Rose (2000) against the possibility that nations with similar currencies will in general, take part in more trade, making a connection among monetary integration and trade. Nevertheless, data demonstrates that trade interaction in the monetary area is uneven, these three (Lesotho, Namibia and Eswatini) nations connect better with the economy of South Africa and not among one another. With that impact, the CMA data proves that monetary integration has not remarkably uplifted intra-zone trade (Grandes, 2003). Additionally, exports of South Africa pm its own cover of an expected 80 percent of all-out intra-SACU exchange. Hence, because of exports led by South Africa inside the customs union, one might contend that the BLNE nations profit massively from the organization against South Africa. Subsequently, intra-zone trade inside the customs union delineates a greater amount of an inter-industrial pattern, South Africa being a net manufacturer, a provider of high quality (Grandes, 2003). Nonetheless, it is likewise worth referencing that for South Africa the European Union (EU) and the United States (US) comprise an extensively bigger part of export destinations. However, despite the South African economy's dubious importance of questionable significance for the BLNE nations (than it is the other way around), trade agreements appear unambiguous.

Because of the significance of keeping up the rand peg, it is demonstrated that it is essential to help reserve growth through the long term for the LNE nations, henceforth there is a requirement for framework response to the LNE nations. In such a manner, with the end goal of reserve piling, initiatives to build domestic production in the LNE nations to diminish the import bill and in the meantime export increase is essential. In doing such, these economies will most likely hinder the outflow of millions of cash to give payment for foreign goods and services and turn around this procedure by gathering foreign reserves in the long run. One proposal to be taken into consideration is policies of import substitution, legitimately identified with the industrial policies of the LNE economies with a direct emphasis on target sectors, and with service areas planned by every nation's distinguished 'potential' division as opposed to a one-measure fits-all methodology. Imports have immense effects on the level of reserve and

might conceivably ameliorate both reserve levels just as the import coverage if cautious steps are applied to lessen the bearable levels.

2.7.3 CHALLENGES THE CMA WILL FACE IN THE PROCESS OF MOVING TOWARDS A FULL MONETARY INTEGRATION

More developed microeconomic proficiency addition can, in any case, be collected if the CMA member countries go right into a fully-fledged monetary union. Macroeconomic union, increasingly homogenous production arrangement, higher production association and risk supporting feasibility since border nations can depend on the capital market of South Africa and overdraft offices at the Reserve Bank are in a decisive role in making ready the way to full monetary integration. Having said that, in achieving that objective they will confront a few difficulties, to be specific:

- A specific disparity as regards trade shocks. This can place more burden on the proper functioning of the common monetary union since nations confronting disparate relative price varieties would require distinctive trade balance adjustments.
- Regarding the aforementioned point, the absence of diversification of fare export may strengthen the disparate effects of trade shocks, for the most part, due to the small portion of intraregional trade. Regardless of this, numerous nations have been endeavouring strategies to broaden into real and financial tradable authorities such as tourism and banking. That is where the economies to diversify towards non-tradable commodities, then exchange rate policy loss could become increasingly important. With everything considered, exceptionally high normal tradability in the area would at present make surrendering this instrument advantageous.
- The single direction heading of trade intra-CMA may likewise be a stumbling block to the rand's decisive acceptance as the common currency, with export profit being attached to various third currencies. Nonetheless, as the shares that diverse export markets have are comparative, in that they are for the most part directed to the UK, the EU or the US, pegging to a currency basket is a plausibility not to be ruled out. This would be significantly more worthy in perspective on the heightened unpredictability of the rand, thus activated by developing portfolio capital flows in South Africa.

2.8 ADVANTAGES AND DISADVANTAGES OF FORMING A MONETARY UNION

2.8.1 ADVANTAGES

Tavlas (2008) contends that, in the classical OCA literature, the crucial rewards of monetary union are derived from productivity gain emanating either from the exclusion of the transaction cost of currencies exchange, exclusion of unreliability and exchange-rate volatility. Unreliability about the exchange rates' future presentations bring unreliability for firms regarding future revenues, and the prices of goods and services, for firms. In expansion to the exclusion of the transaction costs, a common currency might make a vital commitment to lowering the cost and retard linked to transboundary bank payments it may also encourage improved price frankness (De Grauwe, 2007). There are higher chances that the associated welfare gains expand with the level of the economy's openness (McKinnon, 1963) through which the exclusion of transaction costs will intensely gauge in countries where large proportions of goods and services are bought and sold to foreign countries. Because of that, they then become increasingly subject to resolution errors since they go up against sizable unpredictable foreign markets with diverse currencies. Hence, less and proportionately open economies will encounter sizable gains of welfare from the exclusion of these risk contrast to large and closed nations.

The appropriation of single currency simultaneously with a collective framework of the national bank are bound to harbour significant improvement of banks 'treasury management, accounting processing and additionally answering to monetary authorities. At the point when edged by the internal market method to do away with the specialized practical hindrances that entangle the transfer process of multinational banks, these rearrangements could go about as motivation for less expensive cross-border payments. This ought to vastly advance improved trade and long - term investment amid the nations of the association and consequently improved income and regional economic growth. As per De Grauwe (2007), the "new" currency received by the monetary union is probably going to gauge more in global relation than the sum of the single currencies before the union. Thus, two major gains are initiated for the union in general. Initially, a global currency will have to improve disclosure to additional income streams via the expanded worldwide transaction with that currency unit, second, a global currency would boost the activities for the domestic financial market as operations demand for foreign direct investment in financial markets will pursue this "new" currency. To the degree that stable and low inflation rate decrease foreseen inflation, economic growth can be increasingly stable. The

commitment of members of the union to meet and sustain the price stability leads directly to an enhancement in the validity of countries already prone to inflation. The connected short-run cost of disinflation (which is frequently an expense related to the formation of the union) will be limited if there are dependable if all members of the union have a reliable commitment to steady prices. In that capacity, there are wealth gains to be collected from development in direction of a monetary union and the cutback in unreliability about the financial and economic condition because of such membership.

2.8.2 DISADVANTAGES

Different from socio-economic state within planned union part nations can make for taking the procedure for framing a monetary union. Regardless of whether a nation will be willing to renounce its currency and at the same time lose its capacity to lead the country-particular monetary policy it rests at the centre of the discussion. Since countries are diverse in some critical viewpoints the utilization of policy instrument such as exchange rates is necessary and helpful. Exchange rate alterations (alongside other monetary policies) are basic in keeping up with interior balance and successfully dealing with these dissimilarities (De Grauwe, 2007). When such capacity is given away; nations lose their independency in altering (along with this line deal) their currencies, nor alter the interest rate in the short-term. Moreover, inclination on economic and socio-political concerns, for example, inflation and unemployment are being called into question when presented with the membership of the monetary union. Disparities in institutions of labour market, legal systems, growth rates and also fiscal systems could result in a necessary modification cost for countries thinking about joining the union.

Whilst main authors of the OCA theory, Mundell (1961) and McKinnon (1963), contend that the loss of control to exchange rate involves excessively high cost, De Grauwe (2007) contends that the rate of exchange contention is baseless. De Grauwe (2007) contends that nations that separately deal with their monetary policy and policies of the exchange rate may notice variation of their exchange as a stream of macroeconomic disturbances as opposed to a macroeconomic stabilization device. This instability in the exchange rate might be a central determinant of asymmetric shocks for these countries by preventing the capacity to manage its impact on macroeconomic situations like inflation and unemployment. Theoretically, a range of costs and benefits related to the emergence of monetary unions exist. Naturally, the nature of cost and

benefits will rely upon systematic attributes of the economics involved and will be researched and comprehended within the scope of the region included.

2.9 THE EFFECTS OF MONETARY INTEGRATION ON SHOCK SYMMETRY

In Mundell's (1961) classical evaluation nations encounter asymmetric shock of demand if these nations are in a currency union, at that point they cannot utilize separate monetary and exchange rate policy to manage a shock of this nature. The evaluation states that the higher the two nations' business cycle correlation the lower the likelihood of asymmetric demand shocks and the stronger contenders for a currency union. Nonetheless, as far as the Lucas Critique, it is sensible to anticipate that a monetary integration will influence the structure and symmetry of shocks that nations experience after the occurrence of monetary integration. Typically, it is accepted that the impact of monetary unification on business cycle correlation functions through the flow of trade. The two fundamental benchmarks are considered in the OCA hypothesis – the degree of trade and connection of business cycles are not free from one another and the two, after monetary integration, are probably going to involve entrance into a currency union may improve international trade and improved trade can be required to influence the character of the country's business cycles.

From a hypothetical perspective, the trade integration's impact of on the business cycles relations throughout nations is equivocal. The small number of economists who have recognized the significance of the endogeneity of trade patterns and the correlation of income are partitioned on the idea of the connection between the two. The two are contradicting perspectives.

The idea is that intercontinental trade might prompt progressively symmetric business cycles. The justification is that integration mirrors an escalation of intra-industry areas of expertise, which prompts a higher divergence of every nation's output. As trade relations reinforce, revenue will turn out to be more firmly correlated, diminishing the effect of industry-specific shocks, and accordingly expanding the optimality of a monetary union. The other concept is that international trade expansion in prompts fewer symmetric business cycles. Minimized barriers of trade can bring about an advanced industrial specialization by nation and can prompt increasingly asymmetric business cycles. These two distinct perspectives are known as the endogeneity of the OCA hypothesis and the Krugman specialization hypothesis respectively (Mongelli, 2002).

Eswatini has experienced specific difficulties from the mid-1990s. Throughout the 1980s, Eswatini's area, facilities, and agro-processing organizations rendered it an appealing spot for private investors who needed to manufacture for the market of South Africa, however, they were not willing to spend resources into South Africa itself. At the point when 1994 saw South Africa democratized, Eswatini lost control of its appealing image. When the inflows of foreign direct investment fell, real GDP growth dropped from 3.6% during the 1990s to just over 2% after 2000. A prolonged dry season has negatively impacted agricultural output in the last few years. Since 2002, a real appreciation of the Lilangeni has hurt Eswatini's primary export activities (sugar, wood pulp, and garments) and manufacturing.

Over recent years, a prolonged dry season negatively impacted the output of agriculture. Since 2002, the real appreciation of the lilangeni hurt Eswatini's activities of manufacturing and primary exports (sugar, wood pulp, and garments). Moreover, the expulsion of the textile quotas by manufacturing nations since 2005 in the month of January has prompted noteworthy losses of jobs in the garment sector.

Contrasted with the other LNE nations experienced comparable or progressively extreme exogenous shocks, Eswatini is lingering behind in adapting and recovery output. Notwithstanding significant additional revenues SACU, the general fiscal deficit expanded in 2004/05-2005/06, led by wage bill sharp increments and other expenditure. The deficits were funded by diminishing foreign reserves and accumulating domestic areas. Despite the shocks to export and solid desire to finance the fiscal deficit, gross international reserves decreased from 2.7 months of imports at the end-2002 to 1.1 months at the end-2005, the lowest level among CMA members. Other reserves adequacy indicators, for example, the ration to short term to debt or too broad money has also diminished. Real GDP growth has kept on diminishing, continuing to diverse from the growth driver in the area which is South Africa.

2.10 THE RAND AS THE ANCHOR CURRENCY OF THE CMA: EXCHANGE RATE DYNAMICS IN SOUTH AFRICA

South Africa as an open economy, the real exchange is a paramount figure of variable as it fills in as a significant relative price signalling for the various parts of the economy. In such a manner, the levels of the real exchange rate combined with all of its solidity have been shown to have an impact on significant factors like private investment and exports (Aron et al., 1997). Thus, it is important to take a glance at South Africa's monetary system as it decides and influences the worth of the rand that straightforwardly affects entire group economies taking

part in the CMA. While the present plan of action necessitates Namibia, Lesotho, and Eswatini to safeguard their peg to the rand, SARB is in charge of shielding rand's external worth around the world. This is a popular CMA bloc floating against the major currencies, explicitly the British Pound, the Euro and the US dollar will result. Moreover, South Africa is a developing marketing economy that has experienced a high net capital outflow more than once following a capital account liberalization, at some point in time bringing about a noteworthy deterioration of the rand.

At the beginning of an amendment to the Bretton Woods Agreement of 1945, South Africa became a participant in the stable system yet alterable par values in that equivalent year. In such a manner, the arrangement obliged part nations to keep up their exchange rate inside 1 percent on either side of the mentioned rates of parity (Van der Merwe & Bank, 1996). In any case, at that time it was allowed for a part nation to alter its exchange rate far more than the specified margin just when the degree of the imbalance was viewed as a significant threat to the balance of payments and this has been completed with the involvement of the International Monetary Fund (IMF).

Generally, South Africa kept up fairly prohibitive measures of exchange control during the entire time frame mostly from the end of the second World War till as far as 1971 (Van der Merwe & Bank, 1996). After the breakdown of the Bretton Woods framework, a majority of nations were constrained into the alteration of their exchange rate sovereignty; thus, the SARB decided to peg the rand to the US dollar as opposed to the Pound Sterling. In the period between 1971 and 1979, the exchange rate policy decision underwent several adjustments, using policies that were either prohibitive or liberally focused on the occasions at the time. Indications of exchange rate solidity became detectable since the president entrusted a Commission of Inquiry into the Monetary System and Monetary Policy in South Africa (regularly alluded to as the "De Kock Commission). In this regard, the change was gone for the advancement of the South African foreign exchange market and to make it moderately free from state intervention (Van der Merwe & Bank 1996). Nonetheless, after the enormous measure of changes that occurred over that period, it was overturned by the socio-political occasions which increased in the period between 1985 and 1994, which incited the authorities to come back to arrangements aimed for directing and dealing with the exchange rate of the rand. After the nation changed to a democratic system in 1994, the management of the exchange rate has been a top priority for

South Africa as it accomplishes and keeps up both macroeconomic stability and coordinates consistent growth of the economy (Mtonga, 2006).

The 1990s saw significant basic changes in South Africa with the change to democracy, the end of foreign sanctions, and the end of most capital controls (Frankel 2007). For a larger part, the liberalization of the account is believed to be the most noteworthy reason for these progressions for the exchange rate of the rand. A lot of instability of the exchange rate of the rand has, however, been noted as far back as South Africa accomplished democratic independence in 1994. These changes in rand's exchange rate have raised extraordinary worries as it directly impacts the economy's foreign trade and capital flows, that of South Africa as well as that of the remainder of the CMA part nations. A noteworthy real depreciation of the rand was noticed during the period between 1995 and 2000, which was trailed by an enormous drop in the value of the currency in 2001 (Nainda, 2014).

It is important to note that movements in exchange rates are central in the determination of monetary policy as they notably influence domestic prices of goods and services. Besides, on account of small open economies, exchange rate developments are of much more prominent significance than in cutting edge industrialised economies as they are probably going to have a relatively more prominent influence on prices, price competitiveness, the dispersion of resources and productivity (Van der Merwe 2004). The effect is further increased for developing nations that are exceedingly indebted and particularly for those whose debt is denominated in foreign currency, as high exchange rate deterioration is a substantial risk to a financial meltdown. Albeit South Africa's debt is predominantly named in rand, this is lamentably not the situation for the smaller part nations that are pegged to the currency.

Previous studies have credited the deterioration of the rand to the high inflation rate of South Africa contrasted with its trading partners. Therefore, in its push to control rising inflation, the SARB in February 2000 reported that it would adopt formal inflation targeting as the monetary policy framework (Van der Merwe 2004). As featured, inflation targeting was embraced with the principal objective of containing domestic inflation to enable the economy to accomplish its more extensive national targets of long-term economic growth that will, on a very basic level, result in employment creation. Right now, the objective is specified as an inflation rate between in the range of 3 to 6 percent which must be consistently estimated over a year's time frame.

The national bank ascribed this monetary approach a way to deal with the component that inflation targeting has many clear targets and consequently guaranteeing that the national bank is considered responsible as it is accepted that this sort of system advances a disciplined monetary policy stance.

Various economists are of the supposition that the most outstanding distinctive component of inflation targeting contrasted with other monetary policy frameworks is that it makes estimating explicit and, in the meantime, straightforward, facilitating responsibility (Van der Merwe 2004). Therefore, inflation targeting national banks is relied upon to stay up to date with advancements in the exchange rate consistently. This is for the most part because of the fundamental detail that the exchange rate conveys; that of being a key transmission mechanism for monetary policy. In such a manner, exchange rate fluctuations influence inflation, aggregate demand, economic growth, employment creation, and income distribution, which are all part of the national objectives for the South African authorities just as the small CMA nations. Thus, it is basic for monetary policy creators to stay up to date with exchange rate improvements for basic decision-making purposes and to guarantee that fundamental mechanisms are set up to lessen dangers.

Because of South Africa, the external value of the rand is affected by supply and demand conditions in the foreign exchange market, making it a flexible exchange rate of the currency. In as much as the policymakers would have wanted to have an impact that is more prominent on the exchange rate to keep up and maintain stability, they have assembled that fluctuation in the value of the rand is deplorably unavoidable (Van der Merwe, 2004). Consequently, changes in the external market keep on affecting the exchange rate value of the rand under the current monetary system. Therefore, sizeable vacillations in financial flows, now and again activated by developments in different economies are difficult to manage and this can thus prompt exchange rate instability. By noticing the information since the South African Reserve Bank actualized the inflation targeting with the floating exchange rate, we can see significant swings in the rand trade.

2.11 MACROECONOMIC CONVERGENCE.

2.11.1 CONVERGENCE CRITERIA

The Maastricht Treaty (1992) utilized by the European Union is the first transition strategy that stressed the requirement for macroeconomic convergence criteria. For instance, a key

characteristic for the German monetary union, which occurred on 1 July 1990, was its speed and absence of any union prerequisites. Germany's choice to actualize the fiscal association was made toward the end of 1989, and after a short six months, the union was a reality. Unlike the Maastricht-type convergence, which includes a long-term effort to finishing union arrangement the German case, demonstrates that financial union can be built up rapidly without earlier conditions being met.

The question of why OCA theory is centred around microeconomic conditions, and the Treaty on macroeconomic convergence, can be approached from two dimensions. Firstly, various nations needing to join the European Union failed to meet all the OCA criteria showing the need for alternative approaches towards increased integration. Secondly, there existed the dread that a future monetary union would have an inflationary bias. De Grauwe and Schnabl (2003) contends that when hopeful participating nations are approached to demonstrate their commitment to low inflation levels (by allowing the disinflationary process to fuel a temporary increment in unemployment) may act to the greatest advantage of the union and accept to fitting in with the required dimensions. In any case, the peril lies in the reality, as pointed out by De Grauwe (1996), that they may likewise act deftly to guarantee entry however may later waver and neglect to re-commit to fitting in with the required dimensions. This kind of 'cheating' might be a fundamental piece of the issues faced in shaping a monetary union. Contrasts in inflation rates between nations might be an impression of contrasts in the institutional features in monetary policy decision making and in shaping a monetary union these institutional contrasts will vanish, making the earlier contrasts in inflation insignificant. Thus, an earlier intermingling of expansion rates is inadequate to shape a fiscal association as the two nations may have similar rates of inflation but then be structurally so different that a monetary union joining between them would be problematic (De Grauwe, 1996). The MEC criteria set by the European Union (EU) countries are reviewed in the subsections below.

1. Inflation rate

The inflation condition is one of three conditions that manage monetary convergence. The EU set the essential that every nation needed to have its inflation rates converging near to (not surpassing 1.5% of) the average rate of the three-member countries with the most minimal rate.

Huge contrasts in economic growth, inflation rates, or spending shortages among individuals make money related to coordination troublesome. The contention is that a

nation experiencing rising inflation would be under pressure to degrade, which would make a fixed exchange rate arrangement burdensome for such a nation (Jenkins and Thomas, 1997). If part nations show constant inflation differentials, the expenses acquired by not utilizing the exchange rate as a modification tool for macroeconomic stabilization will be bigger than the advantages of monetary integration (Khamfula and Tesfayohannes, 2004).

The attractive quality of monetary union among a group of nations can be evaluated by considering the level of divergence in the inflation rates of the nations. Honohan and Lane (2003) note that unique expansion rates are innocuous if the varieties are due to contrasting initial price levels of the nations. In this manner, convergence towards a common price level will involve divergent inflation rates in the meantime. If nations have various baskets of goods, the basket average will vary notwithstanding when individual prices are similar. Essentially, when the long-run relative price level over nations is a component of relative income, relative wealth levels or relative productivities, a more quickly developing nation will, in general, tend to have temporary higher inflation in the change to its new long-run equilibrium relative price level. Every one of these sources of inflation differentials is innocuous to a monetary union.

Dissimilar inflation rates are a reason for concern when there is a probability of nonconvergence in the long term because of the likelihood of continued high inflation in certain nations. For example, transport costs and the border impact could be the reason for inflation differentials in a common market where tariffs, trade quotas, and informal trade barriers have been removed (Engel and Rogers, 2004). Studies, for example, Masson (2006), and Longo and Sekkati (2004) demonstrate that transport costs (partially on account of poor infrastructure and conflict) are high in African nations. Allington et al (2004) give another clarification of the price dispersion in trading partners, recommending that highly traded goods contain a significant nontraded component that baffles price convergence. The prices of finished goods include input costs such as rent, shipping costs, labour costs, and insurance premiums from non-exchanged products. These factors may influence the costs of the non-traded intermediate goods and subsequently, the level of price dispersion for traded final goods.

Inflation differentials are additionally a reason for concern if they are an impression of the basic weak intra-regional modification mechanism to shocks. In such a circumstance, the region will be characterized by frequent and prolonged relative price misalignments or alternating overheating and recession. For instance, if there are short-run supply rigidities in the region, a positive aggregate demand disturbance will prompt an increase in domestic inflation and a real exchange rate change. Price misalignments infer that even the impermanent price increments could trigger persistence mechanisms that keep on operating even when the first shock has vanished, or supply reactions have kicked in. In such a situation, the nations would, in any case, face impermanent asymmetric shocks to relative price levels from an assortment of sources notwithstanding when convergence happens over the long run (Honohan and Lane, 2003).

Lastly, inflation differentials could persevere if members from a monetary union trade at various levels with third nations. Nations that import a significant measure of products from outside the union may experience imported inflation if the exchange rate of the regional currency deteriorates. In this way, nations that import from non-members would confront higher inflation than those that import from part nations (Honohan and Lane, 2003).

2. Interest rate

Long-term nominal interest rates on government debt must not surpass more than two points the average interest rate of the three nations with the most reduced inflation rate. The consideration of this criterion is a method for exploiting the forward-looking character of monetary markets since assumptions regarding future inflation, exchange rates and fiscal policy are amended in the interest rate (Jenkins and Thomas, 1997).

3. Exchange rate

The average exchange rate must not fall by over 2.25% of the average of the EMS in any event two years before joining the monetary union with no measures to stop the free flow of foreign exchange. This criterion was intended to rule out the last devaluation push immediately prior full integration to pick up an upper hand or to amortize excessive public debt (Jenkins and Thomas, 1997).

2.12 CONCLUSION.

This chapter explored various issues regarding the process of forming a monetary union as well as the complexities associated with such union formation. Like any new venture, it is imperative to consider the various costs and benefits of forming/joining a monetary union with the ultimate goal being to come to some idea as to the feasibility of pursuing the venture. The benefits can broadly be defined in two categories namely, efficiency and welfare gains. The main costs are those associated with member states' obligation to relinquish their national currency as well as monetary policy. Fiscal, economic, and social-political policy independence in the wake of union formation. Although this does not form the core purpose of the study, a brief cost-benefit comparison is useful in identifying potential issues that could be faced as the CMA works moving into full-fledged monetary integration.

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CHAPTER 3. THEORETICAL AND EMPIRICAL LITERATURE REVIEW OF MONETARY INTEGRATION

3.1 INTRODUCTION

This chapter is divided into two main parts. Which is the theoretical and empirical literature. The first part is as follows; Section 3.2 presents the theoretical advancement of the OCA theory. Section 3.3 is a list of the OCA's weaknesses and limitations. Section 3.4 discusses the OCA theory today: challenges and applicability. Sections 3.5 discusses the endogeneity of OCA criteria tagged along with the Lucas Critique. Section 3.7 follows the second part that presents the review of empirical literature of various regions, which include are SADC, SACU and SACMA. Lastly is a section, 3.9 that is the conclusion of the chapter.

3.2 THE OPTIMUM CURRENCY AREA THEORY.

An OCA is a community of countries in which the nations 'currencies are permanently connected by fixed exchange rates and the requirements that would make such a region optimum (Salvatore, 1983). In the early discussions about the benefits of fixed as opposed to floating exchange rates, the theory of optimum currency areas emerged and was seen as a common currency as the unusual situation for a fixed exchange rate system. At the time, under the fixed exchange rates structure of the Bretton Woods, the exchange rate decision was seen as hypothetical instead of a main concern and the relevance of OCA analysis was restricted by the one-country-one-currency law. Nonetheless, a large portion of the members in that discussion rendered minimal reference to the distinction in qualities among economies, in reality, giving a sense that the individual instances relating to either floating or fixed exchange rates were appropriate to every economy (Kawai, 1992).

Even though Mundell's (1961) compelling study is globally perceived as the inventor of OCA theory, the reasonable establishment of the work of Mundell (1961) had for quite some time been presented by earlier journalists. In the late 1940s and 1950s Lerner, Friedman, Meade and Scitovsky effectively built up the essential guideline of OCA examination (Dellas and Tavlas, 2009). These authors distinguished the significance of a national fiscal and monetary authority and the undisturbed manoeuvring of merchandise and production factors amid regions. Moreover, they drew attention to the significance of economic response in advancing between inter-regional adjustments among nations. The traditional perception was if countries are vulnerable to asymmetric shocks then modification procedure will require a modification of

exchange rate (because of nations having distinctive currencies), a redistribution of capital or a joint venture. The authors listed above assumed that this traditional modification method might in any case, surprisingly without the exchange rate adjustment, be constructive and consequently suggested that a regional common currency might be ideal.

The floating exchange rate case of Friedman (1953) is founded on three basic elements, the core of which can be summarised as follows: a flexible exchange rate system will give room to an independent monetary policy equilibrium system, under which market forces alter spontaneously to any unsettling influences and consequently institute extrinsic balance while keeping away from the balance of payment problem immanent in fixed but convertible rate. Moreover, a flexible exchange rate would permit the taking away of administering on the manoeuvring of goods and capital within the countries, in turn, advancing multilateral trade (Friedman, 1953).

Cesarano (2006) contends that the previously mentioned author's views, especially Friedman (1953); who had faith in the proficiency of traditional responsive method, for the most part, proposed that a common universal currency would just be optimum from a global welfare viewpoint. Nevertheless, Dellas and Tavlas (2009) contend that Cesarano's (2006) understanding is inadequate since it neglects the vital points in Friedman's reasoning. Cesarano (2006) recognizes the conviction of Friedman (1953) that in a faulty world, currencies that are unconnected and flexible exchange rates amid various regions might encourage alteration amid the areas. However, Cesarano (2006) overlooks the fact that such a region's domain would generally rely on the flexibility of the production factors and goods, as well as the level of monetary and fiscal integration which could, without even a push, be accomplished among areas and ought not to be on a global scale. Accordingly, various authors endorse the significance of Friedman's role in the inauguration of the OCA theory, implying that his findings recognise what is required for the design of these requirements (factor mobility) into a macroeconomic model and to utilize that model to evaluate and the cost of single currency areas.

3. 3 THEORETICAL ADVANCEMENT OF THE OCA THEORY

3.3.1 LABOUR AND FACTOR MOBILITY

The key factor that set Mundell (1961) apart from the prior authors (Lerner,1947, Friedman 1953, Meade, 1951, and Scitovsky, 1958) was his conviction that the conditions vital for the

achievement of the classical adjustment mechanism, such as labour mobility, may be inoperative among both nations and areas of the same country. In that, capacity conditions would call for modification of national borders to take into consideration this classical modification mechanism to work. Furthermore, Mundell (1961) pushed for a single currency to guarantee optimality in such an area. He tried to recognize the conditions that would decrease the case for flexible exchange rates and to exhibit that, under certain conditions, separate currencies, and exchange-rate adjustment would be ineffective.

In formulation, his examination, Mundell (1961) thought about two nations, East and West each having its currency and a central bank that forms a currency union by pegging their exchange rates. Mundell's (1961) examination was administered by four major assumptions: first, the East creates only one good (cars) and West another (lumber). Second, the countries are zero capital mobility, at first balanced bilateral trade and full employment. Third, both countries are defined by price and wage. Lastly, there is a move in inclination from cars to lumber. Following the last assumption, an excess demand for the West product (lumber) and excess supply of East's product (cars) will arise, normally fuelling unemployment in the East and inflationary pressures in the west and flow bank reserves from the East to the West to address the balance-of-payments deficit (Mundell, 1961).

To address these issues Mundell (1961) contended that two mechanisms would consequently bring back the equilibrium in both countries namely: labour/factor mobility and wage flexibility. Labour mobility was basic to his examination, as he believed it to be the central element of an optimum currency area since it would decrease the need for nominal exchange rate adjustment as a method for correcting the external balance. Ingrams (1962) expounded on the usefulness of capital mobility as a substitute for exchange-rate change in the short-run, the thought being that, where such mobility exists, alteration to shocks can be spread out over a more drawn-out timeframe. With a flexible exchange rate, increased demand in the West would bring the wage rate up in that country. Prompting a decline in the aggregate supply of goods and services and an increase in the price level. The diminishing of demand in the East would increase wages in that country, prompting an increase in the aggregate supply of goods and services and a decline in the price level. Economic agents in both countries would buy less Western and more Eastern products, restoring equilibrium. Nevertheless, in the absence of labour mobility and or wage flexibility Mundell (1961) contended that in the incident of

asymmetric shocks ought to be a criterion for determining optimality and those nations susceptible to asymmetric shocks should ideally float their currencies.

Lastly, Mundell recognises certain macroeconomic variables that could bolster moderately expensive currency territories taking note of that as the number of currencies escalated, the productivity as a medium of account and store of value would be drained, as it would mean higher cost of transaction and information (Dellas and Tavlas, 2009). Moreover, many small currency territories could compromise the effectiveness of the foreign exchange market as to foster increased speculator behaviour and thus make the implementation of monetary union increasingly difficult. Consequently, the world currencies ought to be divided into regions where factors of production are mobile but within which factors of production are immobile with the entire zone of labour mobility describing the correct domain for a monetary union.

3.3.2 DEGREE OF OPENNESS

McKinnon (1963) expounded on the thought that openness (beyond labour mobility among regions) ought to be a rule for characterizing optimality. Moreover, his appraisal was established on the supposition that the output of an economy is divided tradable and non-tradable involved an examination of the impact of a shock that alters the relative price of these goods on the economy's gross price level. McKinnon (1963) contended that when the exchange rate of a relatively small open economy changes, reacting to such price shock, the economy's general price index would tend to oscillate more than the general price index of a relatively large closed economy. The purpose behind this is that exchange rate differences in a relatively open economy might cause proportionate or near-proportionate differences in costs, decreasing the corrective functions of the flexible exchange rate.

McKinnon's thoughts were a progression of Mundell's belief in the need for labour mobility for an optimum currency area to exist; labour can only be mobile among regions if a certain level of openness exists. McKinnon (1963) accordingly came to the following conclusion; firstly, relatively open economies should peg their currencies. Secondly, open economies that trade greatly with one another should benefit from a currency area because this would frame a relatively closed economic unit. Subsequently giving a more prominent buffer against the impact of an exchange rate shock and in conclusion, the large geographic area is probably going to be relatively closed and the size of these areas could be a determinant for an optimal exchange rate regime.

3.3.3 FISCAL INTEGRATION

Kenen's (1969) analysis centred around the impact of sectors or industry-specific shocks on the specific export product and built up the thought put forward by earlier scholars, for example, Friedman (1953), that fiscal integration should be a criterion to determine optimality for taking part in a monetary union. Kenen (1969) stated that for high levels of financial integration between regions because it would encourage smoothing out of asymmetric shocks through fiscal transfer from a high employment region to a low employment region. Following from Mundell's contention that countries that are defenceless to asymmetric shock ought to float their currencies, Kenen believed that if the labour mobility condition is met, two countries that are depicted as narrow but similar production structures would together be appropriate contenders for a monetary union. These countries' structural similarities would disclose them equally to any sort of sector-specific shock.

Most conspicuously, Kenen (1969) presented the possibility of product diversification as a key instrument in recognizing both attractive quality and feasibility of a permanently fixed exchange between regions. He contended that highly diversified economies improve the possibility of currency areas. The reason is that the enhancement provides some protection against the impact of asymmetric shock would never again require changes in the exchange rate to counter unemployment and. likewise, Kenen noticed that there may be a case of sectorial diversification as this would accommodate for the smooth migration of labour among regions because of any industry-specific shocks.

In his paper, Bofinger (1994) examines a nation with multiple products where each product constitutes only a small part of its total output. He contends that a shock that is not positively impacting this particularly well would need to overcome by decreasing prices. If the exchange rate was to be utilized to foster stability, the whole price level would shift, creating large negative externalities. All things considered, unlike, Kenen (1969), he concluded that Mundell's rationale does not apply to profoundly diversified countries.

3.3.4 GENERALIZED PURCHASING POWER PARITY (GPPP)

The GPPP theory comprises of two significant macroeconomic variables, namely exchange rate and inflation rate. The Vaubel theory centres on real exchange rates and expresses that a group of nations should form a monetary union when they have no compelling reason to adjust their real exchange rates through changes in nominal exchange rates (Zis, 1992; Marco, 2014). The

similarity in inflation is critical in keeping up a stable exchange among nations (Fleming, 1971). Flexible prices and wages are necessary to re-establishing equilibrium according to Mundell's OCA theory (Dellas and Tavlas, 2009). Among numerous different examinations Aggawal and Mougoue (1996), Bernstein (2000),

Kim et al. (2009), Mishra and Sharma (2010) and Zehirun et al. (2015) have utilized the General Purchasing Power Parity (GPPP) in evaluating the feasibility of monetary unions and single currencies. To offer a point of view to GPPP, the first reference to the purchasing power of parity is made. The purchasing power of parity Purchasing Power Parity (PPP) is one of the key assumptions in open macroeconomics and international finance models (Su et al., 2014).

The PPP speculation depends on a basic idea on the law of one price, which proposes that indistinguishable goods should sell at a similar price in different nations and that the exchange rates between currencies will enable this to occur (Kreinin, 2002). Thus, the presence of PPP depends on the assumption of perfect inter-country goods arbitrage. Therefore, PPP is normal to hold just in the long-run. This is essential because in the short run, economic situations, for example, transaction costs, taxation, trade barriers and contrasts in price lists across countries tend to meddle in the price adjustment (Kim et al., 2009). This suggests the PPP has constraints in clarifying the relations between prices and exchange rates as non-stationary series.

Considering the constraints and shortcomings of the PPP in clarifying the movements in prices and exchange rates and its powerlessness to sufficiently explain the non-stationary brought about by the major determinants of an exchange rate that are non-stationary themselves, Enders and Hurn (1997) proposed the GPPP to address such restrictions and shortcomings. The GPPP theory proposes that even though bilateral real exchange rates are generally nonstationary, over the long run they may be cointegrated, given the driving variable or long run, essential macroeconomic variables or macroeconomic determinants that characterize real exchange rate are exceptionally related (Bernstein, 2000:389; Mishra and Sharma, 2010). The ramifications of this are if GPPP holds in proposed monetary areas, the central powers that influence real exchange rates may share common stochastic trends and at least one linear mix of the different bilateral real exchange rates may exist that is stationary (Mishra and Sharma, 2010).

3.3.5 BUSINESS CYCLE SYNCHRONIZATION.

The similarity of economic structures among potential member nations is viewed as a significant and crucial feature in forming a monetary union, as indicated by the OCA theory (Kenen, 1963).

Dellas and Tavlas (2009) suggest that the similarity of economic structures and fiscal integration among economies are pivotal features of Kenen's commitment to the OCA theory. De Haan et al. (2008) propose that economies, whose business cycles converge, comprise a great contender for a monetary union.

Gross domestic product (GDP) as a complete proportion of monetary activity is utilized to gauge the symmetry/asymmetry of the economies in this region in this study. Various examinations have used this methodology (Artis and Zhang, 2001; Zhang et al., 2004; Byström et al., 2005; Amoah, 2013; Sheik et al., 2013). High degrees of business cycle synchronization among members from a monetary union are significant for the smooth working of a monetary union as it facilitates the administration of economic policies, specifically, in applying a single monetary policy (Gayer, 2007). De Haan et al. (2008) agree and recommend that economies whose business cycles combine establish a great possibility for a money related association. Proof on the absence of synchronization of growth rates across nations recommends just constrained economic convergence of the economies concerned (Drummond et al., 2015). It also is contended that monetary union by itself and the economic and financial integration of the economies could spur the event of common area-wide business cycle synchronization (Gayer, 2007).

3.4. THE WEAKNESS AND LIMITATIONS OF OCA

Redda (2016) stated that the OCA theory is not without limitations and criticisms. Mongelli (2010) outlines the shortcomings and limitations that hampered the normative appeal of the theory. Portions of the criticism levelled against the hypothesis are (Mongelli, 2010):

- A few of the OCA properties are hard to measure unambiguously
- Some of the OCA properties are also hard to assess against one another
- The OCA theory, all in all, did not have a unifying framework
- One could, even now, end up with illustrations of various borders for a currency area by alluding to various OCA properties
- While most OCA studies apply to sovereign nations, OCAs may not relate to national borders
- The talk of the benefits and costs from sharing a single currency by numerous authors was inadequate at best and very obscure and unclear even under the least favourable conditions

- Looking back, the early OCA hypothesis could not have anticipated the developing significance of services in post-industrialized economies.
- Looking back, the early OCA hypothesis could likewise not have anticipated the unavoidable role of institutions in blocking product and labour market flexibility and mobility.

The OCA theory does not expressly address the political dimension of the discussion of monetary unions and single currencies. In any case, there is no uncertainty that political consensus and commitment are crucial in undertaking a choice of this extent. This is because issues of ceding monetary and exchange rate policies and fiscal transfers are certainly political; subsequently, they need the political will of all involved. Mongelli (2010) is of the view that political will among part nations cultivates consistency with joint responsibilities, advances collaboration and supports institutional linkages among part nations.

3.5 OCA THEORY TODAY: CHALLENGES AND APPLICABILITY

Because of the attributes of the world in which the theory of optimum currency area was initially investigated (Bretton woods systems of the fixed however flexible exchange rate and restricted capital mobility) the formalization of criteria accepted to oversee the efficient selection of fixed exchange rate regularly neglected several factors. For example, while watching a small and open country, McKinnon's (1963) contention would call for pegged exchange rates. Be that as it may, if such a nation has a low level of labour mobility with neighbouring areas at that point as Mundell (1969), the country ought to adopt a flexible exchange rate. McKinnon's (1963) openness contention proposed that small economies should fix their exchange rate since they are probably going to be relatively open. However, small economies will generally be less diversified (McKinnon, 1969) and as per

Kenen's (1969) diversification criteria are more suited for the flexible exchange rate. Kenen (1969) proposes that undiversified nations should float their currencies but if these same countries decide to form a monetary union, they end up being more diversified than they were previously.

Mundell (1969) argues and differs that Kenen's diversification contention is unfounded. McKinnon (1963) contends that the diversified economies could be suited for flexible exchange rates as they have expanded their ability to deal with any shocks to their exchange rates even though undiversified economies cannot. Besides, globalization and changes in the openness of

economies could encourage economies to put more effort into specializing in specific sectors or industries and this would positively change previously sector-specific shocks to country-specific shocks. In such a case, the openness criterion proposed McKinnon (1963) would not call for pegged rates yet rather flexible rates to accommodate any shocks to the economy. In a detailed examination of the theory of optimum currency areas Dellas and Tavlas (2009) take into consideration five extra issues that they believe complicate a selection of exchange rate regime for a country. To begin with, is the issue of the nature of the asymmetric shock to productivity examined by Mundell (1961). In his paper, Mundell (1961) talks about what impact a positive shock would have on demand, supply, level of employment and exchange rate adjustment in the two regions but does not recognize the causes and nature of these shocks.

The conclusion that rose out of the post-1960s writing is that the shock-absorbing capacity of the exchange rate regime is significantly more complicated than had been suggested by previous writers (Frankel and Rose, 1998). The cost of accepting a fixed exchange rate regime and letting go of policy autonomy was discovered on both nature (temporary or permanent) and the level of shocks, the more prominent the number and influence of the shocks, the more prominent the advantages from embracing flexible exchange rate. Second, the presentation of capital flow into OCA analysis adjust the consequences of Mundell's (1961) initial system which postulates that a positive shock to productivity will lead to a current account deficit with the rest of the world, expecting the shocks makes capital outflow to acquire the ability to meet the expanded need to deliver more. This will compel the need for exchange rate alteration. Be that as it may, Dellas and Tavlas (2009) contend that if this shock to productivity goes about as a catalyst for economic growth and that this growth is accompanied by capital inflow, will make it conceivable (in opposition to Mundell's theory) to back the deficit without the need for cheapening the currency.

Third, De Grauwe (2007) features the myopic nature of the fiscal transfer argument introduced by the founding authors of OCA criteria. As indicated by De Grauwe (2007), the utilization of fiscal policy can lead to issues associated with debt sustainability and can have an unfriendly impact on securing resources in place, preventing essential alterations. And if one or more members of a monetary union are identified by high fiscal deficit and high debt to-GDP ratios they could make a situation where negative spill-over effects are forced on other part nations, driving up the union interest rate, furthermore, expanding the weight of financing government debts in the member countries. Accordingly, the union might be compelled to force control

mechanisms such as fiscal rules (for example, those utilized in the Eurozone) to limit the extent of the budget deficit and state debt in the union (De Grauwe, 2007)

The fourth issue that the classical literature on OCA neglected to consider is the propriety of monetary union for countries at various phases of economic development. Dellas and Tavlas (2009) contend that the level of real convergence ought to be a key attribute supporting the choice of exchange rate regime. While the classical OCA concentrated on nominal variables reflecting macroeconomic stability, real convergence would require more prominent comparability or equality of real variables of national economies. In conclusion, the core OCA paradigm was a partial-equilibrium and static model including only two countries and coming up short on an explicit welfare function through which the differences can be examined (Dellas and Tavlas, 2009). This model set-up prompted a situation in which it was numerous and sometimes clashing, welfare objectives were being surveyed prompting a situation in which it was hard to find out about the overall significance of the criteria or to examine whether taking part in a monetary union could lead to an economy's structure (McKinnon, 1963). The earlier OCA paradigm neglected to give way to deal with settling clashes among the criteria.

It was just towards the start of the late 1980s and 1990s that the theory of OCA re-emerged as a functioning field of academic and policy interest. The underlying stages of the European Monetary union formulation early achievement was seen to be amazingly advantageous for its members and fuelled further enthusiasm for monetary union in regions outside Europe. Moreover, improvement in academic thinking assumed a critical role in restoring interest in OCA theory.

3.6 ENDOGENEITY OF OCA CRITERIA.

Frankel and Rose (2009) started the debate on the endogeneity of OCA criteria. Analysed to the static and ex-ante nature of the before model which looked to recognize attributes of an economy ought to fulfil before it was viewed as qualified to join a monetary union. Frankel and Rose (2009) concentrated on changes in economic structure and performance that may result from taking part in the monetary union ex-post the core recommendations of endogenous OCA literature are as follows: free trade was seriously hampered by the presence of borders, which mainly characterized to incorporate separate monies. When at least two or more countries decide to form or join a monetary union, the elimination of barriers to trade will take place, fostering increased trade between the members (Engel and Rogers, 2004). The presentation of

a single currency will remove exchange rate-risk and cost of hedging, reduce the cost of information, and raise price transparency all of which will diminish market segmentation and stimulate competition.

Mongelli and De Grauwe (2005) contend that a common currency fosters what could be achieved through pegged rates within discrete currencies, common trade financial and economic integration as well as the acquiring of knowledge. Moreover, trade integration will lead in the more-highly correlated business cycle of typical demand shocks and sizable intra-industry trade, minimizing the need for country-specific monetary policies and lessening the cost of surrendering the nationally tailored monetary policy.

Therefore, as opposed to the earlier writing which accentuated the number and seriousness of asymmetric shocks among nations as the criteria for selecting union membership (*ex-ante*), endogenous OCA literature concludes that taking part itself will lead to a decrease in the incidence of asymmetry shocks among members. From this point of view, it is less critical that convergence and optimal currency area criteria are met before a monetary union is built up and membership will induce convergence, institutional and structural changes that will help participants of the union to discover new techniques of adjusting to economic shocks. The endogenous OCA hypothesis recognizes two major channels of transmission through which a monetary union can be used to influence the economic performance of a country, these being trade integration and improved creditability (Tavlas, 2008).

Trade integration

Trade integration is believed to invigorate growth through two procedures firstly, by promoting allocative efficiency and secondly accelerating the transfer of knowledge. Endogenous OCA theory proposes that a common currency is viable in advancing trade and growth consequently making a lot of national currencies a huge barrier to trade. According to this view, the sacking of cost related to currency conversion along with single currency and a common monetary policy, counteracts future competitive devaluation, an increment of price transparency facilitates foreign direct and portfolio investment as well as formation of long-term relations. This may, after some time, support forms of political integration inside the union (Mongelli, 2002). Consequently, these results would advance mutual trade, financial and economic integration, as well as acquisition of knowledge further advancing conditions for increased productivity of factors, and along these lines rise in potential output (Mongeli, 2002). Lastly, increased trade integration is thought to result in more highly correlated business cycles reason

being the asymmetric demand shocks and increased intra-industry trade, lessening the requirement for country-specific monetary policies (Frankel and Rose, 1998)

Issues of credibility and monetary policy

While prior OCA writing managed for the most part with the country's characteristics of the potential members from a monetary union, recent discussions centre on the credibility of monetary policy and alternative commitment mechanisms for policymakers (De Grauwe, 1996, Dellas and Tavlas, 2009). However, earlier literature stressed the capacity of monetary authorities to achieve an ideal point along a stable long-run Phillips curve.

Recent literature views the prevention of high inflation as the main macroeconomic goal of a central bank, trailed by the administration of business-cycle movements. Even more explicitly this new view investigation shows that nations can gain (or lose) validity by joining a monetary union, and how this may influence their welfare and is regulated by the Barro-Gordon model. The Barro-Gordon model demonstrates how the capacity of government to control prompts inflationary bias. The basic insight of this model is as per the following; when two countries with various statuses concerning inflation choose to form a monetary union, the high inflation rate country is probably going to benefit from the statuses of the low inflation countries. The low inflation country will be influenced negatively by the awful status of the high inflation country, which will encounter a welfare misfortune (De Grauwe 1996),.

Monetary unions and hard pegs are said to provide dedication to low inflation, changing agents' inflation expectations with the goal that the output and employment costs of achieving low inflation equilibrium are decreased.

Another key element of these new improvements is the view on the impacts of a monetary union on the capacity for each nation to utilize a nationally tailored monetary policy. Where traditional authors saw this loss of self-governance as an expense, Dellas and Tavlas (2009) deduce that nations with a history of high inflation that join a monetary union can, in fact, provide validity. This thusly decreases interest rates and unemployment expenses of moving from the high-inflation to the low-inflation equilibrium.

3.6.1 THE LUCAS CRITIQUE

The contention that the various OCA criteria are endogenous is a clear application of the Lucas critique of inappropriate policy assessment dependent on recorded proof only (Lucas, 1976). The Lucas (1976) critique professes that the shape of the economy is endogenous to the

economic policies applied to it. Any new economic policy that is presented will change the guidelines of the game. If there is a chance that there is a change in economic policy, this will bring structural changes to the economy, change desires and genuine conduct that will administer market supply and demand. It is difficult to forecast the impacts of a policy from past evidence because of these changes.

The Lucas critique has, for the most part, been viewed as a disturbance that torments all applied empirical research, to be specific that it needs to depend on historical data to anticipate results in future that neglects to comply with the *ceteris paribus* condition' (Schelkle, 2001). Nonetheless, the Lucas critique has substantial relevance for choices about the arrangement of new currency unions or the augmentation of present ones. The traditional OCA theory did not recognize monetary integration as the fixing of a bilateral exchange rate and the market aftereffect of fixing it (Schelkle, 2001). Policy and policy results were viewed as indistinguishable, while one needs to recognize the policy, to be specific the unification of monetary policy, and the result of the policy, for instance, the synchronization of national business cycles. Monetary integration is a basic change in the monetary policy regime; in this way, it is unjustifiable to state that a proposed currency union ought not to be formed because the area is not an OCA. A significant suggestion of the Lucas Critique is that the listing of OCA criteria to be satisfied before the development of a currency union is needless (Schelkle, 2001). The optimality of a currency area can increase because of monetary integration.

3.7. REVIEW OF THE EMPIRICAL LITERATURE

This area will look at studies that were formerly conducted and that are to some degree in line with the focal point of this paper.

3.6.1 A SELECTIVE REVIEW OF EMPIRICAL LITERATURE FOR VARIOUS REGIONS

Empirical literature grappling with typical OCA criteria (i.e., claiming fixed economic structures) does not give a conclusive proof that a specific group of the importance of monetary union in for specific community countries in Southern Africa. Although some research shows that a small number of member states involving possibly South Africa may establish a common currency region.

3.7.1.1 SADC REGION

Yehoue (2005), Dutu and Sparks (2004) and Jefferis (2007) each one of these analyses proposed that basically, a currency union is feasible with seven countries. Yehoue (2005) found that nine SADC countries had high levels of production shock co-movement, suggesting a currency union can be established between those countries. Besides, using its concept of endogenous trade externalities, Yehoue (2005) concluded that fair trade links would contribute to 23 African economies' monetary union, with the four as a core country (South Africa, Lesotho, Namibia and Eswatini)

In considering the monetary union between the 14 SADC countries, Dutu and Sparks (2004) noticed what they viewed, in their research, as low nominal convergence rates between the countries of the majority. While Dutu and Sparks (2004) deduced that the SADC cannot form an OCA, they inferred that the CMA might be extended to take in countries such as Mauritius, Seychelles, and Botswana. Jefferis (2007) regarded coefficients of bilateral (nominal) exchange rates varying from South African rand and interest rate disparities to inflation disparities from South Africa in its evaluation of monetary union viability between the 14 SADC countries. The author inferred that a 'convergence group' comprised of eight countries: Botswana, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Eswatini and Tanzania. The reports of Yehoue (2005), Dutu and Sparks (2004) as well as Jefferis (2007) report the following observations: (1) In creating a unique union whereby nations would have to join the monetary union if their shares trade (compared to GDP) surpassed the preindicated criterion, Yehoue supported a trade-share threshold of 2% of GDP. Countries with trading shares over 2% with the monetary union would have to link with the union.

However, the 2% threshold seems to be low, arbitrary, and asymmetric. It is asymmetrical as it only considers the potential benefits for countries outside the monetary union. The author, in other words, did not state the welfare standard which might inspire countries in the union to welcome new entrants. Therefore, both the low threshold rate and the industry's asymmetric nature helped shape sizable monetary unions. (2) As noted above, Dutu and Sparks (2004) and Jefferis (2007) did not formally examine the data sets they considered.

The suggestion by Dutu and Sparks of a seven-member CMA's viability relied on inferences based on arbitrary thresholds. In other words, to determine whether there was adequate macroeconomic convergence between countries, the authors described the boundaries that were once exceeded as indicating that the countries concerned did not meet all the requirements of a

monetary union. For reference, in determining whether the extent of (nominal) bilateral exchange-rate fluctuations in relation to SA currency (rand) qualify for convergence, Dutu and Sparks (2004) placed an annual limit of five (5) percent concerning the maximum legal nominal appreciation/depreciation with respect to the rand. Jefferis' (2007) convergence hypothesis of an eight-member group seems to have been focused solely on a casual data review.

The author did not indicate utilised method to determine the convergence level nor did he describe the meaning of a convergence group. According to the above examination, the CMA is supported not only by the member states that are part of the CMA but also by countries that are not part of the CMA but are part of the SADC region. The principal reason behind this is that the SADC also seeks to achieve a currency union, which can be achieved when the union can begin as a core group with the four CMA countries.

Under this group of studies, Yehoue (2005) utilized an econometric method to extract the fundamental disturbances from the real output for 53 African nations (including every one of the 14 SADC nations) for the period 1980-2000. It ought to be noticed that Yehoue (2005) assessed autoregressive equations for levels of real GDP. The author used a three-step autoregressive estimation methodology. The three stages in the strategy were as per the following: (1) the growth of per capita GDP was relapsed upon its own first and second lagged values, (2) the underlying disturbances were calculated utilizing the regression residuals, and (3) the correlation of the disturbances among the particular nations were gotten.

In a comparative view to Karras (2007), Yehoue (2005) evaluated relationships or co-movements of shocks for every one of the SADC nations against the SADC in general. From the discoveries, it was uncovered that most of the co-movement were positive and significant and subsequently, his discoveries were commonly revolved around the probability of forming a monetary union in the SADC area. In any case, the way to common currency would be continuous. Additionally, it ought to be noticed that the results of the investigation did not endeavour to account for the non-stationarity that is accepted to be regularly present in output data in levels. Subsequently, the outcomes may reflect specification errors that will result from the presence of non-stationarity.

Jefferis (2007) calculated the correlation of exchange rate, inflation rates and interest rates of 12 SADC nations (Madagascar and Zimbabwe were excluded from the investigation) more than two sub-periods going from 1990-1996 and 1997-2002. More specifically, the coefficients of

bilateral exchange rates against the South African rand just as interest rates and inflation rate differentials in connection to South Africa were utilized as the variables in the study. Jefferis (2007) states that there is no specific purpose behind picking these subperiods albeit numerous nations experienced immense economic reform programs during these periods. In the analysis, it was assumed that South Africa would be the key member of any regional monetary union. The indicators that were utilized in the analysis were picked because they are of specific relevance to money related association. Thus, Jefferis (2007) noticed that before the monetary union, exchange rates probably been generally stable for quite a while and no significant divergences in inflation and interest rates between potential financial patrons. The discoveries from the investigation uncovered that eight nations contain what Jefferis (2007) named a 'convergence group'; these being Botswana, Lesotho, Mauritius, Mozambique, Namibia, Eswatini, Tanzania and South Africa. It should be noted, however, that Tavlas (2007) accepts that even though Jefferis (2007) had the option to derive from his results that a convergence group is feasible, Jefferis (2007) did not give any formal examination of the sets of data in the study and it appeared that the convergence group was casually based upon the inspection of the data

To summarize the findings examined thus far, the authors either were unsuccessful to find results supportive of monetary unification in one of the countries considered or found support for a monetary union involving a comparatively small group of countries, usually including South Africa and at times, with other CMA countries and Botswana. Findings by Yehoue (2005) and Jefferis (2007) who each proposed a monetary union containing at least seven nations is feasible. Yehoue (2005) discovered high co-movements of shocks in output levels among nine SADC countries, recommending that those nations could form a monetary union. A common finding of the investigations carried out on the SADC countries is that a regionwide monetary union is not possible at present.

3.7.1.2 SACU

The study by Aziakpono (2008) examined the level of financial and monetary autonomy and interdependence between South Africa and the other SACU countries for the period of January 1990- May 2005 using monthly data. More explicitly, the study used the cointegration and error correction models, as well as long-run causality analysis (based on weak exogeneity tests) to evaluate the extent to which the SARB has played a role as an anchor for monetary policy and has impacted the financial markets in the SACU countries.

The study was like that of Aziakpono (2006) but examined more interest rates trying to concentrate on the question of monetary and financial autonomy and to that of Nielsen et al. (2005) who used the rolling unit root tests and a moving regression. Interest parity condition was used by the study for the analyses, with the supposition that in a common monetary area where exchange rate risk is absent, the test of interest rate parity is lessened to a test of the co-movements among interest rates. A β low value would therefore be a sign of independence/policy rigidity or presence of market imperfections, hence low de facto integration. In comparison, in the case of within-country analysis, a high β value infers a high reaction of domestic interest rates to domestic policy stance *vis-à-vis* the central policy rate hence, policy independence and the other way around (Aziakpono, 2008).

The results from the tests for cointegration demonstrated that all the market interest rates in South Africa and Namibia were actively cointegrated with the official rate, while those for, Lesotho, and Eswatini displayed a weak relationship. The results for South Africa adjusted to expectations that, as per CMA arrangement, the economy drove monetary policy formulation and therefore would have more policy autonomy than the other SACU countries. The results for Lesotho and Eswatini conformed to expectations that the economies would have less policy autonomy. The results further proposed that the impact of domestic policy in Namibia was extremely solid (Aziakpono, 2008). All these empirical studies support Grandes's (2004) hypothesis – that the CMA group constitutes an optimum currency area. This being the case, monetary unification and a monetary policy that uses a single central bank is a viable option for SACU member states.

3.7.1.3 SACMA

Tjirongo (1995) utilized the theory of optimum currency areas as a structure to assess Namibia's appropriateness as a member of the CMA, investigated the costs and benefits of joining the CMA and the instruments that can be utilized to address asymmetric shocks in the region. He concluded that, given the absolute size of the Namibian economy versus that of South Africa. "The degree of openness to international trade and the high degree of capital mobility, the utilization of the nominal exchange rate instrument would have restricted effects on asymmetric shocks and thus, it would be beneficial for Namibia to join the CMA arrangement" (Tjirongo, 1995:32). A study by Grandes (2004) studied the underway monetary integration in Southern Africa and whether the CMA has been optimal currency area, as well as the costs and benefits of participating in the CMA. The study made use of the generalised purchasing power

parity (G-PPP) modelling technique to explore these questions. He concludes that the CMA group and Botswana as a *de facto* member form an OCA and the benefits for the CMA are free capital movement and free exchange rate while the costs are related with the loss of seigniorage”.

3.8 CONCLUSION

This chapter comprised of discussions on reading analytically on the theories of monetary union and common currency based on the theory of OCA and as well as the difficulties connected with such union formation. The different characteristics that decide the feasibility of monetary union were explored. These characteristics are factors of labour and mobility, degree of openness, fiscal integration, and GPPP and business synchronization. This thus shed light on the significant idea of endogenous OCA criteria, this idea proposes that the ought to meet these OCA criteria from the earlier was uncalled for as a union forming phase would make situation complimentary for their achievement post enrolment of the union (Mokoena,2012). Lastly, the chapter concludes by discussing previous empirical studies of various regions in Africa that are related to the focus of the research.

CHAPTER 4. RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION.

To examine the viability of a fully-grown monetary union in CMA the study adopted a quantitative approach. It comprises of the following sections, Section 4.2 presents the methodology of evaluating the macroeconomic variables (criteria) such as the budget deficit, inflation, foreign reserves, and government debt and growth rate along with descriptive statistics. Section 4.3 discusses the motivation for data and selection of variables. Section 4.4 present the economic model specification. Section 4.5 explains the method estimation.

Section 4.6 discusses another technique to be utilized to administer the monetary union's viability, which were using the OCA theory, using the business cycle and trade openness. The method entails basic optimality characteristics supported by the OCA theory and employs the descriptive statistics, correlation analysis and Granger causality test. Section 4.7 presents a conclusion. EViews 9 is the software used for analysing data.

4.2 METHODOLOGY ON MACROECONOMIC CONVERGENCE CRITERIA.

Small member countries in CMA, before the initiation of a monetary union, are required to acquire certain Macro Economic convergence Criteria (MECC) in a sustainable manner (Table 4.1 displays a brief version of the MECC and goals evaluated in this investigation). The selected macroeconomic variables in this research are inflation, GDP growth rate, foreign reserves, and government debt. The reason behind these convergence criteria was inspired by its significance as stipulated by the protocols signed by the SADC and other regions and by the necessity for similar variables for easy contrast among the countries (Redda, 2016). The MECC (Table 4.1) just shows a specific result or rate to be accomplished by a specific time, (for this study is 2018) and as such needs descriptive statistics to evaluate the accomplishment or lack thereof (Rossouw,2006).

Table 4.1: Compact version of Macroeconomic convergence criteria (MECC) and goals

Criterion	By 2018
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Inflation	3%
Foreign reserves	More than six months' imports cover
GDP growth	>7%
Budget deficit	3% Gdp as an anchor, with a range of 1%
Government debt	Less 60% of GDP

Source: Rossouw (2006).

4.3 ECONOMIC MODEL SPECIFICATION

The main components of the research are the utilization of a dynamic model to analyse a system's behaviour over a period, as dynamic models are reliable and efficient (Zhang et al, 1999). Dynamic models only require a contemporary relationship between key variables to check whether a change in one or more independent variables at a time t induces a change (Brooks, 2014). Furthermore, these models can be modified by adding lags and a dynamic model that has lag parameters for both dependent and independent variable is known as the Autoregressive Distributed Lag (ARDL) model (Brooks, 2014). As such, this study uses the ARDL model to measure convergence's existence in the CMA.

Two equations are estimated to attain set empirical objectives. The equations are as follows:

$$\Delta INT_i = F(\Delta INT_{sa}) \quad (4.1)$$

$$\Delta INF_i = F(\Delta INF_{sa}) \quad (4.2)$$

Equations 4.1 and 4.2 will both use the ARDL method. Equation 4.1 will be used to test whether the inflation rate of every LNS country converges to the South African inflation rate; whereas equation 4.2 will be used to assess whether the LNS commercial bank interest rates of the LNS converge to the South African interest rate.

4.4 MOTIVATIONS FOR DATA AND SELECTION OF VARIABLES.

The data was acquired from the World Bank and IMF. The data is annually and ranges for the period from 1988 to 2018. The data for Namibia covers the period from 1991-2018 for all the variables. The secondary data for variables incorporates inflation, budget deficit, government debt and foreign reserves along with GDP growth rate, and the real GDDP growth rate for each. Secondary data, for OCA variables that will be used, to evaluate the optimality of monetary

union is trade account (as a percentage of GDP) and GDP growth. The motive behind the choice of the following variables was well informed and motivated by their significance as stipulated in the respective protocol signed by the economic regions (SADC protocol on finance and investment, 2006). This section particularly discusses the methodology used to determine the advancement toward achieving convergence by the year 2018 (As shown in table 4.1). Since in some cases data was available for a shorter period of time for some of the CMA member countries. Given the objective to be achieved, the nature of the statistics required to achieve it, and the method used to assess the progress that need to be achieved by the year 2018(as reported in table 4.1), the selection of time period (21 years) is more than sufficient, even the 10-year period is sufficient. The push to cover a more extended period was done to give further viewpoint and background to the countries' economic conditions involved in the monetary union. Otherwise, the selection of the time is more than sufficient.

Table 4. 2: Data and selection of variables for macroeconomic economic convergence criteria

Criterion	Data utilized	Period	Source
Inflation rate	Inflation, consumer prices (annual %)	1998-2018(21 years)	World databank
Budget deficit	General, government revenue and expenditure	2005 2018(14 years)	IMF
Foreign reserves	Total reserves in months of imports	1998-2018(21 years)	World databank
Government debt	General government gross domestic product as % of GDP	2005-2018(14 years)	IMF
GDP growth	Gross domestic product, constant prices % change	1998 -2018(21 years)	IMF

4.4.1 DESCRIPTIVE ANALYSIS

A quantitative approach was adopted in analysing and assessing the progress towards a monetary union in CMA.

4.4.2 MEASUREMENT OF CENTRAL TENDENCY MECC VARIABLES

Measures of central tendency include the mean, median and mode. A measure of central tendency is "a value that attempts to describe a set of data by distinguishing the central position within a given dataset" (Redda, 2016:51). The frequently used measure of central tendency is the mean or average value. The main reason for computing a mean, in this research, is to examine the accomplishment of key macroeconomic variables (criteria) such as inflation rate, budget deficit, government debt, foreign reserves and GDP growth rate. In other words, the mean was calculated to provide a comprehensive perspective of cumulative accomplishment for a given variable (criteria).

4.4.3 MEASUREMENT OF VARIABILITY IN MACROECONOMIC CONVERGENCE VARIABLES

"Variance and standard deviation are statistics that describe measures of variability. The most frequently used measure of variability is the standard deviation. The standard deviation describes the average amount by which the scores deviate from the mean. Standard deviation is connected closely with variance and it is the square root of the variance. The standard deviation is used to describe how the various MECC were accomplished. In other words, the standard deviation was used to identify the presence of significant variations or fluctuations in the achievement of the MECC. Besides, maximum, and minimum values were detected to highlight the range of observation among the variables" (Redda, 2016:51)

The following section describes the econometric model that was utilized to further measure convergence employed.

4.5 METHOD OF ESTIMATION

The methodology of the analysis is founded on quantitative methods that endorse a functionalist method to economics. The functionalist method is all about the study of economic or social processes, as functionalist seeks to understand economic activities in terms of their relationship to a particular system (Bredemeier, 1995). Lazarsfeld (1951) indicated that a functionalist approach is used to evaluate the role of x in the maintenance of y using t .

As stated in Section 4.3, in the data analysis, this research will use the ARDL estimation model. Therefore, all appropriate statistical tests will be performed to ensure data stationarity and model stability. This includes lag selection tests, unit root tests, as well as residual and stability diagnostic tests. This econometric approach has been preferred because of its ability to deliver dependable results (McCamel, 2017). The ARDL model is versatile when it comes to co-integration and embraces different optimal lags to be assigned to everyone variable used in the

examination. It can be used regardless of how the variables are integrated, whether they are a combination of I (0) and I (1) variables, or simply integrated in the same order except when the variables involved are stationary at the second difference I (2).

4.5.1 UNIT ROOT TEST

Unit root or stationarity is a process where the variance and mean of the series are not changing over time (Asteriou & Hall, 2015). Performing a stationarity test is of vital importance since most macroeconomic variables are nonstationary. It is important because it will abstain from running spurious regression and assist to make proper forecasts dependent on the results obtained (Oche, 2018). Granger and Newbold (1974) concluded that if two independent non-stationary series are regressed on each other, it is far more likely that the relationship between the two variables will be spurious. In time series analysis, Philip Perron and Augmented Dickey fuller are frequently utilised to decide whether there is a unit root or not.

4.5.1.1 AUGMENTED DICKE-FULLER (ADF) UNIT ROOT TEST

The ADF unit root test is used to determine the presence of unit roots and the integration order in time series data (Dickey & Fuller, 1981). The ADF is an upgrade version of the Dickey-fuller test for larger and more diverse data. The following equation is used for testing unit root:

$$\Delta Y_t = \beta_0 + \beta_1 t + \alpha Y_{t-1} + \sum_{i=1}^{\delta} \phi_i \Delta Y_{t-i} + \varepsilon_t \quad (4.3)$$

i -lag order

Δ - Difference operator explaining as $\Delta Y_t = Y_t - Y_{t-1}$

β_0 - Constant

β_1 - The parameter on a time trend

The number of lagged different terms to be included will be established empirically, the lag length choice will be based on the Akaike Information Criterion (AIC).

The test was carried out using the following regressions

$$\Delta Y_t = \alpha_0 + \beta Y_{t-1} + \sum_{k=1}^r \gamma_k \Delta Y_{t-k} + \varepsilon_t \quad (4.4)$$

$$\Delta Y_t = \alpha_0 + \sigma t + \beta Y_{t-1} + \sum_{k=1}^r \gamma_k \Delta Y_{t-k} + \varepsilon_t \quad (4.5)$$

Where equation 4.5 and 4.6 indicate the estimation of regression only with intercept, and with intercept and trend, the null hypothesis state that $\partial = 0$ (no unit root) and $\partial \neq 0$ (there is unit root) meaning there is stationarity in the series.

r -is the number of lags

ε_t –stochastic error term

ΔY = change in dependable variable.

4.5.1.1.2 PHILIP-PERRON (P-P) TEST

Phillips and Perron (1988) designed a unit root test that became admirable in econometrics research of a time series. The method is used so much that by using a non-parametric methodology, the asymptotic distribution of the test value is not disturbed by serial correlation. The test statistics can be interpreted as Dickey-Fuller statistics, which are strong to the serial correlation.

The regression is as follows:

$$\Delta X_t = \alpha' \mathbf{R}_1 + \pi y_{t-1} + \varepsilon_t \quad (4.6)$$

Where $\mathbf{R}_1$ is the vector component of either constant or trend. The P-P is efficient for any serial correlation in the residuals ε_t by altering the test statistics $t_{\pi=0}$. The null hypothesis states that $\pi = 0$, the P-P test statistics are distributed asymptotically as the ADF test statistics and the standardized bias statistics. The P-P test and ADF test have the same null hypothesis that a time series X_t is not stationary.

4.5.2 COINTEGRATION TEST

The forgone section ensured that the variables are free from the unit from the root, the study proceeds to test for cointegration. Since this study used the ARDL approach, the best way for testing cointegration is to make use of the ARDL model method as the research has two single equations. The ARDL uses the ordinary least square (OLS) method. It helps the analysis to proceed to a co-integration check irrespective of whether the study constitutes of variables which are stationary at $I(0)$, $I(1)$ or a combination of variables $I(0)$ and $I(1)$ (Pesaran & Shin, 1997). Therefore, to assess the existence of a long-run relationship within macroeconomic variables in the CMA, ARDL model is used.

4.5.2.1 AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) MODEL

The ARDL model seems to have become more and more prominent because it permits variables to be stationary at $I(0)$, $I(1)$ in a data series or even as a union of $I(0)$ and $I(1)$ variables, which is the abovementioned fact (Pesaran and Shin, 1997). However, it does permits $I(2)$ variables that are stationary at the second difference. Harris and Sollis (2003) state that ARDL provides long-term, unbiased estimates of the causality tested combined with plausible statistics. Therefore, the ARDL model is capable of distinguishing between dependent and independent variables. Besides, the ARDL model does not use standard system equations in its techniques of cointegration, but rather embrace an OLS method, that simplifies the model implementation in estimating the relationships between the variables chosen (Pesaran et, 2001). This results in suggesting the following hypothesis testing framework in the cointegration tests by the ARDL model:

H_0 : There is no cointegration (no long-run relationship)

H_1 : There is cointegration (there is long-run relationship)

Therefore, in testing these two hypotheses, the ARDL model encompasses an F-test, together with a set of two critical bounds, which incorporates the upper and lower bounds. Where $I(0)$ indicates a lower bound and $I(1)$ indicates the upper bound. Provided the F-statistics is higher than these two critical bound values. H_0 of no cointegration can be rejected. The suggestion will be that there is an ongoing long-term effect from the independent variables to the study's dependent variable. Unless, on the other hand, the F-statistics is less than both the critical values of the lower and upper bounds, then the H_0 of no long-run impact cannot be rejected, indicating that there is no long-run impact running from the study's independent variables to the dependent

variables. The decision will remain unaffected even in a case where the F-statistic is larger than the critical value of the lower bound but lower than that of the upper bound (Perasan et al., 2001). With this said, not only does the ARDL model have a reputation for efficient and unbiased estimation of long-run impacts, but also with short-run impacts. Therefore, the ARDL model also produces the error correction model (ECM), which reflects both short-run adjustments and long-run equilibrium when providing the error correction term (ECT). “The ECT is the coefficient of short-run adjustments and is the indicator by which the long-run disequilibrium of the dependent variables is corrected during each quarter” (Alimi, 2014:106). Therefore, the research will proceed to estimate the ECM in the case the cointegration occurs between variables of interest. However, if there is no co-integration between interest variables, the research must estimate a Granger causality test to identify causal patterns and short-run relationships among interest variables. It is worth noting that the ARDL model allows the use of multiple optimal lags; this means that the ARDL model employs a general-to-specific modelling approach, considering the entire adequate number of lags. In econometrics, the number of lags is chosen based on the Schwarz information criterion (SIC), Hannan-Quinn (HQ), the Akaike information criterion (AIC), the likelihood ratio (LR) and the final prediction error (FPE) (Brooks, 2014). Nevertheless, out of the five lag selection criteria, the study utilises the SIC to decide the number of lags to be included in the estimation of the two models.

Empirical research shows that SIC has more strength and more accuracy than the other lag selection criteria when it comes to small or larger sample sizes (Asghar & Abid, 2007). Besides, the SIC also answers the question of over-fitting by adding a penalty term for the number of parameters in the ARDL research models (McCamel, 2017). In view hereof, this study investigates whether a long- and short-run relationship between independent variables (Inflation and interest rate of South Africa) on dependent variables (Inflation and interest rate of smaller member countries) using the ARDL model exists.

The error correction model used for both 4.2.2.1.1 and 4.2.2.1.2 are a modification of Wang (2007). It concludes that the main macroeconomic variables of the smaller participants in any monetary group are influenced mostly by the bigger economy. There is no anticipated input from smaller economies to the dominant country, because of the dominant position of the anchor economy. Moreover, in case there is any divergence of variables of the minor countries from the major country’s variables in the short-term, an adaptation mechanism is initiated until

they become comparable. The speed of adjustment differs based on several factors e.g., economical, and institutional variations.

4.5.2.1.1 ERROR CORRECTION MODEL

i. Short-term adjustment and long-term convergence of inflation in CMA countries

The inflation model for error correction is defined as follows:

$$\Delta Z_i = \alpha + \sum_{j=1}^r \beta \Delta Z_{saf} + \gamma (Z_i - Z_{saf})_{-1} \quad (4.7)$$

Z_i is the inflation rate in country i , (i = Eswatini, Namibia and Lesotho). Z_{saf} is the South African inflation rate. The γ coefficient represents the degree of the recovery of the long-term equilibrium price relationship. The β coefficient reflects the immediate reaction of inflation in the country i to changes in South African inflation rate (Engle and Granger, 1978). If $\gamma = 0$, it implies that there is no price convergence in the long run.

ii. Monetary convergence among the member States of the CMA

The interest rate model for error correction is defined as follows:

$$\Delta K_i = \delta + \sum_{j=1}^r \beta \Delta K_{saf} + \gamma (K_i - K_{saf})_{-1} \quad (4.8)$$

Where K_i is the interest rate in country i , (i = Eswatini, Namibia and Lesotho) and K_{saf} is the South African interest rate. The β coefficient measures country i 's short-term interest rate reaction to changes in South African interest rate. The null hypothesis of no convergence to the long-run relationship is described as $\gamma = 0$. The statistical significance of the γ coefficient assumes convergence of interest rates and the size of γ reflects convergence speed.

The convergence variable speed ought to be negative to support smaller countries adjusting their variables if they diverge from the large economy. In a case where the convergence speed is

zero, this would mean that there is no relationship between these countries. A positive coefficient of convergence will imply that if there are deviations, they will persist.

4.5.3 DIAGNOSTIC TEST

The previous section of this chapter stated that the methodology to be used by the study is the ARDL models; therefore, it is of high importance that the residual model and stability diagnostic tests are conducted on the estimated ARDL models before conclusions are reached. The purpose of this is to make sure all the assumptions of the model (i.e., serial uncorrelated, normality distribution, stability, and homoscedasticity) are valid. If the assumptions of the model are not accurate, the conclusions drawn with this model will be factually inaccurate. The model residual and stability diagnostic tests conducted on all the study's estimated ARDL models are therefore methodized as follows:

4.5.3.1 NORMALITY TEST

The test assumes that the residuals are normally distributed with a zero mean and a constant variance, which is essential to test the residuals. Asteriou and Hall (2011) proposed that the violation of the assumption would lead to an inferential statistic of a regression model not being valid to study it.

The Jarque-Bera test of normality, known as the JB test, explores the normal distribution of the data series. It consists of the skewness and kurtosis measures of the OLS residuals. The test calculates the difference between the data series' skewness and kurtosis compared to the normal distribution. The JB test is based on the idea that zero is equal to skewness and kurtosis. The JB test is as follows:

$$jb = \frac{R - K}{6} \left(S^2 + \frac{(K - 3)^2}{4} \right) \quad (4.9)$$

Where:

R = number of observations

K = number of calculated parameters

S = skewness of variable

K = kurtosis of variable

The test entails two hypotheses for decision-making; the test's null hypothesis is that the residuals are distributed normally. The alternative hypothesis, on the other hand, is that the residuals are not distributed normally. In the decision rule, if the p-value is less than or equal to the level of significance, the null hypothesis is rejected.

4.5.3.2 HETEROSKEDASTICITY

One of the ARDL model's expectations is that the data ought to be homoscedastic, meaning that there should be consistent variations in the residuals. Heteroskedasticity exists when there is no continuous volatility in the error term (Williams, 2015). When this occurs, the predictions of OLS are objectives and unreliable, resulting in inaccurate estimates (White, 1980). The existence of the heteroscedasticity contributes to a greater effect of data from highly variable reason on lowering the weighted criterion in OLS (Gelfand, 2013).

The following diagnostic tests can be used to assess heteroscedasticity: Breusch-Pagan LM test, White test, Glesjer LM test, Harvey-Godfrey LM test, Goldfeld-Quandt test and Park LM test. Nevertheless, in the sense of economic time series, these tests yield different outcomes. The Breusch-Pagan LM test is widely utilized in the analysis of data for the capability of homoscedasticity.

$$Var(\epsilon^2) = \sigma_i^2, i = 1 \dots, n \quad (4.10)$$

$$COV(\epsilon_i, \epsilon_j) = 0, i \neq j = 1, 2, \dots, n \quad (4.11)$$

4.5.3.3 SERIAL CORRELATION TEST

“The serial correlation is the essential restriction of the time series evaluation” (Akinlawon and Moses, 2008:52). The autocorrelation function (ACF) examines the independence of the data series. Whenever the ACF generates the results that are notably distinctive from zero, it means that the findings are dependent. Consequently, the ACF is the main tool for assessing the independence of the variables. The most commonly used method for detecting the existence of serial correlation was produced by Durbin and Watson (1950) (the DW test).

The statistic of the Ljung box Q is used as a backup for the serial correlation.

$$Q_k = S(S + 2) \sum_{i=1}^k \frac{r_i^2}{(n - 1)} \quad (4.12)$$

Where S is the sample size, k is the number lags and r_i is the autocorrelation of the sample. When Q_k is high, then the probability is that the process has uncorrelated data. Q_k is asymptotically approximate.

4.5.3.2.4 STABILITY TEST

The research conducts stability diagnostic tests on all the projected ARDL models. The justification for this is to guarantee that all the study's ARDL models' estimated parameters remain stable over time (Seddighi, 2012). Therefore, the diagnostic stability measures used in the research (i.e. the recursive residual tests) are methodized in this section of the chapter. Therefore, residuals inside the critical lines of the standard error indicate stability, whereas residuals beyond the critical lines of standard error suggest instability. Because of this, two prominent stability tests, defined as the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared residuals (CUSUMSQ) tests (Brown et al., 1975), would be methodized in the study.

□ The cumulative sum of recursive residuals (CUSUM) test

“The cumulative sum of recursive residuals (CUSUM) statistics found in the structured form of the cumulative sum of recursive residuals were tested based on the null hypothesis of quintessential parameter stability” (Brooks, 2014:240). Given this, the CUSUM figures are often zero because the expected interference value is typically zero (Brown et al., 1975). As such, the null hypothesis of the quintessential stability parameter in the CUSUM test is rejected in the case where residuals are not within the critical lines of standard error. The equation of CUSUM can be subsequently presented as follows (Brown et al., 1975):

$$W_t = \sum_{k=t}^t 1 / S \quad (4.13)$$

Where $t = k + 1, \dots, T$ and $s = S_T(T - K)$

In equation 4.13 W_t is recursive residual, whereas s indicates the calculated standard deviation and t is the time it takes a constant to deviate. Consequently, if δ denotes a constant and δ continues to be constant from time to time, then $E(W_t)$ will be equal to zero. Nevertheless in the case where δ deviates, then W_t will accordingly deviate from the critical line of its zero mean value $E(W_t)$. As such, the magnitude of the deviation from the critical zero mean value line ought to be calculated using a set of two critical five percent, confidence interval lines that will assess the stability level and therefore, determining whether the null hypothesis of the quintessential parameter stability is rejected or not

□ The cumulative sum of squared recursive residuals (CUSUMSQ) test

The cumulative sum of squared recursive residuals (CUSUMSQ) statistics found in the standardized form of the cumulative sum of squared residuals is also assessed based on the quintessential stability parameter null hypothesis (Brooks, 2014). The CUSUMSQ and CUSUM have similar characteristics as such; nevertheless, the distinctive characteristic of the two tests can be explained by the fact that the CUSUM test consists of the cumulative sum of recursive residuals, while the CUSUMSQ test plots the cumulative sum of square residuals (Brown, et al., 1975). The CUSUMSQ statistic is based on the above-mentioned null hypothesis of quintessential parameter stability and can be presented as follows (Brown, et al., 1975)

$$S_t = S_t / S_T = \left(\sum_{j=k+1}^t w_j^2 \right) \quad (4.14)$$

Where: $t = k + 1, \dots, T$ and the expected value of S_t for the null hypothesis, parameter stability is $E(S_t) = (t - k) / (T - k)$ and the ideal method to capture meaning values is to begin from zero at $t = k$ to join at $t = T$. As such, the significance of the deviation of S from the expected value is determined using the range of 5 percent confidence interval diagonal critical lines parallel to each other around the expected value.

4.6 METHODOLOGY ON THE ASSESSMENT OF OCA

The OCA theory investigation also entails a quantitative technique. According to the OCA theory, the extent of economic openness and business cycle synchronization are used to examine the monetary union's feasibility.

4.6.1 DATA AND SELECTION OF OCA VARIABLES.

Table 4.3 displays information concerning the source of data and variables. The annual data is downloaded from the World Bank and IMF from 1988 to 2018 (30 years), which is more than adequate for econometric analysis. Yearly GDP (constant prices) percentage change of all the nations in the CMA was downloaded to assess business cycle synchronization (comparability of economic systems). Trade was downloaded to examine the countries' trade openness in the CMA.

Table 4. 3: Data and selection of variables

Variables	Description	Source and period
Trade	Trade as a percentage of Gdp	World Bank (1988-2018)
Gdp	GDP growth rate	IMF (1998-2018)

4.6.2 DESCRIPTIVE ANALYSIS FOR THE DEGREE OF OPENNESS

A globally trading economy is more concerned on having a fixed exchange rate (Mongelli, 2008). This is accomplished via the approval of common currency. Trade openness of an economy is a pivotal feature in examining the attractiveness of a monetary union and approving single currency (McKinnon, 1963).

The degree of economic openness is determined by the amount of its import and export measured in terms of a percentage of GDP (Byström et al., 2005). Mean and standard deviation were considered to examine the countries' trade openness in CMA.

4.6.3. EVALUATION OF BUSINESS CYCLE SYNCHRONIZATION

Similitude in economic structure is viewed as a significant aspect in framing a monetary union, according to the OCA theory (Kenen, 1969). It is proposed by De Haan et al. (2008) that economies that their business cycles converge comprise a good chance for a monetary union. GDP as an integral measure of economic operation is utilized to gauge the symmetry/asymmetry of the economies participating in the CMA in this study.

Correlation analysis and Granger causality tests were utilized to examine business cycle synchronization. The OCA expresses that part nations that intend to build a monetary union ought to have comparable economic structures. To evaluate this, correlation analysis was seen as fitting as applied in past examinations (Artis & Zhang, 2001; Zhang et al., 2004; Byström et al., 2005:619; Amoah, 2013; Sheikh et al., 2013).

4.6.3.1 CORRELATION EXAMINATION FOR BUSINESS CYCLE SYNCHRONIZATION

Correlation analysis discloses the level to which changes in certain variables are related to changes in another variable (McDaniel & Gates, 2002). The Correlation coefficient (r) ranges from -1 to +1 (Zikmund et al., 2010). An estimation of zero to one (positive union) demonstrates that as the value for a certain variable increase, the other variable does of the same, whereas a value between zero and -1 (negative union) implying that as the values of some variables increase, that of the other variable decrease. if r equals zero, no union is signalled (Chandra & Sharma, 2013).

The Pearson product-moment correlation coefficient (r) was utilized to examine all possible bivariate relationships. A two-tailed significance level was expected at the cut level of $p < 0.01$ or $p < 0.05$. In surveying the size of the relationship coefficients, Cohen's d-measure of effect sizes was used to measure the significance of an effect. An absolute value ranging from 0.10 to 0.29 signifies a weak relationship, values between 0.30 and 0.49 represent a medium relationship and a value of 0.50 to 1.00 signifies a strong relationship between the variables (Pallant, 2013).” A positive and significant correlation coefficient would signify a synchronous business cycle (i.e., having business cycle synchronization) while a negative coefficient signifies asynchronous business cycle i.e., lack of business cycle synchronization” (Redda, 2016:55).

4.7 CONCLUSION

This chapter was to introduce the data and econometric techniques that was applied in this research. The study applied descriptive statistics such as mean, standard deviation, using macroeconomic variables to assess the degree of convergence in the CMA. Moreover, an econometric model was to further evaluate the possible monetary union. The ARDL model was employed because its applicable irrespective variables and the data series are stationary at $I(0)$ and $I(1)$ or a combination of $I(0)$ and $I(1)$ variables. Two-unit root tests, along with the stationarity were assessed (ADF and PP) just before the estimation of ARDL to decide on the order of integrations and detect unit root. Thereafter, obtaining the speed of adjustment to equilibrium via the corresponding ECM. The study estimates residual and stability diagnostics (i.e heteroscedasticity, serial correlation, normality, and diagnostics test examine whether the results obtained using the ARDL model are reliable or not. Finally, the methodology of OCA, to assess the OCA criteria, descriptive statistics, and line graph and correlation analysis were utilized.

CHAPTER 5: RESULTS AND DISCUSSION.

5.1 INTRODUCTION

The chapter presents the analysis and interpretation of the results in this study in a manner conforming to the general objective set out in the introduction. Section 5.2 provides results of individual descriptive statistics for macroeconomic variables in the CMA. Section 5.3 gives the findings of the unit-roots. Section 5.4 presents the Autoregressive Distributed Lag (ARDL) model results. Section 5.5 gives the results of the Diagnostic tests. Sections 5.6 and 5.7 presents the optimum currency area analysis, which includes presentation and discussion of the correlation analysis and line graph results. The last section provides the conclusion.

5.2 MACROECONOMIC CONVERGENCE CRITERIA ANALYSIS

In evaluating and interpreting the fully-fledged in this section, a quantitative method was adopted. In evaluating the realisation of the macroeconomics convergence criteria, the descriptive statistical analysis was utilized.

5.2.1 ACHIEVEMENTS OF MACROECONOMIC VARIABLES

5.2.1.1 INFLATION RATE

In regard to inflation, member countries of SACMA are supposed to achieve a three percent inflation rate by the year 2018. To evaluate the advancement made as for inflationary condition, assessment of central tendency (mean) and measure of variability (standard deviation) were computed. Table 5.1 displays statistical information for the past 21 years (1998-2018) and 10 years (2009-2018), for CMA. Special attention was drawn to the year of assessment (2018) achievement against the MECC intended for the year 2018.

Over the past ten years, it is apparent from the statistic evaluation that South Africa, Namibia, Eswatini and Lesotho managed to keep a lower inflation rate of 5.48, 5.54, 6.21 and 5.15 percent, individually. This means all the SACMA member countries managed to maintain an average of a single-digit inflation rate. Nevertheless, none of the member states managed to achieve an average of three percent.

In regard to the assessment year (2018), none of the countries in the CMA managed to meet the MECC in terms of the reference value, which was 3 percent. Lesotho recorded the smallest inflation rate in the region. The average inflation for the entire CMA was 4.40, which fell out

of the intended target. There is very little variation in the achievement of the inflation rate, this is shown by the low standard deviation of 0.34 that there is a strong or high correlation of the inflation rate. This reflects the integration of financial sectors in the area, it is clear that the countries failed to meet the goal for 2018, but they achieved their inflation rate more harmoniously and there were very few differences as reflected by the mean and standard deviation. The CMA member states have the challenge to address, they harmoniously fail to adequately meet the MECC. Based on the above results, the conclusion is that in terms of inflation rate CMA member countries are in good phase to move towards a fully-fledged monetary union.

Table 5. 1: Inflation rates

COUNTRY	21 YEARS (1998-2018)				10 YEARS (2009-2018)				2018
	Max	Min	Mean	St.dev	Mean	St.Dev	Skew	Kurt	
Eswatini	12.66	3.45	7.05	2.29	6.21	1.44	0.64	2.27	4.81
Lesotho	33.813	-9.62	6.40	7.71	5.15	1.32	0.11	2.13	4.0
Namibia	9.45	2.28	5.75	1.74	5.54	1.19	-0.58	1.99	4.29
South A.	10.15	-0.69	7.36	2.28	5.48	1.01	0.30	2.1	4.5
<i>Note: Aggregate for CMA for 2018: Mean=4.40 St.Dv=0.34; Max=4.81 Min= 4</i>									

5.2.1.2 BUDGET DEFICIT

“Budget deficit is determined as the difference between general government revenue and general government expenditure both communicated as percentages of GDP” (Redda, 2016:71). The macroeconomics criterion demands participating nations to maintain a budget deficit of three percent or less with a range of one percent by 2018. Table 5.2 shows the measure of variability (standard deviation) and central tendency (mean) are evaluated to examine the progress made regarding the budget deficit for 14 years (2005-2018). Adequate data for all the member countries were available only for this period.

Over the past 14 years, all the CMA countries manage to maintain the targeted budget deficit. Though they managed to maintain a targeted budget deficit; it was characterized by disparity

proved by the high standard deviation. South Africa is the only country that has met the criterion thoroughly throughout the study.

As for the assessment year (2018), none of the CMA countries managed to meet the macroeconomic convergence criteria, they all need serious work on their fiscal discipline. Especially Eswatini with a -10.5-budget deficit. The average budget deficit for the whole CMA was 4.04 meaning it does not meet the macroeconomic goal of the year (2018). The standard deviation for the year 2018 is 2.85. Based on the above results, the CMA still have various issues to address before moving to another level of integration.

Table 5. 2: Budget deficit as a percentage of GDP

COUNTRY	14 YEARS (2005-2018)				2018
	Max	Min	Mean	St.dev	
Eswatini	8.42	-10.78	-2.73	4.88	-10.5
Lesotho	11.36	-13.83	-0.57	6.31	-5.15
Namibia	5.81	-8.65	-2.82	3.88	-4.92
South A.	9.08	-7.06	-2.10	4.29	-4.42

Note: Aggregate for CMA for 2018: Mean=-6.2 St.Dv=2;85 deficit=-10.5

5.2.1.3 GDP GROWTH RATE

For both economic regions, Table 5.3 provides historical Statistics for the last 21 years (1998-2018) and 10 years (2009-2018). This also underlines the accomplishment of 2018 against the MECC set for this specific year.

The CMA member countries are required to achieve a minimum of 7 percent to meet macroeconomic convergence criteria. The SADC protocol on finance and investment did not use the reference value as criteria to be met, the GDP growth (7 percent) rate is adopted from the second criterion of the East African Community (EAC) since SADC protocol on finance and investment did not state the specific reference value that needs to be achieved by member countries.

Table 5. 3: GDP growth rate (1998-2018)

Country	21 YEARS (1998-2018)				10 YEARS (2009-2018)				2018
	Max	Min	Mean	St.dev	Mean	St.Dev	Skew	Kurt	
Eswatini	6.1	0.82	3.01	1.61	2.57	1.39	0.82	2.72	2.35
Lesotho	6.66	-0.52	3.40	1.68	3.40	1.95	0.53	2.26	2.77
Namibia	6.68	-0.86	3.76	2.24	3.47	2.95	-0.43	1.36	0.08
S.Africa	5.60	-1.54	2.64	1.82	1.51	1.42	-0.80	3.16	0.79

Note: Aggregate for CMA for 2018: Mean=1.46 St.Dv=1.33; Max=2.77 Min= -0.08

CMA member countries are struggling to achieve high economic growth to take in the high degrees of unemployment and enhance or better the living standard in their countries, this reflected on statistics information over the past 10 years. The standard deviations and average means of the member countries over the past 10 years are reflecting divergence in their development.

Concerning the assessment year (2018), none of the CMA were able to achieve the MECC, which is something that needs to be improved if there is to be a successful fully-grown monetary union in the future. The foregoing outcome reflects that member countries in the area will probably encounter asymmetric shocks due to the low correlation of growth rates. Nonetheless, such a situation does not indicate that the CMA ought not to move for full monetary integration; rather it means that alteration mechanisms (shock absorbers) should be able to be utilized in the case where they encounter different shocks. Considering the above results and what needs to be set in place before a move to another level of integration, the CMA is in a good position.

5.2.1.4 GOVERNMENT DEBT

In regard to government debt, the MECC demands that member countries maintain a government debt of 60 percent of GDP or less by 2018. Table 4.3 shows a measure of central tendency (mean) and a measure of variability (standard deviation quantified for measuring improvement with respect to budget deficit for the last 14 years (2005-2018). CMA member countries managed to maintain their government debt that is well within the target for 14 years

with Eswatini managing to have the lowest average government debt (17.26). Concerning the year of assessment (2018), all the CMA member countries continued to show a level of fiscal discipline by maintain the government debt and achieve the goal of 2018. CMA member countries managed to attain the goal for 2018 by achieving an average government debt of 45.57 percent. The results of the budget deficit propose that in terms of the government debt the CMA is in a good position for a move towards full monetary integration. However, member countries have to reduce the deviation amongst each other (St.de=8.79) which will eventually depreciate as the economies become more integrated.

Table 5. 4: General government gross debt as a percentage of GDP

COUNTRY	14 YEARS (2005-2018)				2018
	Max	Min	Mean	St.dev	
Eswatini	35.24	10.30	17.26	5.7	35.24
Lesotho	107.56	31.82	52.55	21.22	44.53
Namibia	45.79	15.47	26.46	8.64	45.79
South A.	56.71	26.51	39.67	8.87	56.71

Note: Aggregate for CMA for 2018: Mean=45.57 St.Dv=8.79; Max=56.71 Min=35.24

5.2.1.5 FOREIGN RESERVE

The MECC necessitates those member countries to keep a foreign reserve cover at least six months of import cover. Table 5.5. Shows statistical information for the past 21 years (1998-2018) of foreign reserves held by CMA members. It also highlights the assessment year (2018). CMA member countries in the last twenty-one years have been having difficulties in meeting this criterion. All of them have less than 4 months' imports cover. In respect to the assessment year (2018), the standard deviation is 0.95 that shows there is not much disparity, which is a sign of convergence among member states.

Table 5. 5: Foreign reserve targets in months of imports

COUNTRY	21 YEARS (1998-2018)				2018
	Max	Min	Mean	St.dev	
Eswatini	4.46	2.96	3.74	0.51	3.15
Lesotho	6.62	3.43	2.08	0.95	3.43
Namibia	4.51	1.75	3.1	0.81	4.26
South A.	5.47	3.32	4.58	0.62	5.27
<i>Note: Aggregate for CMA for 2017: Mean=4.03 St.Dv=0.95;Max=5.27 Min=3.15</i>					

Member countries of the CMA therefore, ought to examine the position they are currently in because the evaluation indicates that they have a serious challenge in sustaining adequate foreign reserves (at least six months' cover). The solution to this problem would be working towards import substitution and improve intra-trade while supporting export to better their foreign reserve levels as they plan to move towards full monetary integration.

The following section shows results based on the degree of openness and business cycle synchronization, to analyse whether the CMA is ready to be an optimum currency area.

5.3 UNIT ROOT RESULTS

The presented ADF unit-roots results of interest rate and inflation in table 5.10. Concerning the interest rate, the results show that the South African interest rate is stationary at the first difference and the rest is stationary at level, which includes Namibia, Lesotho and Eswatini

Table 5. 6: Augmented Dickey fuller (ADF) unit root results of interest rate and inflation in CMA Countries

INT	Level I(0)				1 st Difference I(1)				Results
	Intercept		Trend and intercept		constant		Trend& intercept		
	T.stat	P.value	t.sats	P.value	T.stats	P.value	T.stat	P.value	
Eswatini	-7.442	0.000	-7.358	0.000***	-6.73	0.000***	-6.665	0.000	I(0)
Lesotho	-5,998	0.000***	-5,874	0.000***	-10.261	0.000***	-10.097	0.000***	I(0)
Namibia	-4.298	0.002***	-5.481	0.001***	-6.698	0.000***	-6.496	0.000***	I(0)
South A.	-2.600	0.104	-2.786	0.213	-6.365	0.000***	-6.281	0.000***	I(1)
INF									
Eswatini	-5.719	0.000***	6.899	0.000***	-9.65	0.000***	-9.378	0.000***	I(0)
Lesotho	-2.139	0.232	-2.747	0.227	-4.981	0.000***	-5.147	0.002***	I(1)
Namibia	-2.808	0.07*	-2.988	0.155	-7.917	0.000***	-8.165	0.000***	I(0)
South A.	-3.673	0.010**	-2.947	0.163	-5.199	-0.000***	-6.365	0.000***	I(0)

(*) , (**), (***) indicate 10%, 5% ,1% level of significates; INT = Interest rate; INF= Inflation

INT= Interest rate INF= Inflation

When it comes to the inflation rate, results show that the inflation rate of Lesotho is stationary at first difference, the rest are stationary at level.

Table 5. 7: Phillip-Peron (P-P) unit root results of interest rate and Inflation in CMA Countries

INT	Level I (0)				1 st Difference I(1)				Results
	Intercept		Trend and intercept		constant		Trend& intercept		
	T.stat	P.value	T.stat	P.value	T.stats	P.value	T.stat	P.value	
Eswatini	-7.103	0.000***	-7.020	0.000***	-38.167	0.000***	-37.622	0.000 ***	I(0)
Lesotho	-5.998	0.000***	-5.902	0.000***	-24.703	0.000***	-28.622	0.000***	I(0)
Namibia	-4.293	0.002***	-5.042	0.002***	-12.585	0.000***	-12.797	0.000***	I(0)
South A.	-2.260	0.104	-2.821	0.201	-6.348	0.000***	-6.353	0.000***	I(1)
INF									
Eswatini	-5.719	0.000***	-15.934	0.000***	-23.979	0.000***	-23.274	0.000***	I(0)
Lesotho	-1.834	.0357	-3.250	0.094*	-9.656	0.000***	-9.512	0.000***	I(0)
Namibia	-.2661	0.094*	-3.743	0.036	-7.637	0.000***	-7.85	0.000***	I(0)
South A			-2.947	0.163	-5.199	-0.000***	-6.365	0.000***	I(1)

(*), (**), (***) indicate 10%, 5% ,1% level of significates

INT= Interest rate INF= Inflation

The presented PP unit-roots results of interest rate and inflation in table 5.11 show that both the interest rate and inflation for South Africa are stationary at the first difference and the rest are stationary at level.

5.4 THE AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) MODEL RESULTS: LONG-RUN AND SHORT-RUN IMPACTS.

The optimal ARDL models were all estimated at a constant level without trend along with their respective R-square value.

Table 5. 8: The ARDL model selected for interest rate

ARDL model	Trend Specification	Max no. of logs	Optional model	R. square
Es on S.A	Constant	1	(1.0)	84.54%
LS on SA	Constant	1	(1.0)	72.32%
Nam on SA	Constant	1	(1,0)	78.10%

ES=Eswatini LS=Lesotho Nam= Namibia SA= South Africa

Source: arranged by author (data from World Bank, 1988-2018)

The R^2 value for the first ARDL model (1, 0) (ES), implies that 84. 54 percent of the variation in the inflation rate of Eswatini can be clarified by the South African inflation rate. While the R^2 value of the second ARDL model (1.0) (LS), means that 72.32 % percent of the variation in the inflation rate of Lesotho can be clarified by the South Africa inflation rate. Lastly, the R^2 value of the third ARDL model (1, 0) (Nam) means that 78.10 percent of the variation in the interest rate of Namibia can be explained by the interest rate of South Africa.

Table 5. 9: The ARDL model selected for Inflation

ARDL model	Trend Specification	Max logs	Optional	R Square
Es on S.A	Constant	1	(1.0)	80.19%
LS on SA	Constant	1	(1.0)	82.12%

Nam on SA	Constant	1	(1,0)	75.46
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ES=Eswatini LS=Lesotho Nam= Namibia SA= South Africa

Source: arranged by author (data from World Bank, 1988-2018)

The optimal ARDLE models were all estimated at a constant level without trend as presented in Table 5.9 with their respective R-square value. The R^2 value for the first ARDL model (1, 0) (ES) suggested that 80.19 percent of the variation in the interest rate of Eswatini can be explained by the interest rate of South Africa. While the R^2 value of the second ARDL model (1,0) (LS), implies that 82.12 % percent of the variation in the interest rate of Lesotho can be clarified by the interest rate of South Africa. Lastly, the R^2 value of the third ARDL model (1, 0) (Nam) means that 75.46 percent of the variation in the interest rate of Namibia can be explained by the interest rate of South Africa. Therefore, Table 5.6 and Table 5.7 give bound test results.

5.4.1 ARDL BOUND TEST RESULTS

Table 5. 10: Inflation.

Bond yields	Lesotho		Namibia		Eswatini	
Bound test	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
5%	3.62	4.16	3.62	4.16	3.62	4.16
10%	3.02	3.51	3.02	3.51	3.02	3.51
F-stat	33.66		24.52		30.32	

I(0) and I(1) imply indicate lower and upper bound respectively at statistical significance level of 5% and 10%

Table 5.8 presents the bound test results for variables used in the study and the test results reveal that the dependent variables have a long-run relationship (an inflation rate of Lesotho, Namibia and Eswatini) and independent variable (an inflation rate of South Africa). The F-statistics were 33.66, 24.52 and 30.32, respectively. They were all greater than the upper bound critical value, which implies that there is cointegration (long-run relationship).

Table 5. 11 : Interest rate.

Bond yields	Lesotho		Namibia		Eswatini	
Bound test	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
5%	4.94	5.73	4.94	5.73	4.94	5.73
10%	4.04	4.78	4.04	4.78	4.04	4.78
F-stat	25.6		16.10		37.00	

I (0) and I (1) imply or indicate lower and upper bound respectively at the statistical significance level of 5% and 10%.

Table 5.9 presents the bound test results for variables used in the study and the test results indicate that dependent variables have a long-run relationship (interest rate of Lesotho, Namibia and Eswatini) and independent variable (South African interest rate). The F-statistics were 25.6, 16.10 and 37.00 respectively they were all greater than the upper bound critical value, which implies the existence of a cointegration long-run relationship.

5.5 ERROR CORRECTION MODEL

Table 5. 12: Error correction model results of Inflation

Countries	β	γ
Eswatini	0.79 (3.81)	-0.91 (-3.60)
Lesotho	1.00 (6.95)	-0.74 (-3.04)
Namibia	0.93 (5.71)	-0.55 (-2.44)

t statistic in parenthesis

The proof of long-run price convergence and short-run adjustment in the CMA is proven by the results presented in Table 5.12. The suggestion of the results is that the South African inflation rate highly influences those of the smaller countries as identified by the β which is large and significant for all the smaller members, with the correct sign. The coefficient, which identifies the rate of long-run inflation convergence, ranges between -0.55 to -0.91 Eswatini has the highest speed of convergence at -0.91, followed by Lesotho at -0.74 and the lowest is

Namibia at -0.55. Because the smaller member countries' currencies are pegged one to one to the rand and that they strongly depend on imports from South Africa, these findings are reasonable. This makes the South African inflation rate relevant to the whole area.

Table 5. 13: Error correction model results of the interest rate.

Countries	β	γ
Eswatini	0.82 (6.11)	-1.30 (-4.18)
Lesotho	0.65 (4.82)	-1.29 (-4.04)
Namibia	0.53 (3.56)	-1.00 (-3.71)

t statistic in parenthesis ()

The findings shown by Table 5.13 indicate that the South African interest rate greatly influences those of the smaller countries as identified by the β which is large and significant for all the smaller members, with the correct sign. The coefficient, which identifies the rate of long-run interest rate convergence, is higher and very similar for Eswatini and Lesotho at 1.30 and -1.29 individually. Namibia at -1.00 is not significantly different but is the lowest in comparison with other countries.

5.6 DIAGNOSTICS TEST

This section will look at the Normality test, homoscedasticity test, then continue with serial correlation, lastly will be the stability

Table 5. 14: Breuch-Pagan LM test for serial correlation for inflation (1) and interest rate (2)

	Eswatini	Lesotho	Namibia
1.Prob chi-square	0.57	0.70	0.38
2. Prob chi-square	0.38	0.63	0.25

In the case where the error terms are not correlated, autocorrelation does occur (Brooks, 2008). The null hypothesis is that serial correlation does not exist. The interest rate and inflation finding exhibit that the null hypothesis is not rejected because none of the p-values are below the 5 percent level of significance.

Table 5. 15: Breuch- Pagan heteroskedasticity inflation (1) and interest rate (2)

	Eswatini	Lesotho	Namibia
1.Prob chi-square	0.47	0.97	0.24
2.Prob chi-square	0.23	0.58	0.17

The null hypothesis is that there is no heteroscedasticity, implying that the residuals must be homoscedastic. In this case, the p-values are above the 5 percent level, meaning that the null hypothesis cannot be rejected. This shows that the assumption of the ARDL model was not violated; the findings can be used for conclusion or judgement.

Table 5. 16: Normality test

	Eswatini	Lesotho	Namibia
P-value	0.74	0. 42	0.46
P-value	0.63	0.41	0.91

The null hypothesis of the Jargue Bera (JB) normality test is a normal distribution. Table 5.16 shows that both the interest rate and inflation are normally distributed. This means that the aforementioned bound test and ECM are correct and not misleading.

5.6. 1 STABILITY TESTS

INFLATION RATE.

Figures 5.1 and 5.2 present results of Cusum and Cusum Q for inflation rate that was carried out based on ARDL approach. The findings show that external critical lines at a 5 percent level of significance, whereas the blue lines indicate the Cusum and CUSUMQ statistics. If the cumulative sum is outside the two critical lines, parameter instability is likely to exist.

Thus, it can be concluded that there is parameter stability as the Cusum and CusumQ statistics line stick within the stability lines.

Figure 5. 1: Cusum test for inflation

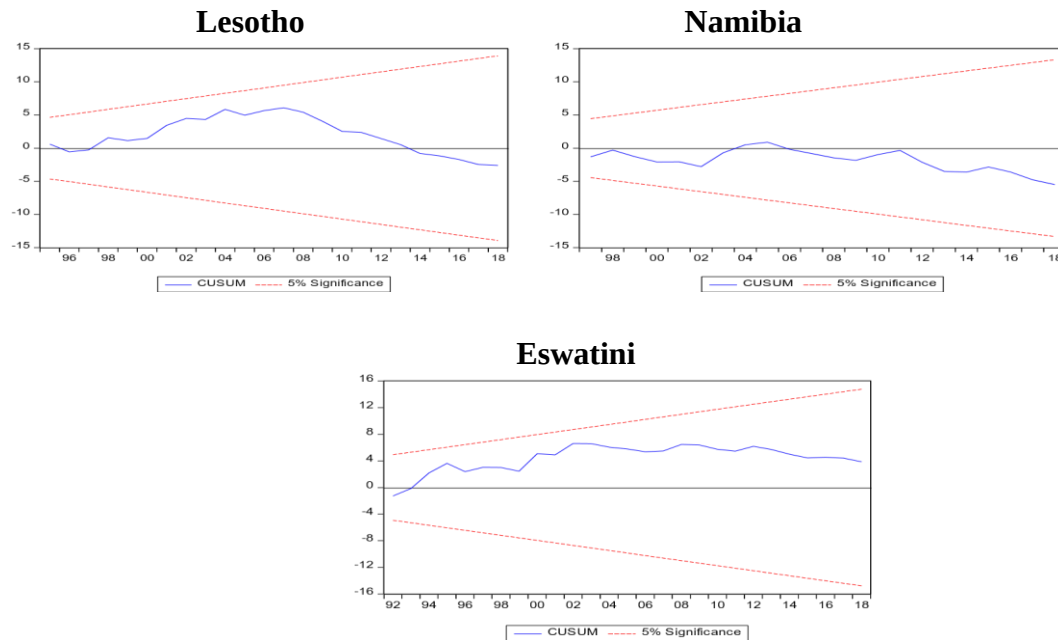
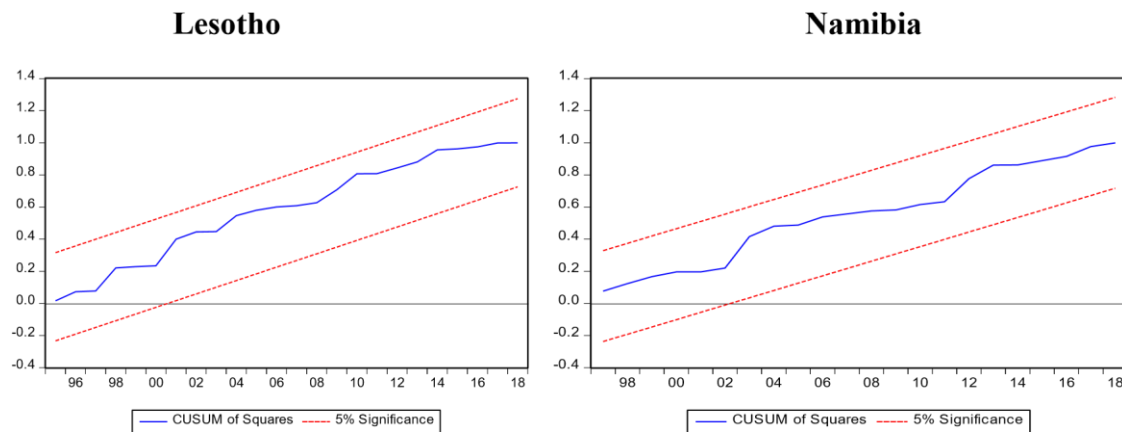
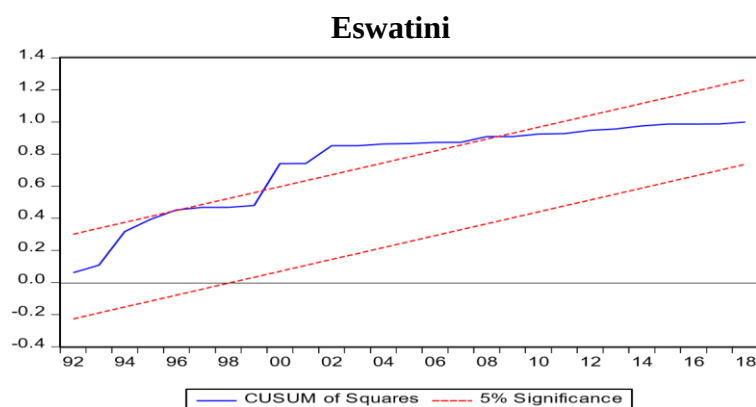


Figure 5. 2: Cusum Q for inflation





□ INTEREST RATE

Figures 5.3 to 5.4 present results of the Cusum and Cusum Q for interest rate that was carried based on ARDL. The findings show that external critical lines at a 5 percent level of significance, whereas the blue lines indicate the Cusum and CUSUMQ statistics. If the cumulative sum is outside the two critical lines, parameter instability is likely to exist. Thus, it can be concluded that there is parameter stability as the Cusum and CusumQ statistics line stick within the stability lines, except for Lesotho and Eswatini interest equation.

Figure 5. 1: Cusum test for interest rate

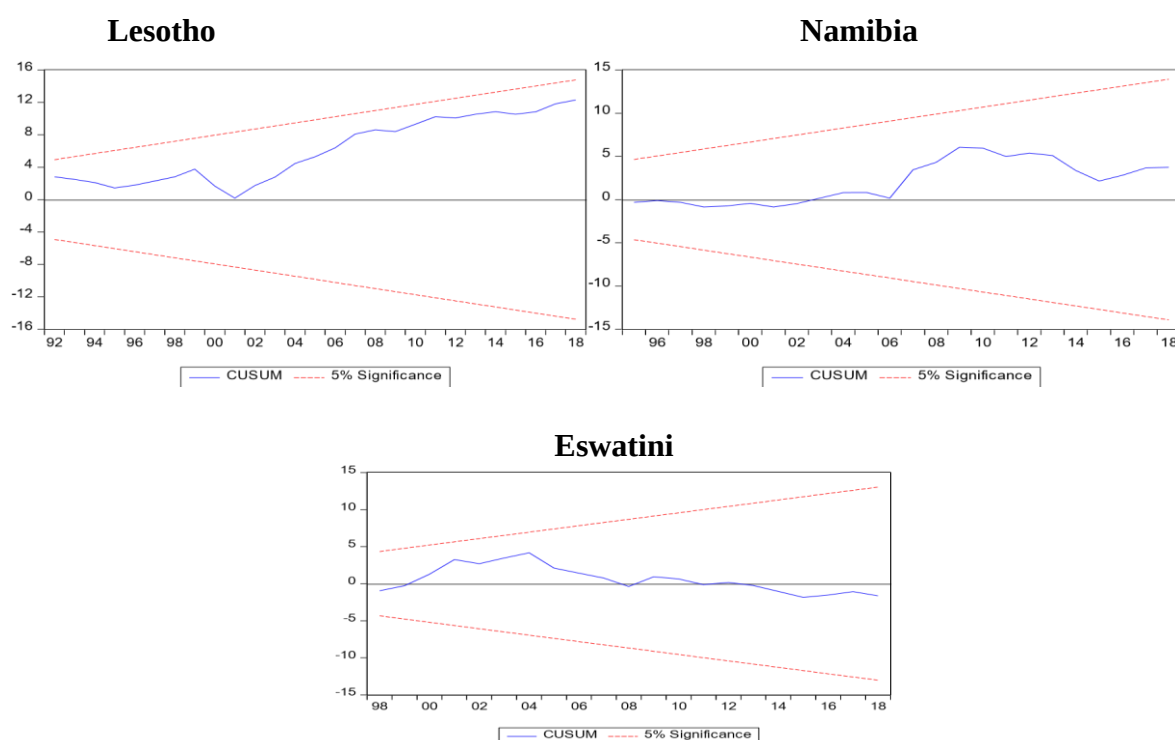
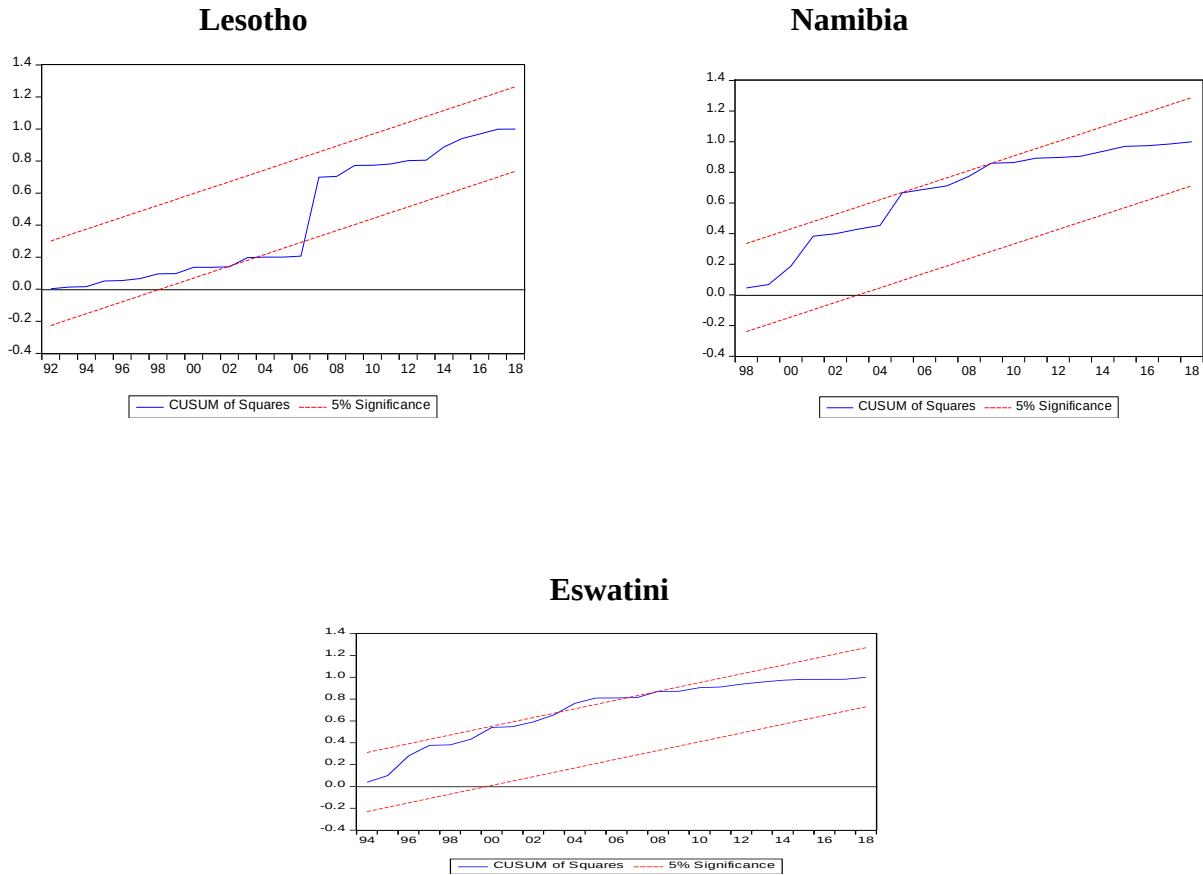


Figure 5. 2: CUSUM Q for interest rate



5.7 OPTIMUM CURRENCY AREA ANALYSIS

The objective of this segment is to present an economic analysis of the viability of a fully-fledged monetary union in the CMA utilizing two properties of optimality proposed by the OCA theory, which are the trade openness and business cycle synchronization.

5.7.1 DEGREE OF OPENNESS.

The degree of openness of an economy is computed by the sum of its imports and exports expressed by a percentage of GDP (Byström *et al.*, 2005). A 60 percent trade (percentage of GDP) was utilized as a baseline for trade openness as implemented in the EMU (Amoah, 2013).

As indicated by McKinnon's (1963) theory, one of the soonest and significant supporters of the OCA theory, trade openness of an economy is a critical feature in evaluating monetary

union's desirability and reception of a single currency. Drummond et al. (2015) sides with the idea that monetary union and single currency members profit by lower exchange costs, price adjustment, effective allocation of resource and increased accessibility to goods, labour and financial market.

5.7.1.1 DEGREE OF OPENNESS CMA

Table 5.17 shows the trade openness of the economies of CMA countries for the last 21 years (1988-2006) and 11 years (2007-2018). Lesotho was excluded from the period of 1988-2006 due to very limited data. There is strong sign that, countries participating in the CMA are available for international trade and are demonstrating progress with time. In the last 10 years (2007-2017), all the examined CMA countries managed to meet the requirement, registered an average of trade percentage of more than 60 percent.

In respect to the assessment year, the initial assessment year (2018) data was not yet made available at the writing of the research, therefore the previous year (2017) had to be the assessment year. All CMA countries managed to meet the requirement for the OCA criteria as they have consistently shown over previous years that they are open to trade. But so far as trade is concerned, the CMA member countries will stand to benefit from the move towards the common currency.

Table 5. 17: Trade openness (1998-2017)

Country	20 YEARS (1988-2006)				11 YEARS (2007-2018)				2018
	Max	Min	Mean	St.dev	Max	Min	mean	St.dev	
Eswatini	175.79	106.92	144.26	17.88	114.85	79.66	93.22	13.14	84.41
Lesotho					161.89	117.91	136.61	15.75	128.01
Namibia	98.24	82.35	92.29	4.48	125.48	83.65	103.36	12.17	83.65
S.Africa.	60.28	37.49	47.82	6.69	72.87	55.42	61.45	4..65	59.47

5.8 SYNCHRONIZATION OF THE BUSINESS CYCLE IN CMA.

To assess the homogeneity of economic structures and evaluate whether the CMA is an OCA, correlation analysis and line graph were used.

Table 5. 18: Business cycle synchronization CMA

	Eswatini	Lesotho	Namibia	South Africa
Eswatini	1.00			
Lesotho	0.06 0.74	1.00		
Namibia	0.29 0.13	0.26 0.17	1.00	
South Africa	0.51* 0.00	0.11 0.58	0.11 0.58	1.00

*/**/*** denotes significance at 0.01, 0.05 and 0.10 level respectively

There is only one positive bivariate relationship that showed a medium to strong correlation coefficient indicating a high level of synchronization (Eswatini and South Africa). The denominator in this positive bivariate association was South Africa. This correlation occurred between South Africa and Eswatini. There are five positives with insignificant correlation, and they were unable to show clear business cycle convergence (there is a lack of business cycle synchronization). There was no occurrence of clear convergence among all CMA member countries.

Based on the above analysis, there is no persuasive proof that suggests business cycle synchronization. The business cycle convergence realized only one (1 out of 10) bivariate relationship and its deficiency of implying similarities in economic structure due to the existence of the significant divergence (9 out of 10) in the business cycles. In terms of the correlation analysis, there is no business cycle synchronization in the CMA, meaning it cannot constitute an optimum currency area.

Figure 5.5 shows individual country-specific business cycles for the four CMA member countries in a timeline from 1988-2018, while Figure 5.6 shows aggregates of business cycles of the same countries in the single-line graph for the same time frame. Observing figure 5.5 of the line graphs, there is marginal proof of convergence but is not strong enough to prove that there is business cycle synchronization in the CMA (see Figure 5.6), which means that there is a disparity of economic structures in the economic structures of the economies involved. The analysis of the line graph supports that of the correlation.

Figure 5. 5: Business cycle synchronization CMA

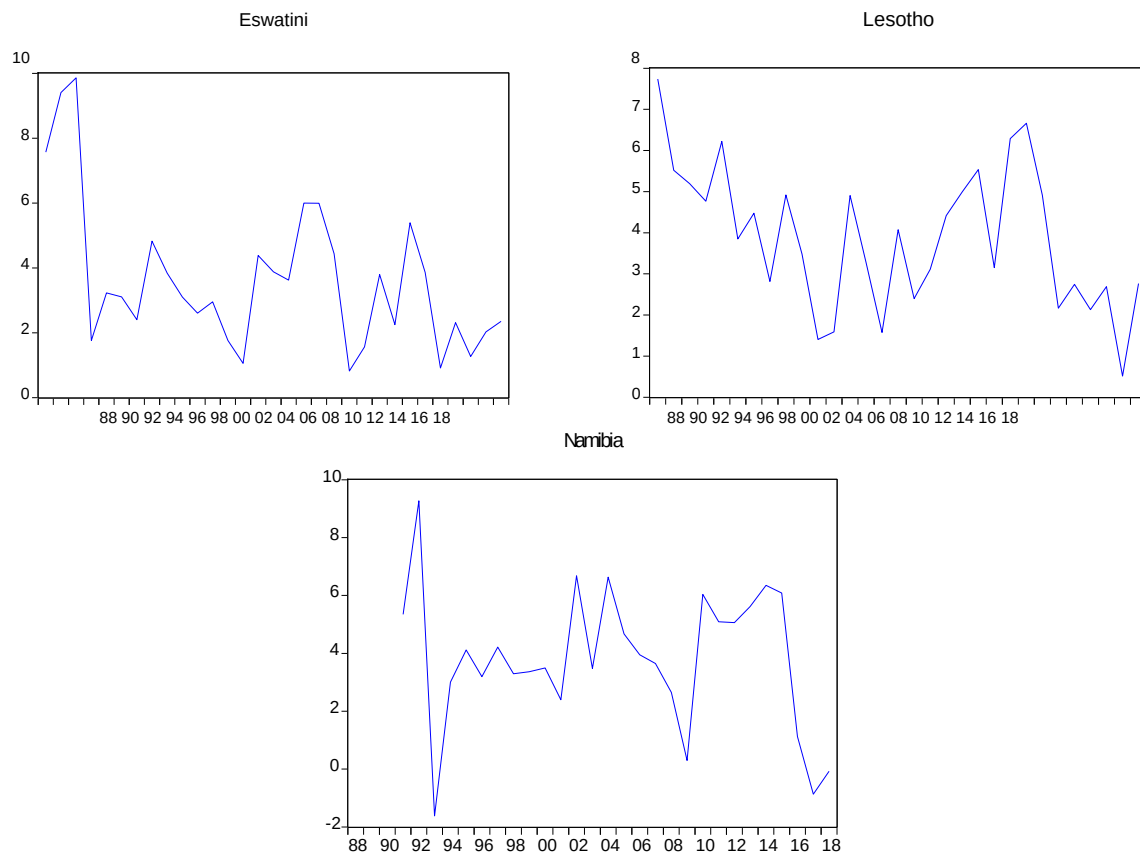
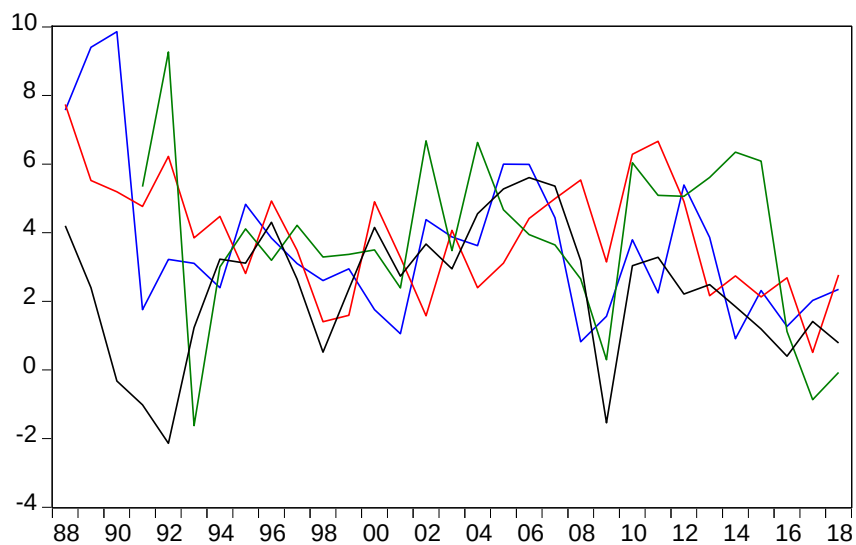
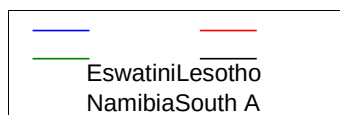


Figure 5. 6: Business cycle synchronization CMA (1988-2018)





5.9 CONCLUSION

This chapter presented analysis and interpretation that were conforming to the objectives. The above analysis relates to the macroeconomic variables and OCA criterion. Analysed based on the macroeconomic variables, four of the five CMA member countries reflected convergence. Most of the macroeconomic variables achieved convergence not by meeting the stipulated reference value for the year of assessment, but there was a co-movement that was reflected by the low standard deviations, which led to the conclusion that there exists convergence in the CMA.

CMA member countries must improve fiscal discipline in areas such as budget deficit, foreign reserves, and government debt. The study affirmed strong relations among CMA countries. The conduct of the inflation rate and interest rate show strong signs of nominal convergence. This implies a high correlation analysis correlation analysis level of integration of the financial sectors in the region and economic integration in the setting of the interest rate. Under the theory of OCA, the degree of openness of the economies and business cycle synchronization were analysed for the CMA. Concerning the trade openness, generally, the CMA member countries are open for trading which means they meet the OCA requirements. The results of the correlation analysis, the line graph shows that currently the CMA lacks business cycle synchronization, meaning there is a disparity in the economic structures. The lack of business cycle synchronization implies that the utilization of a single monetary policy as an adjustment instrument would not be appropriate for all nations, as they will confront dissimilar shock. The overall conclusion based on the above OCA analysis is that CMA has the potential to be an optimum currency area, but there are more positive steps that must be considered for a successful and functional common currency. However, this does not imply that such a situation will prevent the CMA from forming a monetary union; rather it means that alteration mechanisms should be in a position to be utilized as shock absorbers in a case where they encounter different shocks. The overall conclusion based on the results above is that the CMA is well positioned to push towards a complete monetary union.

CHAPTER 6: POLICY RECOMMENDATION AND CONCLUSION.

6.1 INTRODUCTION.

This chapter concludes and sets out recommendations for future policymaking. The first section provides key findings of the study. The second section presents the discussion on policy implications and recommendations. The last section underlines the limitations of the study and the opportunities for further research.

6.2 SUMMARY OF THE STUDY

The study analysed the readiness of the CMA in moving towards a monetary union with the intention of being able to provide a preparatory indicator of whether they ought to carry on with pursuing the agenda. Chapter 2 presented the history of the common monetary area, an overview of the LNE economies and the influence of the South African monetary policy on the LNE economies since it is the major economy, policy adjustment of South Africa and that the smaller members and the monetary management in the LNE countries. It continued to discuss the economic integration, briefly touched on the advantages and disadvantages connected to the establishment of a monetary union. The rand as the anchor currency and macroeconomic convergence were the last two to be discussed.

Chapter 3 reviewed the theoretical advancement of the OCA theory and empirical literature. The OCA theory review described a collection of criteria that were considered to be compulsory state before the establishment of the union including, among many others, labour and factor mobility, openness, as well as fiscal integration. Subsequently, the basis of the OCA criteria was put question by the inclusion of the endogeneity of OCA criteria which suggested that it was less significant that the OCA conditions are met before the establishment of a monetary union. It argued that membership of the monetary union would cause convergence, institutional and systematic improvement that will help union members find new ways of responding to economic shocks. Two key transmission channels through which a monetary union can influence a country's economic efficiency, namely trade integration and improved reputation. While the OCA theory does not address the need to achieve prior convergence of macroeconomic or microeconomic variables such as inflation, and interest rate, and such convergence was an essential component of the economic monetary union (EMU) implementation. As stated by the traditional OCA theory, as countries with different inflationary rates prior the formation of the union may be identified by similarities in other key economic variables. Nevertheless, the shift to a monetary union generally did not seek for

member states to meet specific convergence requirements gradually until they form a union. Lastly, chapter 4 and chapter 5 presented the methodology and analysis of the results. The collective of econometric methods was explored in chapter 4 in a way to accomplish the fundamental objective of this thesis. The key econometric technique used to assess the long run equilibrium under time series were the error correction model (ECM) and ARDL bound test cointegration. Macroeconomic convergence and symmetric shock are basic concerns, as the CMA seeks to move forward into full monetary union. Countries in the region have ample proof of nominal convergence, as illustrated by the interest rate action and an inflation rate that demonstrates that the area's financial sectors are integrated.

Based on the existence of convergence in the literature of the region it is suggested that countries will probably reap more rewards from establishing a full monetary union. Empirical evidence continues to favour the presence of asymmetric shock in the region based on the low growth rates correlation. The use of a one monetary policy as a stabilization instrument will not be appropriate and sufficient for all the participating countries, as they will experience dissimilar shocks. This does not imply that the CMA cannot move forward into full monetary integration, rather it means shock absorbers should be in position to be used as responding methods to different shocks.

6.3 KEY FINDINGS

This research adds to the discourses on monetary integration that have been at the front line in economic policy discussion. This monetary unification process is to be carried out in phases, beginning with the formation of regional monetary unions by each of the sub-regions of the African continent as an intermediate objective towards an African Monetary Union.

The study aimed to examine the readiness of the CMA in moving towards a fully-fledged monetary union, the objective was achieved by evaluating the extent of convergence in the CMA in terms of the macroeconomic variables and assessing whether the CMA can constitute an optimum currency area. Macroeconomic convergence is critical for the CMA as they look to make a move to another level of integration. There are various measures used to analyses the possibility of the monetary union by evaluating the extent of convergence in the CMA and whether it can constitute an optimum currency area. Descriptive statistic such a mean and standard deviation were of use to measure the extent of the convergence among the macroeconomic variables, trade as a percentage of GDP and business cycle were utilized to evaluate whether the CMA constitute an optimum currency or not (GDP growth rate).

The empirical results of the descriptive statistics proved that convergence exists among macroeconomic variables. Which is an indication that it would probably be advantageous for member countries to move to the next level of integration, which will lead to faster growth due to the process of convergence, as well as the capacity to receive new technologies developed in the leading nations. The estimated ARDL model results also revealed that there exists monetary convergence in the CMA. The outcome is proven by the co-movement of inflation and interest rate.

To assess the viability of CMA forming an optimum currency area, the study depended on the OCA theoretical lenses of the. This theory suggest that CMA correlation meets most of the basic requirements required to shape an optimal currency area. The results reflect a certain level of disparity among CMA member states, implying that there is the possibility of facing asymmetric shocks for the participating countries. However, such a situation does not imply that the CMA cannot form a monetary union; rather it means that alteration mechanisms should be in a position to be utilised as shock absorbers in cases where they encounter different shocks. This implies that there are more positive steps that need to be taken if the CMA is to thrive economically. The overall conclusion, based on the empirical results is that the CMA, is a good phase to move toward a full-fledged monetary union and at a lesser cost. However, the disparity of the economic structures in the CMA means that in their move for a full monetary integration they must be patient and cautious as they work toward it. Also, empirical results from previous studies such as Jenkins and Thomas (1997), Grandes (2003.2004), Khamfula and Huizing (2004), Nielsen et al. (2005), Azaikpono (2006, 2008), Matsaseng (2008), Memela (2010) and Dlamini (2011), confirm the potential in the CMA to establish an optimum currency area. Since Eswatini, Lesotho and Namibia's currencies are already pegged to the South African rand, it could be advantageous for SACMA to pursue full monetary union

The expansion of economic structures and refinement that part nations may reverse after the monetary union establishment would benefit significantly the LNE countries whose economies experience serious problems such as low economic activity.

Part-nation adoration following the monetary union creation, it will usually be advantageous in the face of major economic problems. The ascension of the CMA would be a steppingstone for the SADC's anticipated wide monetary union.

6.4 POLICY RECOMMENDATIONS

The study may benefit policy makers to carry out policies that will address issues affecting CMA member countries. Considering the delicate nature of the monetary union, the maintenance of monetary union will demand consistent and positive steps that must take place throughout. Other monetary unions (EMU) suggest that establishing a currency union is more than just countries willing to join, but also how many successful economies are willing to coordinate with weaker economies.

The reserve bank as the leading central bank in the CMA ought to hold regular consultations with the LNE countries to make policy decisions emanating from an informed position. There are several aspects of the integration processes of the EMU and CFA franc zone that the CMA members can draw lessons from: consultative procedures, regulation enforcement and commitment, political will, shared vision, and consensus. Smaller members of the CMA ought to be apply for a formal role in the annual SARB monetary Policy committee meetings since this formulation of monetary and exchange rate policies have a huge impact in their countries.

There is a need for the CMA to implement their own convergence criteria and other conditions that countries ought to satisfy so be they can become members; this will give outside countries that impetus to join something to work with.

6.5. LIMITATION OF THE STUDY AND AREAS FURTHER RESEARCH.

Data collection has become a common issue for African studies, so this study is no exception. The study intended to have 30 observations from 1988 to 2018 but this was not accomplished since the data was not available for some of the variables. This does have an impact on the study since the time series analysis requires at least 30 observations.

For areas of further research, since the empirical results confirmed that there is level of disparity that exists amongst the CMA member countries, therefore as the region seeks to move to another level of integration, there is a need to constantly monitor the synchronization of this economic structures. Similarly, the extent of the economic convergence ought to be regularly evaluated as the countries become more integrated. Lastly further research can be made on the feasibility of monetary union from the perspective of political will and stability.

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8 APPENDIXES.

Appendix A, ADF Unit root results for INTEREST RATE.

1.1 Lesotho (ADF unit root)

* Level, Intercept

Null Hypothesis: LESOTHO has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.998174	0.0000
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

* Level, Intercept and trend

Null Hypothesis: LESOTHO has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.874215	0.0002
Test critical values: 1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

* First difference, intercept

Null Hypothesis: D(LESOTHO) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-10.26174	0.0000
Test critical values: 1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, intercept and trend

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-10.09683	0.0000
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.2 Namibia (ADF unit root)

* Level, Intercept

Null Hypothesis: NAMIBIA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.297512	0.0024
Test critical values: 1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

*Level, Trend, and intercept

Null Hypothesis: NAMIBIA has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.481185	0.0008
Test critical values: 1% level	-4.374307	
5% level	-3.603202	
10% level	-3.238054	

*MacKinnon (1996) one-sided p-values.

*First difference, intercept

Null Hypothesis: D(NAMIBIA) has a unit root
 Exogenous: Constant
 Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.698661	0.0000
Test critical values: 1% level	-3.737853	
5% level	-2.991878	
10% level	-2.635542	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(NAMIBIA) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.496976	0.0001
Test critical values: 1% level	-4.394309	
5% level	-3.612199	
10% level	-3.243079	

*MacKinnon (1996) one-sided p-values.

1.3 South Africa (ADF unit root)

*Level, intercept

Null Hypothesis: SOUTH_A has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.600413	0.1040
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

Level, trend, and intercept

Null Hypothesis: SOUTH_A has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.786371	0.2127
Test critical values: 1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(SOUTH_A) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.364616	0.0000
Test critical values: 1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(SOUTH_A) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.281736	0.0001
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.4 Eswatini. (ADF unit root)

*Level, Intercept.

Null Hypothesis: Eswatini has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.210396	0.0000
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: Eswatini has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.126387	0.0000
Test critical values: 1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(Eswatini) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-12.13636	0.0000
Test critical values: 1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-11.88982	0.0000
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

Appendix B. PP unit root results of INTEREST RATE.

1.1 Lesotho(PP Unit root)

*Level, intercept

Null Hypothesis: LESOTHO has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.998174	0.0000
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: LESOTHO has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.902901	0.0002
Test critical values: 1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, intercept

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant
Bandwidth: 28 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-24.70359	0.0001
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, trend and intercept

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 28 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-28.62220	0.0000
Test critical values:		
1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.2 Namibia (PP unit root)

*Level, intercept.

Null Hypothesis: NAMIBIA has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-4.293315	0.0024
Test critical values:		
1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

*Level, trend and intercept

Null Hypothesis: NAMIBIA has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.041580	0.0020
Test critical values:		
1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept.

Null Hypothesis: D(NAMIBIA) has a unit root

Exogenous: Constant

Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-12.58523	0.0000
Test critical values:		
1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

*First difference, trend and intercept

Null Hypothesis: D(NAMIBIA) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-12.79704	0.0000
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

1.3 South Africa (PP unit root)

*Level, Intercept

Null Hypothesis: SOUTH_A has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.600413	0.1040
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, trend and intercept

Null Hypothesis: SOUTH_A has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.820590	0.2013
Test critical values:		
1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, intercept

Null Hypothesis: D(SOUTH_A) has a unit root

Exogenous: Constant

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.347570	0.0000
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept.

Null Hypothesis: D(SOUTH_A) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.353641	0.0001
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.4 Eswatini (PP unit root)

*Level, Intercept

Null Hypothesis: Eswatini has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-7.102859	0.0000
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

* Level, Trend and intercept

Null Hypothesis: Eswatini has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-7.020288	0.0000
Test critical values: 1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant

Bandwidth: 28 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-38.16656	0.0001
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 28 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-37.62283	0.0000
Test critical values:		
1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	35.76184
HAC corrected variance (Bartlett kernel)	2.620453

Appendix C, ADF Unit root results for Inflation

1.1 Lesotho (ADF unit root)

*Level, Intercept

Null Hypothesis: LESOTHO has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.138953	0.2317
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: LESOTHO has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.747230	0.2269
Test critical values: 1% level	-4.323979	
5% level	-3.580623	
10% level	-3.225334	

*MacKinnon (1996) one-sided p-values.

*FIRST difference, Intercept

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.980715	0.0004
Test critical values: 1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

*FIRST difference, Trend and intercept

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
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Augmented Dickey-Fuller test statistic	-5.146857	0.0016
Test critical values:	1% level	-4.339330
	5% level	-3.587527
	10% level	-3.229230

*MacKinnon (1996) one-sided p-values.

1.2 Eswatini (ADF unit root)

*Level, Intercept

Null Hypothesis: Eswatini has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.719277	0.0000
Test critical values:	1% level	-3.670170
	5% level	-2.963972
	10% level	-2.621007

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: Eswatini has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.899480	0.0000
Test critical values:	1% level	-4.296729
	5% level	-3.568379
	10% level	-3.218382

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-9.649925	0.0000
Test critical values: 1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-9.378128	0.0000
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.3 Namibia (ADF unit root)

*Level, Intercept

Null Hypothesis: NAMIBIA has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.808401	0.0704
Test critical values: 1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: NAMIBIA has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 2 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.988000	0.1549
Test critical values: 1% level	-4.374307	
5% level	-3.603202	
10% level	-3.238054	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(NAMIBIA) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.916959	0.0000
Test critical values: 1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(NAMIBIA) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.165073	0.0000
Test critical values: 1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

1.4 South Africa (ADF unit root)

*Level, Intercept

Null Hypothesis: SOUTH_A has a unit root
 Exogenous: Constant
 Lag Length: 4 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.673291	0.0109
Test critical values: 1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: SOUTH_A has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.947403	0.1634
Test critical values: 1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(SOUTH_A) has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.199030	0.0003
Test critical values: 1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(SOUTH_A) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.364967	0.0001
Test critical values: 1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Appendix D, PP unit root results of Inflation.

1.1 Eswatini (PP unit root)

*Level, Intercept

Null Hypothesis: Eswatini has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.719277	0.0000
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: Eswatini has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 29 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-15.93422	0.0000
Test critical values:		
1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant

Bandwidth: 15 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-23.97926	0.0001
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

First Difference, Trend and intercept

Null Hypothesis: D(Eswatini) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 15 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-23.27438	0.0000
Test critical values:		
1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.2 Lesotho (PP unit root)

*Level, Intercept

Null Hypothesis: LESOTHO has a unit root

Exogenous: Constant

Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.834471	0.3574
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, trend and intercept

Null Hypothesis: LESOTHO has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 8 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.250001	0.0942
Test critical values:		
1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant
Bandwidth: 15 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-9.655907	0.0000
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(LESOTHO) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-9.512943	0.0000
Test critical values:		
1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

1.2 Namibia (PP unit root)

*Level, intercept

Null Hypothesis: NAMIBIA has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.661180	0.0938
Test critical values:		
1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: NAMIBIA has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.743147	0.0364
Test critical values:		
1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.

First difference, Intercept

Null Hypothesis: D(NAMIBIA) has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-7.637326	0.0000
Test critical values:		
1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

First difference, Trend and intercept

Null Hypothesis: D(NAMIBIA) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-7.857179	0.0000
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

1.3 South Africa

*Level, Intercept

Null Hypothesis: SOUTH_A has a unit root

Exogenous: Constant

Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.633168	0.4538
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

*Level, Trend and intercept

Null Hypothesis: SOUTH_A has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.215709	0.4643
Test critical values:		
1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

*First difference, Intercept

Null Hypothesis: D(SOUTH_A) has a unit root

Exogenous: Constant

Bandwidth: 28 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.946541	0.0000
Test critical values:		
1% level	-3.679322	
5% level	-2.967767	
10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

*First difference, Trend and intercept

Null Hypothesis: D(SOUTH_A) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 28 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-10.08958	0.0000
Test critical values:		
1% level	-4.309824	
5% level	-3.574244	
10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

Appendix D, Inflation rate convergence results.

1.1 Lesotho and South Africa

Dependent Variable: D(LESOTHO)

Method: Least Squares

Date: 12/29/19 Time: 00:02

Sample (adjusted): 1990 2018

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.030741	0.302490	0.101627	0.9199
D(LESOTHO(-1))	0.036985	0.209660	0.176403	0.8615
D(SOUTH_A)	1.001497	0.144089	6.950519	0.0000
D(SOUTH_A(-1))	-0.106964	0.247666	-0.431886	0.6697
ECT(-1)	-0.748297	0.245807	-3.044251	0.0056
R-squared	0.725275	Mean dependent var	-0.342207	

Adjusted R-squared	0.679487	S.D. dependent var	2.816722
S.E. of regression	1.594654	Akaike info criterion	3.926776
Sum squared resid	61.03011	Schwarz criterion	4.162517
Log likelihood	-51.93825	Hannan-Quinn criter.	4.000607
F-statistic	15.84002	Durbin-Watson stat	1.909935
Prob(F-statistic)	0.000002		

1.2 Namibia and South Africa

Dependent Variable: D(NAMIBIA)

Method: Least Squares

Date: 12/29/19 Time: 00:33

Sample (adjusted): 1993 2018

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.277770	0.364849	-0.761329	0.4549
D(NAMIBIA(-1))	-0.301978	0.166911	-1.809219	0.0848
D(SOUTH_A)	0.926475	0.162326	5.707486	0.0000
D(SOUTH_A(-1))	0.225910	0.254535	0.887540	0.3848
ECT(-1)	-0.550007	0.225643	-2.437515	0.0238

R-squared	0.754589	Mean dependent var	-0.663731
Adjusted R-squared	0.707844	S.D. dependent var	3.349096
S.E. of regression	1.810236	Akaike info criterion	4.195833
Sum squared resid	68.81605	Schwarz criterion	4.437775
Log likelihood	-49.54583	Hannan-Quinn criter.	4.265503
F-statistic	16.14266	Durbin-Watson stat	1.445604
Prob(F-statistic)	0.000004		

1.1 Eswatini and South Africa

Dependent Variable: D(Eswatini)

Method: Least Squares

Date: 12/29/19 Time: 01:02

Sample (adjusted): 1990 2018

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Eswatini(-1))	0.022274	0.152431	0.146125	0.8850
D(SOUTH_A)	0.786063	0.206126	3.813513	0.0008
D(SOUTH_A(-1))	-0.151848	0.219516	-0.691739	0.4955
ECT(-1)	-0.914653	0.254234	-3.597675	0.0014

R-squared	0.617945	Mean dependent var	-0.093828
Adjusted R-squared	0.572098	S.D. dependent var	3.625078
S.E. of regression	2.371315	Akaike info criterion	4.692209
Sum squared resid	140.5784	Schwarz criterion	4.880801
Log likelihood	-64.03702	Hannan-Quinn criter.	4.751273
Durbin-Watson stat	1.872570		

Appendix E, interest rate convergence results.

1.1 Eswatini and South Africa

Dependent Variable: D(LESOTHO)

Method: Least Squares

Date: 12/28/19 Time: 20:58

Sample (adjusted): 1990 2018

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.373474	0.830352	0.449779	0.6569
D(LESOTHO(-1))	0.035240	0.194927	0.180787	0.8581
D(SOUTH_A)	0.655240	0.385933	1.697807	0.1025
D(SOUTH_A(-1))	-0.422818	0.428201	-0.987428	0.3333
ECT(-1)	-1.291875	0.309376	-4.175740	0.0003
R-squared	0.654746	Mean dependent var		0.057944
Adjusted R-squared	0.597203	S.D. dependent var		6.991669
S.E. of regression	4.437352	Akaike info criterion		5.973578
Sum squared resid	472.5622	Schwarz criterion		6.209319
Log likelihood	-81.61688	Hannan-Quinn criter.		6.047409
F-statistic	11.37849	Durbin-Watson stat		1.943216
Prob(F-statistic)	0.000025			

1.2 Eswatini and South Africa

Dependent Variable: D(NAMIBIA)

Method: Least Squares

Date: 12/28/19 Time: 22:45

Sample (adjusted): 1993 2018

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.701092	0.756466	-0.926799	0.3646
D(NAMIBIA(-1))	-0.081614	0.176647	-0.462019	0.6488
D(SOUTH_A)	0.531653	0.352697	1.507392	0.1466
D(SOUTH_A(-1))	0.359458	0.394519	0.911129	0.3726
ECT(-1)	-1.003402	0.270125	-3.714585	0.0013
R-squared	0.627478	Mean dependent var		-0.213975
Adjusted R-squared	0.556521	S.D. dependent var		5.744992
S.E. of regression	3.825832	Akaike info criterion		5.692470
Sum squared resid	307.3769	Schwarz criterion		5.934412
Log likelihood	-69.00212	Hannan-Quinn criter.		5.762141
F-statistic	8.843117	Durbin-Watson stat		1.074680
Prob(F-statistic)	0.000238			

1.3 Eswatini and South Africa

Dependent Variable: D(Eswatini)

Method: Least Squares

Date: 12/28/19 Time: 21:32

Sample (adjusted): 1990 2018

Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.014868	0.886876	0.016764	0.9868
D(Eswatini(-1))	-0.004264	0.188793	-0.022586	0.9822
D(SOUTH_A)	0.819396	0.408901	2.003899	0.0565
D(SOUTH_A(-1))	0.108775	0.438846	0.247866	0.8063
ECT(-1)	-1.308486	0.324149	-4.036682	0.0005
R-squared	0.704537	Mean dependent var	-0.204077	
Adjusted R-squared	0.655293	S.D. dependent var	8.082228	
S.E. of regression	4.745215	Akaike info criterion	6.107736	
Sum squared resid	540.4095	Schwarz criterion	6.343477	
Log likelihood	-83.56217	Hannan-Quinn criter.	6.181567	
F-statistic	14.30713	Durbin-Watson stat	1.344646	
Prob(F-statistic)	0.000004			

Appendix F. Serial Correlation result for Inflation

1.1 Lesotho and South Africa.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.114597	Prob. F(1,23)	0.7380
Obs*R-squared	0.143776	Prob. Chi-Square(1)	0.7046

1.2 Namibia and South Africa

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.642929	Prob. F(1,21)	0.4316
Obs*R-squared	0.772361	Prob. Chi-Square(1)	0.3795

1.3 Eswatini and South Africa

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.275240	Prob. F(1,24)	0.6047
Obs*R-squared	0.328811	Prob. Chi-Square(1)	0.5664

Appendix H for Serial correlation of Interest rate

1.1 Lesotho and South Africa.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.188809	Prob. F(1,23)	0.6680
Obs*R-squared	0.236125	Prob. Chi-Square(1)	0.6270

1.2 Namibia and South Africa.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.055122	Prob. F(1,20)	0.3166
Obs*R-squared	1.302922	Prob. Chi-Square(1)	0.2537

1.3 Eswatini and S.A

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.682715	Prob. F(1,26)	0.4162
Obs*R-squared	0.767592	Prob. Chi-Square(1)	0.3810

Heteroskedastic

Appendix G, heteroskedastic results of Inflation

1.1 Lesotho and S.A

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.122708	Prob. F(4,24)	0.9729
Obs*R-squared	0.581204	Prob. Chi-Square(4)	0.9651

Scaled explained SS	0.204074	Prob. Chi-Square(4)	0.9951
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Namibia and South. A.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.399474	Prob. F(4,21)	0.2685
Obs*R-squared	5.472061	Prob. Chi-Square(4)	0.2422
Scaled explained SS	3.413003	Prob. Chi-Square(4)	0.4912

Eswatini and South A.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.825709	Prob. F(4,24)	0.5218
Obs*R-squared	3.508141	Prob. Chi-Square(4)	0.4766
Scaled explained SS	2.308928	Prob. Chi-Square(4)	0.6791

B. Interest Rate

Lesotho and South Africa.

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.499101	Prob. F(2,27)	0.6126
Obs*R-squared	1.069571	Prob. Chi-Square(2)	0.5858
Scaled explained SS	2.572620	Prob. Chi-Square(2)	0.2763

Nam

AND

sA

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	4.446352	Prob. F(4,21)	0.0093
Obs*R-squared	11.92254	Prob. Chi-Square(4)	0.1709
Scaled explained SS	7.660271	Prob. Chi-Square(4)	0.1048

Eswam and SA

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.428997	Prob. F(4,24)	0.2548
Obs*R-squared	5.578264	Prob. Chi-Square(4)	0.2329
Scaled explained SS	7.497393	Prob. Chi-Square(4)	0.1118

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.569635	Prob. F(4,24)	0.2146
Obs*R-squared	6.013423	Prob. Chi-Square(4)	0.1981
Scaled explained SS	7.768023	Prob. Chi-Square(4)	0.1005