

**MALAWI'S TRILEMMA: MONETARY POLICY INDEPENDENCE, EXCHANGE
RATE STABILITY AND FINANCIAL INTEGRATION**

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ABSTRACT

Malawi has, in the last few decades, undergone several reforms relating to monetary, exchange rate and financial integration policies in a bid to achieve sustainable economic growth. Despite these reforms, however, the country has barely attained desirable macroeconomic performance. This study sets out to establish if the need for these policy reforms is due to the fact that the country is constrained from the simultaneous achievement of optimal levels of monetary policy independence, exchange rate stability and financial integration, as postulated by the 'trilemma'. The trilemma is evaluated using an approach introduced by Aizenman et al. (2008), in which the Ordinary Least Squares (OLS) method is applied to a model in which a constant is regressed on indices constructed for the policy intermediate goals; the results indicate that the trilemma is a binding constraint in Malawi and that the largest trade-off is between exchange rate stability and financial integration.

Given these constraints, the study also considers the combination of the trilemma intermediate policy goals that has been dominant in the country in the last three decades, using predicted values from the model and a graphical analysis to explore this objective. The analysis reveals that Malawi has, on average, prioritised exchange rate stability and monetary policy independence at the expense of financial integration.

The study also assesses how the trilemma intermediate policy goals affect macroeconomic performance, specifically regarding output growth rate and inflation. The results reveal that exchange rate stability is associated with faster output growth, financial integration is associated with higher inflation, and that monetary policy independence is not a significant factor. The results emphasise the importance of consistent stability of the exchange rate if Malawi is to achieve faster and sustainable economic growth. Given this, policy makers must be cautious, as the current floating exchange rate regime, combined with financial integration, could lead to slow growth and high inflation.

DECLARATION

This thesis is wholly my own work, except where explicitly stated otherwise and duly acknowledged. It has not been submitted to any other university, college or technikon for degree purposes.

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Charity Kamamkhudza

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TABLE OF CONTENTS

ABSTRACT	i
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
LIST OF ACRONYMS	x
CHAPTER 1	1
INTRODUCTION	1
CHAPTER 2	6
LITERATURE REVIEW	6
2.1 The Trilemma or Impossible Trinity Hypothesis	6
2.1.1 Use of the Trilemma Intermediate Policy Goals (Advantages and Disadvantages)	8
Monetary Policy Independence	8
Exchange Rate Stability	8
Financial Integration	9
2.1.2 The Impossibility of the Simultaneous Attainment of the Three Intermediate Policy Goals of the Trilemma – a Theoretical Perspective	11
2.1.3 Challenges to the Validity of the Trilemma Hypothesis	13
2.1.4 Macroeconomic Effects of the Trilemma Intermediate Policy Goals	14
2.1.4.1 Monetary Policy Independence and Macroeconomic Performance	15
Monetary Policy Independence and Inflation	15
Monetary Policy Independence and Output	15
2.1.4.2 Impact of Exchange Rate Stability on Macroeconomic Performance	15
Exchange Rate Stability and Inflation	15
Exchange Rate Stability and Output	16
2.1.4.3 Impact of Financial Integration on Macroeconomic Performance	17
Financial Integration and Inflation	17
Financial Integration and Output	18
2.2 Empirical Literature	19
Introduction	19
2.2.1 The Trilemma in History	20
2.2.2 The Validity of the Trilemma Hypothesis	22
2.2.3 Evolution of the Trilemma Configurations in Different Income Groups	26

2.2.3.1	Developed Countries	27
2.2.3.2	Emerging Market Developing Countries.....	28
2.2.3.3	Non-emerging Market Developing Countries	29
2.2.4	Previous Research Findings on the Impact of the Trilemma Intermediate Policy Goals on the Economy	30
2.2.4.1	Impact of Monetary Policy Independence on the Macro-economy	30
	Monetary Policy Independence and Inflation.....	30
	Monetary Policy Independence and Output	30
2.2.4.2	Impact of Exchange Rate Stability on the Macro-economy	31
	Exchange Rate Stability and Inflation	31
	Exchange Rate Stability and Output.....	32
2.2.4.3	Impact of Financial Integration on the Macro-economy	33
	Financial Integration and Inflation	33
	Financial Integration and Output	34
2.3	Summary and Conclusion.....	35
CHAPTER 3.....		38
MALAWI'S ECONOMY AND THE EVOLUTION OF MONETARY AND EXCHANGE RATE POLICIES AND FINANCIAL LIBERALISATION.....		38
	Introduction	38
3.1	Evolution of Monetary Policy, Exchange Rate Policy and Financial Liberalisation in Malawi (1964-2015).....	38
3.1.1	Pre-Liberalisation Period (1964 to mid-1980s).....	39
3.1.2	Financial Liberalisation Period (from late 1980s to 1994)	40
3.1.3	Post-Liberalisation Period (1995 to 2012)	42
3.1.4	Most Recent Period and the Current State (2012 to 2015)	44
3.1.4.1	Exchange Rate Policy	44
3.1.4.2	Monetary Policy	46
	Current Objectives of Monetary Policy in Malawi	46
	Monetary Policy Framework and Instruments	47
3.2	Overview of Malawi's Economy and Financial System	50
3.2.1	Country Overview	50
3.2.2	Overview of Malawi's Economy	51
3.2.3	Financial System Overview	52
3.3	Summary and Conclusion.....	55
CHAPTER 4.....		57
METHODOLOGY		57
	Introduction	57

4.1	Construction of Measures for the Intermediate Policy Goals of the Trilemma.....	58
4.1.1	Measure for Monetary Policy Independence (MI)	58
4.1.2	Measure for Exchange Rate Stability (ERS).....	60
4.1.3	Measure for Financial Integration (FI).....	61
4.2	Testing if the Trilemma is binding in Malawi	64
4.3	Determining the Dominant Combination in the Last Three Decades	66
4.4	Examining the Impact of the Trilemma Intermediate Policy Goals on Macroeconomic Performance	67
4.5	Unit Root and Diagnostic Tests	69
4.6	Data Sources and Analysis Tools	69
4.7	Summary and Conclusion.....	69
CHAPTER 5.....		71
EMPIRICAL RESULTS AND DISCUSSION.....		71
Introduction		71
5.1	Preliminary Observations in the Constructed Trilemma Indices.....	71
5.1.1	Descriptive Statistics of the Trilemma Indices	71
5.1.2	Preliminary Observations on the Trends of the Trilemma Indices	73
5.2	Validity of the Macroeconomic Policy Trilemma in Malawi.....	74
5.2.1	Unit Root Tests for Trilemma Indices.....	74
5.2.2	Empirical Test Results for the Validity of the Trilemma in Malawi	75
5.2.3	Diagnostic Tests for the Trilemma Regression	77
5.3	Determining the Dominant Combination	78
5.4	Examining the Impact of the Trilemma Intermediate Policy Goals on Macroeconomic Performance	81
5.4.1	Unit Root Test Results for Macroeconomic Indicators and Control Variables .	81
5.4.2	Regression Results and Discussion	82
	5.4.2.1 Results on the Impact of the Trilemma Intermediate Policy Goals on the Output Growth Rate:	84
	5.4.2.2 Results on the Impact of the Trilemma Intermediate Policy Goals on the Level and Volatility of Inflation	86
5.4.3	Diagnostic Tests	89
5.5	Summary and Conclusion.....	91
CHAPTER 6.....		93
SUMMARY AND CONCLUSION.....		93
6.1	Summary of the Study	93
6.2	Policy Recommendations	96
6.3	Study Limitations	98

6.4 Areas for Further Research.....	98
References	99
Appendix	104

LIST OF FIGURES

Figure 2.1 The Trilemma Triangle	7
Figure 3.1 GDP Growth Rate (Annual %)	39
Figure 3.2 Overall Inflation (Monthly %)	42
Figure 3.3 Malawi Kwacha per U S Dollar Exchange Rate (Monthly Mid-rate)	43
Figure 3.4 Interest Rates	49
Figure 4.1 Monetary Policy Independence Index	60
Figure 4.2 Exchange Rate Stability Index (ERS)	61
Figure 4.3 Financial Integration Index (FI)	64
Figure 5.1 Trilemma Indices	73
Figure 5.2 Predicted Values ($aMI + bERS + cFI$)	76
Figure 5.3 Individual Contributions of the Trilemma Indices to the Total	79
Figure 5.4 Cumulative Contributions of the Trilemma Indices to the Total	80

LIST OF TABLES

Table 3.1. Total Assets for Malawi's Financial Institutions	53
Table 3.2. Financial Sector Credits to the Economy	54
Table 3.3. Malawi Stock Exchange Statistics	54
Table 5.1 Summary Statistics of the Trilemma Indices	71
Table 5.2 Augmented Dickey-Fuller Test Results for the Trilemma Indices	74
Table 5.3 Estimated Trilemma Equation Output	75
Table 5.4 Correlations between the Trilemma Indices	76
Table 5.5 Diagnostic Tests for the Trilemma Regression	78
Table 5.6 Means of Individual and Cumulative Contributions of the Trilemma Indices to the Total	79
Table 5.7 Unit Root Test Results for Macroeconomic Performance Indicators – Augmented Dickey-Fuller Test	82
Table 5.8 Regression Output for the Impact of Trilemma Intermediate Policy Goals on Macroeconomic Performance	83
Table 5.9 Tests for Serial Correlation and Heteroskedasticity	90
Table 5.10 Multicollinearity Tests: Variance Inflation Factors	91

LIST OF ACRONYMS

ADB	African Development Bank
AFEDs	Authorised Foreign Exchange Dealers
AREAER	Annual Report on Exchange Arrangements and Exchange Rate Restriction
COMESA	Common Market for East and Southern Africa
CPI	Consumer Price Index
DSI	Domestic Share Index
ECF	Extended Credit Facility
ERM II	European Exchange Rate Mechanism
ERS	Exchange Rate Stability
FA	Foreign Assets
FCDA	Foreign Currency Denominated Accounts
FI	Financial Integration
FL	Foreign Liabilities
FSI	Foreign Share Index
GDP	Gross Domestic Product
HAC	Heteroskedasticity and Autocorrelation Consistent
IMF	International Monetary Fund
KAOPEN	Chinn-Ito Financial Openness Index
LRR	Liquidity Reserve Requirement
MASI	Malawi All Share Index
MFIs	Micro-Finance Institutions
MI	Monetary Policy Independence
MSE	Malawi Stock Exchange
MWK	Malawi Kwacha
NDA	Net Domestic Assets
NEMC	National Economic Management Committee
NFA	Net Foreign Assets
OLS	Ordinary Least Squares
OMO	Open Market Operations
PR	Policy Rate
PRGF	Poverty Reduction Growth Facility
RBM	Reserve Bank of Malawi
SADC	Southern African Development Community

US	United States
USA	United States of America
VIF	Variance Inflation Factors

CHAPTER 1

INTRODUCTION

In pursuit of the macroeconomic stability that creates an environment conducive to sustainable economic growth, countries adopt different macroeconomic policies. One of the biggest challenges for most countries, however, is how to simultaneously manage the three intermediate¹ goals of macroeconomic policy that would contribute to attaining this; monetary policy independence, exchange rate stability and financial integration. Aizenman (2010), defines national monetary policy independence (or sovereignty) as the ability of a country to implement its own monetary policy in order to achieve specific objectives without being constrained to follow the monetary policy actions of another country or a monetary union. The highest level of exchange rate stability would be when a country pegs the value of its currency to that of another (Mandilaras, 2014). Financial integration (or free capital mobility), as defined by Ogbuagu & Ewubare (2015), describes a situation in which the financial markets of neighbouring, regional or global economies are closely linked. Ogbuagu & Ewubare (2015) indicate that this integration can take various forms, one of which is elimination of controls on cross-border financial operations and flows.

The trilemma of International Finance and Macroeconomics, also known as the ‘impossible trinity’, postulates that it is not possible for a country to achieve optimal levels of all the three intermediate policy goals simultaneously (Mandilaras, 2014; Obstfeld et al., 2005). The argument posed in the literature (Aizenman et al., 2008; Hutchison et al., 2012; Obstfeld et al., 2005; Sengupta, 2015) is that there are trade-offs between them; an improvement in one has a negative effect on one or both of the other two. Even though attainment of the three intermediate policy goals is desirable for the attainment of ultimate policy goals such as high economic growth and low inflation, countries are thus faced by the constraint of having to choose at most two at a particular point in time. The hypothesis is based on the theory of uncovered interest rate parity² and empirical evidence.

In light of the trilemma, over the past few decades countries have tried out different combinations of the three. For instance, Aizenman (2010) and Hsing (2012a) observed that

¹ The three goals: monetary policy independence, exchange rate stability and financial integration, are intermediate goals of macroeconomic policy since they are used to attain ultimate goals such as higher economic growth and low inflation.

² ‘Uncovered interest rate parity’, as defined by Bekaert et al. (2007), Cumby and Obstfeld (1982) and Francis et al. (2002), refers to a parity condition in which the difference between the interest rates in the two countries is equal to the expected rate of change in the exchange rate.

the United States of America (USA) has embraced financial integration, where anyone is free to invest in and out of USA with ease; the country's central bank has autonomy over monetary policy, but exchange rates are determined by market forces. Countries in the Eurozone like France, Germany, Italy and Greece have also embraced free capital mobility but, as Hsing (2012a) notes, they have eliminated any exchange rate movements within the Eurozone by adopting the Euro as their currency; this in turn means that the freedom to conduct independent monetary policy has been lost. Lastly, Hsing (2012a; 2012b) indicated that, while China has autonomy over its monetary policy and controls its exchange rate through maintaining strict exchange controls, financial liberalization is sacrificed. This diversity in policy choices among countries would seem to indicate that country choices depend on their unique needs and circumstances.

Malawi, like many other countries, could be battling with the trilemma; this has become especially pronounced in the last few decades as the country aims to achieve exchange rate and price stability while opening up to the global financial system. According to Chipeta & Mkandawire (1991) and Mwabutwa (2014), after independence in 1964 the country's financial system was heavily controlled by government; there were onerous exchange controls and direct controls on credit and interest rates, in addition to the government adopting a fixed exchange rate system. Mangani (2011) and Ngalawa & Vieggi (2011) noted that financial liberalisation started in late 1980s as a result of macroeconomic imbalances developing due to the failure of the economy to adjust to external shocks. Some of the reforms mentioned by Ngalawa & Vieggi (2011) include floating exchange rates, changing from direct to indirect tools of monetary policy, and relaxing some exchange controls to open up the current and capital accounts.

Despite the reforms adopted, by 1994 the exchange rate, inflation and output had become more volatile, leading to further reforms being adopted between 1994 and 2014, some of which were mentioned in Mangani (2011) and Simwaka & Mkandawire (2011). The most recent reforms were implemented in 2012 when the country shifted from a peg to the US\$ to a floating exchange rate regime (Lungu, 2015; Simwaka & Mkandawire, 2011). Additional exchange controls were loosened during this period to further open up the current account, and liberalisation of the capital account is gradually progressing. Additionally, as stated in the Reserve Bank of Malawi Monetary Policy Statement Number 3 (2016, January 06), the Reserve Bank started to use an interest rate targeting monetary policy framework (using the Taylor rule equations) in the context of inflation targeting in January 2014, moving away

from the previous regime of targeting monetary aggregates. Even after these policy changes, however, the problem with volatility of the exchange rate, inflation rate and output persists.

These frequent changes in macroeconomic policies, and the observed volatility in macroeconomic indicators in Malawi, could be explained by the trilemma; that is, the constraints policy makers face between monetary policy independence, exchange rate stability and financial integration.

Empirical studies on the trilemma concept have been plagued by the difficulty in measuring a country's level of achievement for each of the intermediate policy goals which Aizenman et al. (2008) addressed by developing indices for the goals. Studies focusing on various issues relating to the trilemma have since emerged in literature. Most empirical studies are, however, concentrated in developed countries (especially in Europe) and in emerging³ market developing countries. The few studies that were done in non-emerging⁴ market developing countries, such as those by Aizenman (2010), Aizenman & Ito (2011) and Aizenman et al. (2008; 2010; 2013), mostly assessed the trilemma concept at an aggregate level, and not at a single country level. A single country study (Ogbuagu & Ewubare (2015)) was done in Nigeria but focused on only two of the three, namely exchange rate stability and financial integration; there seems to be a gap in the literature regarding single country studies in non-emerging market developing countries.

Under normal circumstances, each of the intermediate policy goals of the trilemma should promote lower and stable inflation and higher and sustainable output growth (Aizenman & Ito, 2011; Hsing, 2012b; 2013b; Mandilaras, 2014; Obstfeld, 1994). Empirical studies on the issue have, however, produced mixed results. For instance, using multiple countries, Aizenman (2010) found that greater monetary policy independence is associated with higher inflation and greater capital account openness with lower inflation in developing countries. Contrary to these results, Hutchison et al. (2012) found that, in India, greater monetary independence was associated with lower inflation, and greater capital account openness with higher inflation volatility. Hutchison et al. (2012) found greater exchange rate stability to be associated with lower inflation volatility in India, but Hsing (2012b) found that in Greece

³ Emerging markets refer to national economies that are still considered developing but are progressing towards becoming advanced. They are often characterised by high prospects of economic growth but lower per capita income and less developed capital markets than advanced economies. Examples according to the International Monetary Fund (IMF) are Brazil, Russia, India, China, South Africa, Indonesia and Mexico.

⁴ Non-emerging market developing countries are poor unindustrialised economies characterised with low per capita income and underdeveloped capital markets. Malawi is in this category according to the IMF classification.

greater exchange rate stability had no significant effect on either the level of, or the volatility in, inflation.

These mixed results would seem to indicate that country choices and the effects of the trilemma on inflation and output depend on country-specific factors, and is thus pertinent for Malawi. The study could provide some assistance in understanding the effects of macroeconomic policy changes that the country has gone through in the last three decades, particularly whether and how changes in the intermediate policy goals can be linked to inflation and output performance.

Given the background, the study is aimed at achieving the following goals:

1. To empirically evaluate the trade-offs between monetary policy independence, exchange rate stability and financial integration in Malawi as implied by the trilemma hypothesis;
2. To determine the combination of the intermediate policy goals of the trilemma that has been dominant or prevalent in Malawi in the last three decades;
3. To assess the extent to which pursuing the trilemma intermediate policy goals has affected macroeconomic performance in Malawi in terms of the level and volatility of inflation and output growth over the last three decades.

The study adopts a positivist, quantitative approach, using OLS and Eviews software for analysis. Specifically, the study follows an existing methodology in the literature introduced by Aizenman et al. (2008) and later used by Aizenman et al. (2009; 2010; 2011; 2012), Hsing (2012a; 2012b; 2013a; 2013b), Hutchison et al. (2012) and Jian et al. (2011), among others. The use of an existing methodology could make the findings comparable to those of other studies that applied the same methodology to other countries.

Firstly, indices are constructed for each of the three intermediate policy goals using formulae developed by Aizenman et al. (2008) for monetary policy independence and exchange rate stability, and by Jian et al. (2011) for the financial integration index. The monetary policy independence index is constructed by normalizing correlations between Malawian and South African interest rates. The exchange rate stability index is constructed by normalizing volatility (the standard deviation) of the exchange rate between the Malawi Kwacha and the US\$ and the financial integration index as the ratio of the sum of the gross stock of foreign assets and liabilities to gross domestic product (GDP). These indices measure Malawi's level of achievement in each of the intermediate policy goals over a period.

Secondly, to evaluate the tradeoffs between the intermediate policy goals and hence assess whether or not the trilemma hypothesis is binding in Malawi, a linear model is estimated using the OLS method by regressing a constant (one) on the three constructed indices. The rationale for estimating this linear model, as argued by Hutchison et al. (2012:11), is that if there are indeed trade-offs between the three intermediate policy goals, their weighted sum should equal unity, reflecting the overall constraint on the three indices. The parameters in this model provide approximate estimates of the weights assigned to each intermediate policy goal.

Next, to determine the most prevalent combination of the intermediate policy goals of the trilemma over the sample period, a graphical analysis of possible combinations is conducted.

Lastly, to assess the effects of the trilemma intermediate policy goals on macroeconomic performance, the OLS method is applied on three models in which the macroeconomic performance indicators - the output growth rate, the inflation rate and inflation volatility⁵ - are regressed on the indices for the intermediate policy goals of the trilemma and some control variables.

The study uses monthly data spanning the period from January 1983 to December 2015 obtained from the Reserve Bank of Malawi, Malawi National Statistics Office, Board of Governors of the Federal Reserve, International Monetary Fund and the World Bank websites.

The thesis is organised into six chapters. Chapter 1 is an introduction where a brief background and context to the study is provided while stating the motivation, significance, goals and methodology of the study. Chapter 2 provides a review of existing theoretical and empirical literature on the trilemma concept which should provide an understanding of the subject and gaps that the study may fill. Chapter 3 follows with a description of the context of the study, providing an overview of Malawi's financial system, how the three policies (monetary policy, exchange rate policy and financial liberalisation) have been pursued in the country and how the economy has performed over the study period. Chapter 4 describes the methodology, procedures, techniques and data to be used. Chapter 5 follows with a presentation, interpretation and discussion of the results. Chapter 6 concludes, providing a summary of the research and findings, policy recommendations and areas for further research.

⁵ Measured by standard deviation of the inflation rate (Consumer Price Index)

CHAPTER 2

LITERATURE REVIEW

This chapter provides a review of existing literature relating to the trilemma concept. It is aimed at providing an outline of the trilemma hypothesis while highlighting the position in the body of relevant knowledge in which the study is located. It is divided into two main sections: theoretical and empirical literature.

The theoretical review describes in detail the nature of the trilemma hypothesis. It includes definitions of the three components of the trilemma and provides theoretical explanations regarding why they may or may not be desirable. It also explains why the intermediate policy goals of the trilemma cannot be pursued simultaneously, in the process highlighting theories from which the trilemma hypothesis draws its arguments. Lastly, it reviews theoretical debates on the validity of the trilemma and theoretical aspects regarding how each of the three intermediate policy goals affects the macro-economy.

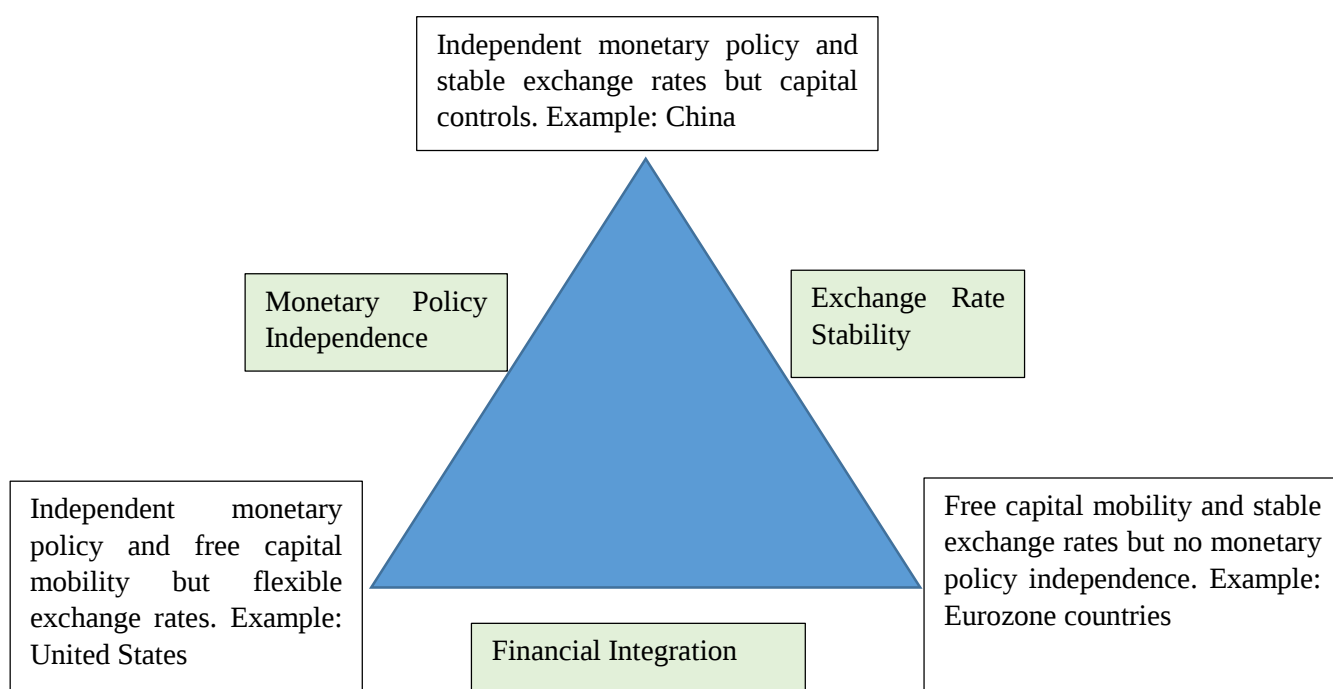
The empirical section discusses studies that have been done on the trilemma. Focus is on studies that have empirically examined the validity of the trilemma, those that have assessed the evolution of the trilemma intermediate policy goals over time and those that have examined their effects on economic performance.

2.1 The Trilemma or Impossible Trinity Hypothesis

As previously stated, the ‘trilemma’, also called the ‘impossible trinity’, is a hypothesis in the field of International Finance and Macroeconomics which posits that a country cannot simultaneously pursue optimal levels of the following three intermediate goals of macroeconomic policy: monetary policy independence, exchange rate stability and financial integration (Aizenman et al., 2008; 2009; 2010; Globan, 2014; Grenville, 2011; Hosny et al., 2015; Mandilaras, 2014). This, according to Aizenman & Ito (2011), Hutchison et al. (2012) and Sengupta (2015), is due to the fact that there are trade-offs between the three, such that an improvement in one induces a worsening in one or both of the remaining two. Consequently, Jian et al. (2011), Mandilaras (2014), Mankiw (2010) and Schoenmaker (2011), argue that a country can pursue only one or at most two of the trilemma intermediate policy goals at a point in time, but not all three.

To illustrate, the trilemma is often described using some version of the triangle in Figure 2.1 overleaf:

Figure 2.1: The Trilemma Triangle



(See Aizenman, 2010; Aizenman & Ito, 2011; Aizenman et al., 2009)

The sides of the triangle each represent one of the trilemma intermediate policy goals: monetary policy independence, exchange rate stability and financial integration. All three are desirable for the attainment of ultimate goals of macroeconomic policy such as high economic growth and low inflation but, according to the trilemma, a country can be on two at most at any one time.

The vertices of the triangle thus represent possible combinations a country can choose. A country that chooses the top vertex values the freedom of setting its own interest rates (monetary policy independence) and stable (pegged) exchange rates but forgoes the benefits of free capital mobility by employing capital controls; China would be a good example. The left vertex represents a situation where a country that chooses monetary policy independence and free capital mobility has to let exchange rates float; the United States opted for this option. Lastly, a country that chooses the right vertex accrues the benefits from free capital mobility and stable exchange rates but at the expense of its freedom to conduct independent monetary policy; a preferred choice of countries in the Eurozone.

The next section examines the benefits and costs that may be associated with use of the various intermediate policy goals.

2.1.1 Use of the Trilemma Intermediate Policy Goals (Advantages and Disadvantages)

Theoretical literature provides several reasons as to why the trilemma intermediate policy goals may be appealing to policy makers. Each, however, may be associated with undesirable effects. The trilemma, accordingly, emanates from the difficulty in determining which intermediate policy goal is more beneficial than the others in promoting macroeconomic stability.

Monetary Policy Independence

To begin with, Mankiw (2010) argues that monetary policy independence affords a central bank the ability to use monetary policy as a tool for stabilising the economy. With monetary policy autonomy, a central bank is able to stimulate a sluggish economy by engaging in monetary easing or cool down an overheated economy by engaging in monetary tightening (Hsing, 2012; 2013). Additionally, Mandilaras (2014) points out that, without being subjected to other countries' macroeconomic management policies or actions, a central bank can effectively respond to external shocks with monetary sovereignty. Monetary independence thus enables a central bank to use its own monetary policy as a tool to achieve internal balance which can potentially lead to a stable and sustainable economic growth.

On the flip side, as argued by Aizenman & Ito (2011), greater monetary policy independence can lead to increased inflation and output volatility if policy makers, faced with price and wage rigidities, use their sovereignty to manipulate inflation and output movements in the short run. Aizenman & Ito (2011) further argue that, without fiscal discipline, policy makers can abuse their sovereignty by monetising the national debt which can breed volatility, especially high and unstable inflation. This mostly happens in countries where the central bank is not fully independent from government or political influence.

Exchange Rate Stability

Hsing (2013) argues that exchange rate stability (fixed / pegged exchange rates) is attractive to policy makers mainly because it protects the value of a country's currency. Floating exchange rates, on the other hand, are prone to speculative dynamics which, according to Mankiw (2010) and Ogbuagu & Ewubare (2015), may result in excessive volatility in exchange rates and in turn broader economic instability, especially in small open economies with inefficient foreign exchange markets. As such, stable exchange rates allow individuals and institutions or businesses to make concrete long-term plans and participate in the world

economy without reference to possible adverse exchange rate movements. Moreover, as Aizenman & Ito (2011) and Mandilaras (2014) indicate, stable exchange rates may lead to price stability by (i) providing an anchor for inflationary expectations and (ii) by mitigating uncertainty which lowers the risk premium, in turn fostering domestic and international investment and trade. Further, Aizenman & Glick (2009) argue that maintaining exchange rate stability during an economic crisis can increase confidence in the central bank and thereby expedite the effectiveness of efforts aimed at stabilising output movements.

On the other hand, high levels of exchange rate stability, according to Aizenman & Ito (2011), can limit policy makers by removing the option to use the exchange rate as a potentially effective policy tool for absorbing external shocks. A free floating exchange rate, in comparison, acts as a natural defence against unfavourable international capital flows (Globoff, 2014). For instance, during excessive capital inflows, the exchange rate would appreciate, leading to an increase in the foreign price of domestic assets, automatically reducing demand for the domestic assets by foreign investors.

A pegged exchange rate may be desirable as a policy tool for stabilising the economy through stabilising the exchange rate and prices, but may also be a source of volatility, especially during excessive foreign capital flows.

Financial Integration

There is a heated debate regarding whether or not financial integration is beneficial. For some proponents (Aizenman & Ito, 2011; Hsing, 2012; Mandilaras, 2014) a financially open economy attracts foreign capital inflows in the form of foreign direct investment (FDI), portfolio investment and other forms of investment. The increase in investment boosts output in the short-run by enhancing or supplementing domestic savings and hence promotes fixed investment and economic growth (Aizenman & Ito, 2011; Hsing, 2012; Mandilaras, 2014). Additionally, Aizenman & Ito (2011) and Mankiw (2010) argue that financial integration encourages foreigners to bring their expertise (technological and managerial know-how) into the country, increasing domestic factor productivity and in turn boosting output.

Financial integration also enables a country's citizens to invest in international financial markets and thereby diversify their portfolios. Aizenman & Ito (2011), Mandilaras (2014) and Obstfeld (1994) argue that this international diversification may help a country stabilise through risk sharing with other countries and may also encourage efficient allocation of capital as well as production specialisation in the long run. Capital-poor countries, according

to Ogbuagu & Ewubare (2015), can especially benefit from financial integration as they can diversify away their production bases which are mostly agriculture and natural resource-based. This is why Levine (2001) asserts that if having a broader base of capital is one of the drivers of economic growth, then financial integration may be part of the solution.

Mandilaras (2014) and Ogbuagu & Ewubare (2015) further posit that financial integration can generate long-run indirect benefits from better and more appropriate economic policies; the argument is that the cost of policy mistakes increases with greater financial integration. Policy makers would then take extra caution when formulating or implementing policies, bearing in mind that any mistake would reduce their country's competitiveness on the international market.

Financial integration is, however, not without flaws. Perhaps the most well-known side effect of greater financial integration is that it increases the risk exposure of countries to volatile short-term cross-border capital flows (hot money) which are subject to sudden stops and reversals (Aizenman et al., 2009; Aizenman & Ito, 2011). Volatile cross-border flows are one of the major causes of economic instability at both country and global level. Most economic or financial crises in the last few decades were either caused, or exacerbated, by the interconnectedness of world financial markets. For instance, the 2008 global financial crisis started in the United States but spread across the globe due to the integrated nature of the US and international financial markets.

Further, as mentioned by Sengupta (2015), large capital inflows can fuel domestic inflationary pressures and the formation of asset price bubbles which have the potential to cause economic instability. This is due to the fact that capital inflows dramatically increase the demand for domestic assets and hence demand for the local currency and eventually the monetary base.

Further, Buigut & Rao (2011) and Jian et al. (2011) argue that greater financial integration can reduce national government autonomy in macroeconomic policy management. This is because policy makers may be obliged to follow international standards to compete on the international market.

Lastly, developing countries are prone to capital flight problems when they choose greater financial liberalisation. Most developing countries have less-developed financial markets characterised by low liquidity and few asset classes. Financial liberalisation in such countries would enable some investors to free their resources and pursue other more rewarding, liquid

and sophisticated investment opportunities in international markets; these outflows could lead to the problems referred to earlier.

Each of the intermediate policy goals of the trilemma can be a double edged sword. Policy makers would have to assess and weigh the benefits and costs of each goal in relation to the country's unique needs and circumstances before adopting any of them. Unfortunately, that kind of assessment is not an easy task. While it would be relatively simpler if it was possible to use all three intermediate policy goals at once, that is not, in terms of the trilemma hypothesis, possible.

2.1.2 The Impossibility of the Simultaneous Attainment of the Three Intermediate Policy Goals of the Trilemma – a Theoretical Perspective

The trilemma hypothesis is a fundamental contribution of the 1960's Mundell-Fleming model (an extension of the IS-LM Neo-Keynesian model) which considers a small economy choosing its exchange rate regime and financial integration with global financial markets (Aizenman, 2010). As a matter of illustration, consider a country that has adopted a fixed exchange rate regime and full financial integration but is also trying to have full autonomy over monetary policy. Say, in an effort to reduce domestic inflation, the country raises interest rates to a position higher than world interest rates. In this case, 'arbitrage theory' in Financial Economics posits that foreign investors (arbitrageurs) will be attracted by the relatively high interest rates to invest in that country; high foreign exchange capital inflows and increased demand for the local currency will result, putting pressure on the local currency to appreciate. However, because the exchange rate is fixed, the monetary authority will have to maintain the value of the local currency by intervening in the foreign exchange market through purchasing the excess foreign currency. The local currency will be used to purchase the foreign currency, increasing the local reserves. The increased liquidity in the system will, unless it's neutralized by open market operations, put upward pressure on the general price level; the goal of reducing inflation will be frustrated.

A second scenario, similar to that presented by Mandilaras (2014), would be a central bank trying to boost spending by lowering interest rates relative to world rates. Lower interest rates would be relatively unattractive to arbitrageurs who, because of financial integration, would be free to sell their investment holdings in the local market and demand foreign currency to invest in higher yielding investments elsewhere. In order to prevent the local currency from depreciating against the foreign currency and hence defend a pegged exchange rate, the central bank would have to run down on its reserves by selling the foreign currency; this

would reduce liquidity in the system and, unless neutralized, negate the central bank's initial objective of boosting spending.

It would not be possible, therefore, for the central bank to exercise full monetary policy independence in the presence of full exchange rate stability and financial integration. What would work for the country to have monetary policy independence is to either give up financial integration by imposing controls on capital flows or float the exchange rate to allow it to move to a new equilibrium. Otherwise, according to the impossible trinity theory, it is impossible to attain optimal levels of all three intermediate policy goals at the same time.

Some of the theories underlying the impossible trinity hypothesis (the trilemma) are 'uncovered interest rate parity' and 'arbitrage'.

Uncovered interest rate parity, as defined by Bekaert et al. (2007), Cumby and Obstfeld (1982) and Francis et al. (2002), refers to a parity condition which states that the difference in interest rates of two countries is equal to the expected rate of change in the exchange rate between the currencies of the two countries. For the above examples, the uncovered interest rate parity would be presented mathematically as follows:

$$i_L - i_B = E(e)$$

Where i_L is the interest rate of the local country, i_B is the interest rate of the base country and $E(e)$ is the expected rate of change in the exchange rate between the two countries.

For instance, assuming initially the interest rate of government bonds in both the local country (i_L) and the base country (i_B) is 10%, if the local country changes its interest rate to 15% so that the difference in interest rates between the two countries is 5%, according to the uncovered interest rate parity, the exchange rate between the two countries' currencies would be expected to depreciate by 5%. If the exchange rate does not change, or changes by more or less than 5%, an opportunity to make arbitrage profits exists.

Arbitrage, according to Faure (2013), refers to the act of simultaneously purchasing and selling identical or similar financial assets with the intention of profiting from price differences. It involves purchasing an asset in the cheaper market and, at the same time, selling an identical or similar asset in the more expensive market. In short, arbitrage is a trade that seeks to make riskless profit by exploiting differences in the prices of identical or similar assets in different markets or in different forms. It exists due to market inefficiencies like the

absence of uncovered interest rate parity (Faure, 2013) and would tend to drive the prices to equality.

Revisiting the first case, it was assumed that the local country has adopted a fixed exchange rate and financial integration but it is also trying to pursue monetary policy independence. If the country decides to raise interest rates by 5%, according to ‘uncovered interest rate parity’, the exchange rate is supposed to depreciate by 5%. Because the country has adopted a fixed exchange rate, however, an ‘arbitrage’ opportunity exists for investors to profit by purchasing government bonds in the local country at a lower price and selling base country government bonds at a higher price. This means that due to financial integration there will be capital inflows into the local country; capital inflows will increase the supply of foreign currency, increasing pressure on the exchange rate to appreciate. The central bank intervenes by buying *forex* from the market to defend the fixed exchange rate, but in the process increases liquidity in the system which opposes the initial objective of the central bank of raising interest rates to reduce inflation. It is clear that optimal levels of each of the intermediate policy goals cannot be attained simultaneously; hence the trilemma.

2.1.3 Challenges to the Validity of the Trilemma Hypothesis

As can be seen, central bank intervention in the foreign exchange market could lead to further inflation by increasing the monetary base (the first case) or liquidity shortages by reducing the monetary base (the second case). Altinkemer (1998), Grenville (2011) and Sengupta (2015) point out that sterilised rather than unsterilized intervention would enable countries to use the trilemma intermediate policy goals at the same time. For instance, in the first scenario, in order to prevent the foreign exchange intervention from raising the inflation rate further, the central bank would sterilise the intervention by conducting a contractionary open market operation by selling local-currency-denominated securities to withdraw excess liquidity from the markets. Mandilaras (2014), however, argues that this challenge assumes that central banks are not limited by the extent that intervention in the foreign exchange market can be neutralized.

The literature identifies two constraints to sterilisation that may be encountered. Firstly, according to Jian et al. (2011) and Mandilaras (2014), international reserves are not an inexhaustible resource; the more the central bank intervenes in the *forex* market to prevent a depreciation of the local against the foreign currency in an environment of fixed exchange rates and free capital mobility, the faster international reserves would be depleted. The

sustainability of foreign exchange market intervention by the central bank is thus questionable in the long-run, rendering its ability to deal with the trilemma questionable.

The second limit to sterilisation lies in its costs. Altinkemer (1998) argues that sterilised intervention is costly because it is associated with the risk of increasing interest rates as well as reinforcing inward capital flows. The securities that the central bank uses for sterilisation have to bear attractive interest rates for the sterilisation to be effective, meaning offering higher interest rates relative to market rates. Ultimately, all other rates in the financial system follow suit, thereby attracting further international capital inflows. Excessive sterilisation and the associated high interest rates increase the interest payment burden for the central bank, in turn increasing losses, which are for the account of the taxpayer. Also, as Jian et al. (2011) point out, the higher interest rates triggered by sterilisation can promote macro and micro moral hazard which can lead to distortions in the financial system. The costs associated with sterilisation make its long-run sustainability questionable, implying that monetary policy independence, in an environment of fixed exchange rates and financial integration, would also be unsustainable. The trilemma constraint would, therefore, be binding.

Besides the issue of the effect of sterilisation on the trilemma, there are other arguments raised that question the validity of the trilemma hypothesis. Grenville (2011) contends that the impossible trinity story is problematic because it assumes that (i) currencies are close substitutes, (ii) portfolio capital flows are mainly driven by interest rate differentials and (iii) foreign direct investment is driven by other factors; for example, foreign investors may be attracted to invest in a country because of future long-term growth prospects. This type of capital inflow, in Grenville's (2011) view, would be structural rather than cyclical and would not easily be reversed due to short-term movements in interest rates. Clearly, the trilemma hypothesis does not take into account all the factors that drive capital flows.

The existence of arguments against the trilemma hypothesis indicates the importance of an empirical validation of the issue; there is a growing empirical literature on the subject discussed later.

2.1.4 Macroeconomic Effects of the Trilemma Intermediate Policy Goals

One of the objectives of this study is to assess how the pursuit of the trilemma intermediate policy goals influences macroeconomic performance in Malawi. Accordingly, the effect of the pursuit of these intermediate goals on macroeconomic stability is considered.

2.1.4.1 Monetary Policy Independence and Macroeconomic Performance

Monetary Policy Independence and Inflation

It was mentioned earlier that monetary policy independence could result in either a decrease or an increase in inflation. Whether monetary policy independence decreases or increases the level, and / or volatility, of inflation, Aizenman & Ito (2011), Mandilaras (2014) and Ihnatova & Căpraru (2014) argue that this depends on the credibility of the monetary authorities. If the central bank is credible enough, monetary policy independence would give them the ability to use monetary policy as an effective tool to decrease or control inflation levels and volatility. If the central bank is not credible, on the other hand, Aizenman & Ito (2014) argue that greater monetary policy independence would allow them to abuse their power and use monetary policy for other undesirable objectives such as to finance fiscal deficits and manipulate output and inflation levels for government debt or for political reasons. These practices would lead to high and volatile inflation. Monetary policy independence would thus be good news for countries with credible central banks but bad news for countries with low central bank credibility.

Monetary Policy Independence and Output

Reasonably low and stable inflation promotes investment and consumption which are important components of a country's total output or gross domestic product (GDP). In contrast, high and volatile inflation discourages investment and consumption. Since inflation affects output, for reasons explained in the preceding section, monetary policy independence would also decrease or increase output depending on central bank credibility. That is, assuming a credible central bank, monetary policy independence, working through its effect on inflation, can lead to high, stable and sustainable economic growth. If the central bank lacks credibility, monetary policy independence can be a source of low and volatile output growth (Aizenman & Ito, 2011). Hence, like the effect on inflation, monetary policy independence can advance or suppress economic growth or make it volatile.

2.1.4.2 Impact of Exchange Rate Stability on Macroeconomic Performance

Exchange Rate Stability and Inflation

Some theoretical literature predicts that exchange rate stability should go together with low and stable inflation. Aizenman et al. (2010) and Mandilaras (2014) argue that long-run stability in the exchange rate can be seen as an indication of a central bank's credibility in the

conduct of monetary policy, especially in its commitment to defend an anti-inflationary monetary policy stance. This can mitigate uncertainty in the economy and hence result in low and stable prices.

A fixed exchange rate can, as argued by Hsing (2012; 2013), potentially lead to high or volatile inflation by subjecting the local country's currency movements to movements in the anchor currency. When the anchor currency appreciates (depreciates), the local currency would depreciate (appreciate), so that volatility in the anchor currency would potentially transmit to the local currency. Volatile exchange rates breed uncertainty and eventually inflation volatility.

Exchange rate stability can also attract large international portfolio capital inflows which can easily be reversed in times of macroeconomic shocks. These volatile movements in capital flows can increase uncertainty and volatility in the domestic country and eventually lead to high or volatile inflation. According to Ihnatova & Căpraru (2014), after the European Union (EU) enlargement in 2004 and 2007, new Eastern EU member countries which had adopted the EURO as their currency faced high capital inflows which initially generated two digit inflation rates and later on low inflation after the crisis.

Thus, despite a well-known theoretical proposition that exchange rate stability leads to low and stable inflation, fixed exchange rates have the potential to generate high and volatile inflation.

Exchange Rate Stability and Output

The effect of exchange rate stability on output can be both positive and negative. Two positive effects stand out in literature. First, Aizenman & Ito (2011) and Hsing (2013a) assert that stable exchange rates can mitigate uncertainty and thereby lower both foreign exchange risk and interest rate risk premiums. This promotes investment, consumption and international trade, and in turn leads to high, stable and sustainable economic growth. Second, Aizenman and Glick (2009) contend that a prolonged stability in exchange rates or maintenance of fixed exchange rates during an economic crisis can increase the credibility of monetary authorities. A credible central bank enhances consumer, producer and investor confidence and thereby contributes to stabilising output movements. According to Ogbuagu & Ewubare (2015), small open economies particularly benefit from the output-stabilising effect of exchange rate stability.

Among the negative effects of exchange rate stability on output is that a pegged exchange rate regime deprives policy makers of an easy tool for absorbing external shocks. The argument in the literature (Friedman, 1953 and Meade, 1951 in Ogbuagu & Ewubare, 2015) is that with a flexible exchange rate a country can more easily adjust to real shocks than with a fixed exchange rate regime where adjustments to the real exchange rate are done through relative price changes; these are costly and slow in a world of price rigidities. The slow adjustment process of the economy can slow down output growth. Aizenman & Ito (2011) argue that this rigidity caused by fixed exchange rates can also lead to resource misallocation, contributing to unbalanced and unsustainable output growth.

Another negative impact of exchange rate stability on output relates to the effect of capital inflows attracted by the stable exchange rates. As previously stated, short-term capital inflows can easily reverse in times of external shocks, thereby contributing to output volatility through the investment channel (Ihnatova & Căpraru, 2014). Aizenman et al. (2010), however, argue that the volatility-enhancing effect of fixed exchange rates can be mitigated by holding high levels of international reserves, an issue that is still under scrutiny in literature.

Exchange rate stability can, thus, be a desirable tool for promoting output growth and decreasing output volatility but it also carries the risk of actually doing the opposite.

2.1.4.3 Impact of Financial Integration on Macroeconomic Performance

Financial Integration and Inflation

The theoretical relationship between financial integration and inflation can be unpredictable. In some circumstances, for instance when the domestic country is characterised by low unemployment and attractive interest rates, financial integration can lead to large capital inflows (direct and portfolio investment) which could put pressure on prices and wages to rise, in turn raising inflation. In other circumstances, however, the same increase in capital inflows can put pressure on the country's currency to appreciate. In this case imports for the country could become cheaper, reducing inflation in the process. Similarly, Mandilaras (2014) puts forward that increased investment inflows can increase domestic production which could lead to low prices and in turn reduce inflation.

It was also earlier mentioned that capital inflows in an environment of free capital mobility are prone to abrupt reversals in times of economic shocks. These capital movements or speculative attacks, according to Ihnatova & Căpraru (2014), have the potential of causing severe instability in the economy, inflation volatility inclusive.

Like the other two intermediate policy goals of the trilemma, therefore, financial integration can be a double edged sword on inflation.

Financial Integration and Output

Picking up from theoretical literature, financial integration in some cases is associated with high output growth and low output volatility but in other cases it is with low output growth and high output volatility.

Beginning with positive effects, Aizenman & Ito (2011) believe that financial integration leads to output growth by allowing for more efficient allocation of resources. This is due to the fact that, with more financial integration, both domestic and foreign investors have the opportunity to invest in more profitable businesses or assets either in or outside the country. The returns realized from these investments should increase aggregate output. In addition, as mentioned before, Aizenman & Ito (2011) believe that not only can financial integration attract capital inflows which supplement domestic savings and investment, it can also attract managerial and technological knowhow which enhances factor productivity, and in turn aggregate output.

Aizenman & Ito (2011) further contend that countries with access to international financial markets and with open financial markets themselves are in a better position to contain economic shocks due to risk sharing with other countries and portfolio diversification. Aizenman et al. (2010) also argue that financial integration can contribute to real exchange rate stability which stabilizes the economy. Macroeconomic stability in turn promotes economic growth.

On the negative side, Hsing (2012a; 2013a) and Ihnatova & Căprarua (2014) suggest that financial integration exposes a country to the risk of abrupt capital inflows which, as explained previously, can lead to economic volatility and hence low and unstable output growth. Thus, as much as financial integration can be beneficial through enhancing output growth and reducing economic growth volatility, in some circumstances it can reduce economic growth or lead to output volatility.

From the above theoretical discussion, it can be noted that the effects of each trilemma intermediate policy goal on the economy are not clear-cut. Each one of them can have desirable and undesirable effects. Perhaps that should explain the differences in choices of

these intermediate policy goals that countries have made and the resultant effects on their economies. This is why, in subsequent sections, empirical aspects of the trilemma hypothesis, including the macroeconomic effects of the trilemma intermediate policy goals, are examined so as to gain a better understanding of the trilemma concept, before focusing on Malawi in subsequent chapters.

2.2 Empirical Literature

Introduction

The trilemma hypothesis has, to an extent, been regarded as a theoretical curiosity. Even though the concept has been widely accepted in academia and among policy makers, comprehensive empirical scrutiny of the concept is only just beginning to gain momentum. This is probably because, not only is it strenuous to test the constraints implied by the trilemma, but it is also difficult to measure a country's extent of achievement in each of the intermediate policy goals of the trilemma: monetary policy independence, exchange rate stability and financial integration.

Obstfeld et al. (2005) and Aizenman et al. (2008) are notable and comprehensive pioneer studies that developed the first methods to empirically analyze the trilemma hypothesis. The term 'trilemma' for the impossible trinity was actually brought into widespread use by Obstfeld & Taylor (1997) and Obstfeld et al. (2005). Few empirical studies followed after Obstfeld et al. (2005), perhaps because of the rigor required in the study; the majority emerged after Aizenman et al. (2008) developed methods for constructing indices that measure a country's level of achievement in each of the trilemma intermediate policy goals. A majority of the studies actually have in fact been based on the Aizenman et al. (2008) methodology.

The 2007-2008 global financial crisis also triggered an influx of empirical studies on the trilemma concept as economists tried, and are still trying, to understand and look for solutions to various economic and financial problems facing the world.

This part of the chapter reviews the pioneering, and some subsequent, studies on the trilemma concept. As per the objectives of this study, the review concentrates on studies focused on analyzing the validity of the trilemma hypothesis, examining country choices over the past few decades and assessing the macroeconomic effects of the trilemma intermediate policy goals.

2.2.1 The Trilemma in History

The trilemma has been widely accepted in academia and among policy makers as a major macroeconomic policy guiding framework, largely because the trade-offs implied by the trilemma have been observed in history. Aizenman & Ito (2011) observed that different financial architectures have endeavoured to achieve two of the trilemma intermediate policy goals; attempts to achieve all three have led, or at least contributed to, the breakdown of some historical financial systems. Some of the financial crises in history were also to some extent triggered by attempts to pursue all intermediate policy goals of the trilemma at the same time.

Going as far back as the classical gold standard, Obstfeld et al. (2005) observed that the gold standard financial system was characterised by fixed exchange rates, unconstrained capital mobility but limited monetary policy independence. The main aim of the gold standard system, according to Obstfeld et al. (2005), was exchange rate stability which required free capital mobility among countries at the expense of internal price stability. During and after World War 1, however, governments feared that the gold standard could bring about inflationary and / or deflationary pressures and hence volatility (Obstfeld et al., 2005). They thus attempted to pursue both exchange rate and price stability; this could not happen with unrestricted international gold movements. As a result, according to Obstfeld et al. (2005), the governments had to impose controls restricting international flows of gold. This was one of the main reasons for the breakdown of the gold standard system. That is, the attempt to pursue all the three intermediate policy goals of monetary policy independence, exchange rate stability and financial integration during the gold standard led to its downfall.

The Bretton Woods financial system that followed the breakdown of the gold standard also broke down partly due to countries trying to pursue the three intermediate policy goals of the trilemma at the same time. Obstfeld et al. (2005), Aizenman & Ito (2011) and Aizenman et al. (2010) stated that the system gave countries autonomy over monetary policy with relatively stable exchange rates, but it was associated with restricted capital movements. During that time, as Bordo (1981) mentioned, countries' currencies were pegged to the US\$ which was in turn convertible to gold. However, throughout the 1960s and 1970s, the world financial structure was changing gradually. Bordo (1981) stated that other currencies (such as the Western European currencies) became convertible into gold and could therefore be used as reserve currencies. This increased international financial transactions and strengthened monetary interdependence; as a result the US\$ became so overvalued that it was difficult to maintain its convertibility to gold (Bordo, 1981). In August 1971, according to Bordo (1981), the then president of the United States, Richard Nixon, announced that the convertibility of

the US\$ to gold would be suspended (IMF). The increase in financial integration had made it difficult to maintain fixed exchange rates and monetary policy independence during the Bretton Woods era, an example of the trilemma in practice.

After the breakdown of the Bretton Woods system, countries were given the freedom to choose any exchange rate regime desired in combination with their policy choices on monetary policy independence and financial integration. Aizenman et al. (2010) noted that most developed countries, such as the United States, the United Kingdom, Canada and Australia, opted for free floating exchange rates to allow for monetary independence and free capital mobility. Some countries like Hong Kong and Eurozone member countries in recent decades opted for stable exchange rates and free capital mobility but had to forego monetary policy independence by having currency boards, as Hsing (2012a; 2012b; 2013a) noted. Most emerging market economies such as China and some non-emerging market developing economies (until recently) opted for the third combination of stable exchange rates and monetary independence while maintaining controls on capital mobility to some extent (Aizenman et al., 2010; Hsing, 2012a; 2012b; 2013a). Thus, even presently most countries pursue only two of the trilemma intermediate policy goals and are cautious to pursue all three.

Strengthening the trilemma hypothesis further, historical literature provides examples of economic crises that are believed to have been caused by countries' attempts to simultaneously achieve high levels of all the trilemma intermediate policy goals since the breakdown of the Bretton Woods system. Sengupta (2015) cited the 1994-1995 Mexican peso crisis, the 1997-1998 Asian financial/debt crisis and the 2001-2002 Argentinean financial crisis as examples.

The Asian 1997-1998 crisis, according to Patnaik and Shah (2010), is known to have been caused by East Asian countries' pursuit of the combination of all the intermediate policy goals of the trilemma. East Asian countries had fixed exchange rate regimes (*de facto* dollar peg) and were promoting *de facto* financial integration, and at the same time pursuing independent monetary policy (Garnaut, 1998; Patnaik & Shah, 2010). First, the fixed exchange rate meant that foreign investors could invest in East Asia without fear of exchange rate fluctuation risk. Second, the financial integration implied that foreign investors could invest in and out of East Asia with ease. Third, as Garnaut (1998) noted, East Asian countries had interest rates higher than the US and some other important countries. These three points attracted large amounts of short-term investment inflows into the East Asian region. Garnaut (1998) noted that, while initially the trade balance in the region was within reasonable levels, when the trade balance

shifted and the economic outlook became blurred, foreign investors quickly withdrew their investments, triggering the 1997-1998 crisis. Some countries like Thailand had no option but to float and devalue their currencies after they ran out of reserves (Garnaut, 1998). Thus, the pursuit of all the intermediate policy goals of the trilemma is believed to have been a significant source of historical economic crises.

In light of the above and other historical accounts, the trilemma hypothesis that it is impossible to simultaneously achieve optimal levels of monetary policy independence, exchange rate stability and financial integration cannot be ignored. The next section reviews studies that were aimed at providing empirical evidence on the validity of the trilemma hypothesis.

2.2.2 The Validity of the Trilemma Hypothesis

Historical observation and / or experience provide important insights into the validity of the trilemma hypothesis. However, empirical investigations which involve testing whether or not the trilemma hypothesis is binding are even more important. Besides, it was previously mentioned that theoretical literature has been found to be both for and against the validity of the trilemma. This section is dedicated to reviewing empirical studies on the issue.

The first notable comprehensive empirical study that assessed the validity of the trilemma hypothesis by examining the relationships among all the trilemma intermediate policy goals was done by Obstfeld et al. (2005). Preceding research was focused on one, or at most two of the trilemma aspects, but not all three simultaneously.

Obstfeld et al. (2005) assessed whether exchange-rate and capital-control regimes affected the extent to which a country's interest rates diverge from world interest rates. The methodology involved analysing the responsiveness of local interest rates to world interest rates under different exchange-rate and capital-control regimes defined as the Gold Standard era (1870-1914), the Bretton Woods era (1959-1970) and the post-Bretton Woods era (1973-2000). Monthly panel data for 103 countries was used.

The results showed that interest rate shocks transmitted markedly and rapidly during fixed exchange rate episodes during the Gold Standard era (which was also associated with limited capital controls). In contrast, fixed exchange rate episodes in the Bretton Woods era which was associated with tight controls on capital mobility, were not much of a constraint on local interest rates, indicating that countries retained a great deal of monetary policy independence.

As for the post-Bretton Woods era when countries started to embrace free capital mobility, increased transmission of interest rate shocks among countries with fixed exchange rates was found, indicating limited, or the loss of, monetary policy independence. The results also revealed that countries with flexible exchange rate regimes, both before 1914 and in the post-Bretton Woods era, enjoyed more monetary policy independence than countries with fixed rate regimes.

In general, Obstfeld et al. (2005) found that monetary policy was more constrained in times of fixed exchange rates combined with free capital mobility than in times of flexible exchange rates combined with free capital mobility as well as in times of flexible exchange rates combined with capital controls. Support for the constraints implied by the trilemma was found, and is still a very relevant constraint on macroeconomic policy.

Research conducted prior to that of Obstfeld et al. (2005) analysed the trilemma using similar approaches to the one used by Obstfeld et al. (2005), where the relationship between domestic and base country interest rates were assessed under different exchange rate and capital-control regimes. These earlier studies, however, focused on the transmission of interest rate shocks between countries in relation to exchange rate regimes, with little attention to capital-control regimes being paid. The results, nevertheless, were supported by those obtained later by Obstfeld et al. (2005). For instance, using panel data for the period between 1973 and 2000, Shambaugh (2004) considered interest rates in domestic and base countries in relation to exchange rate regimes in 155 countries. It was found that interest rates in countries with pegged exchange rates followed those of their base countries fairly closely, compared to countries with more flexible exchange rates. It was concluded that the trilemma would serve as an important guide for macroeconomic policy study.

Frankel et al. (2004) studied whether the choice of exchange rate regime affects the sensitivity of domestic interest rates to changes in international interest rates, using a sample of 46 countries (18 industrialised and 28 developing countries) for the period from 1970 to 1999. The results showed that, in the short-run, most countries pursuing flexible exchange rate regimes adjusted to changes in international interest rates more slowly than countries with fixed exchange rates; whereas in the long-run most countries, including those with flexible exchange rates, adjusted fully to changes in international interest rates. This suggests that most countries with flexible exchange rate regimes possessed a higher degree of monetary policy independence than their counterparts with fixed exchange rates, an implication of the trilemma.

In a more recent panel study Bleaney et al. (2013), using a similar approach to Obstfeld et al. (2005) found differing results; countries with pegged exchange rates but less onerous capital controls were associated with a higher degree of monetary policy independence than the trilemma constraints would imply. After accounting for peg credibility issues, however, their results became more consistent with the constraints of the trilemma.

A different approach (the one adopted in the present study) to testing the validity of the trilemma hypothesis emerged in literature with an empirical study by Aizenman et al. (2008); this is frequently regarded in recent literature as a landmark study on empirically testing the trilemma hypothesis, most probably because this was the first empirical study that tested the constraints of the trilemma using measures of country's levels of achievement in the trilemma intermediate policy goals. Unlike most previous studies which tested the trilemma by analysing correlations between domestic and base country interest rates, Aizenman et al. (2008) developed indices for measuring monetary policy independence, exchange rate stability and financial integration which were then used in a regression framework to assess the relationship among the three variables, to estimate trade-offs between them and thus to test if the trilemma hypothesis is binding. Panel data for 179 countries for the period between 1970 and 2006 was used.

Findings indicated that the trilemma is a binding constraint and that the relationship among the trilemma variables is likely linear so that their weighted sum adds up to a constant. In other words, an increase in the level of achievement in one trilemma variable should be traded-off with a decrease in either one or both of the other two trilemma variables. These findings were also confirmed in subsequent studies (Aizenman et al., 2009; 2010a; 2010b; 2011; 2012; 2013) which mostly built on the 2008 study.

Recent work used the Aizenman et al. (2008) approach to test the validity of the trilemma hypothesis at a single country level. Hutchison et al. (2012) is one of such studies. The study modified the Aizenman et al. (2008) panel-data approach to suitably assess trade-offs between the trilemma intermediate policy goals in a time-series framework in India for the period between 1996 and 2009. The aim was to test the validity of the trilemma in India, analyse its evolution and assess its impact on the macro-economy over the study period. The findings confirmed that the trilemma hypothesis is a binding constraint so that there are indeed linear trade-offs between monetary policy independence, exchange rate stability and financial integration in India. Jian et al. (2011) applied the Aizenman et al. (2008) methodology in

China, and found that the weighted sum of the trilemma variables indeed added up to a constant, also indicating that the trilemma is binding in China.

Similarly, Hsing (2012a; 2012b; 2013a; 2013b) built on the Aizenman et al. (2008) methodology to conduct country-specific studies in some European countries: Greece, Bulgaria, Brazil and Poland, respectively. The studies also found support for the trilemma.

Alternative methodologies have also recently emerged in literature. Mandilaras (2014), for example, introduced a ‘Euclidean geometry’ methodology to test the trilemma in 123 countries using annual data for the period between 1970 and 2012. These results were compared with those obtained using the Aizenman et al. (2008) methodology. Both approaches revealed overwhelming evidence in support for the trilemma across different income and geographic groups and time. Lastly, Cortuk et al. (2012) used ‘Kalman Filter Analysis’ along with the Aizenman et al. (2008) approach to test for the trilemma in Turkey. Once again, support was found for the trilemma trade-offs.

As discussed in section 2.1.5, there are theoretical arguments against the validity of the trilemma hypothesis, but these have not been widely analysed empirically to dispute the constraints implied by the trilemma. For instance, one of the arguments raised is that countries can pursue all the trilemma intermediate policy goals by holding sufficient foreign exchange reserves to enable the central bank to intervene in the foreign exchange market. China is often mentioned in the literature as an example of such countries. It has not, however, yet been proved that China is not subject to the trilemma constraints, such that it is able to achieve to the full extent monetary policy independence, exchange rate stability and financial integration simultaneously. If anything, what has come out of empirical studies is that China is able to achieve just the middle levels of these trilemma intermediate policy goals, and not full levels (Aizenman et al., 2010). This basically means that China still faces the constraints of the trilemma. Besides, Hutchison et al. (2012) incorporated the influence of international reserves in their assessment of the trilemma in China. They found that the international reserves variable was not statistically significant in their model and concluded that international reserves do not mitigate the trilemma trade-offs in China. Nevertheless, understanding the middle ground position of some countries like China in the context of the trilemma is still a work in progress.

Similarly, Grenville (2011) strongly opposed the validity of the trilemma. One argument mentioned is that East Asian countries (China included) have been able to pursue, to some

extent, monetary policy independence, exchange rate stability and financial integration at the same time; therefore the trilemma may be regarded as not holding in East Asian countries. This argument could, however, be a misunderstanding of the implications of the trilemma hypothesis which asserts that countries are constrained from achieving ‘to the full extent’ the three intermediate policy goals of the trilemma simultaneously, not ‘middle levels’. Also, as mentioned in section 2.2.1, the attempt to pursue all the trilemma intermediate policy goals in East Asia triggered a financial crisis in 1997-1998. Further empirical evidence is thus required to support the claim that the trilemma hypothesis does not hold in East Asia.

A further example advanced by Grenville (2011) in opposing the trilemma is the fact that Singapore is able to pursue monetary policy independence, exchange rate stability and financial integration simultaneously. It is, however, noted that Singapore implements its monetary policy through the exchange rate; it does not try to control its interest rates which closely follow those of the United States. Clearly, this is the trilemma in practice: Singapore has lost the ability to set its own interest rates by choosing to control exchange rates and embrace financial integration.

It may be argued that the majority of studies focused on testing the validity of the trilemma found the constraints implied by the trilemma to be valid. There are few, if any, comprehensive empirical studies that provide tangible evidence against the trilemma hypothesis. Most papers that argue against the validity of the trilemma provide unsatisfactory empirical evidence to support their claim and most of their arguments are based on misunderstandings of the basic implications of the trilemma or ‘impossible trinity’ hypothesis.

It is worth mentioning that most studies on the validity of the trilemma were done in developed countries, especially in Europe, and in emerging market developing countries. A few studies that incorporated non-emerging market developing countries are panel-data studies. There are few, if any, single-country studies in non-emerging market developing countries and this is the area at which the current research is directed.

The next section provides a review of how the trilemma intermediate policy goals have evolved in different income groups.

2.2.3 Evolution of the Trilemma Configurations in Different Income Groups

Countries’ choices of the trilemma intermediate policy goals have evolved over time. This is true for all income groups: developed countries, emerging market developing countries and

non-emerging market developing countries. Choices have been similar among countries of the same group but different across the groups. This is probably because countries in different income groups encounter different challenges and have different needs, whereas countries within the same income group may face similar challenges and needs.

There are quite a number of studies, both panel and single-country, that have analyzed the evolution of the trilemma intermediate policy goals in different income groups. This section reviews the patterns that have been observed in each group.

2.2.3.1 Developed Countries

Aizenman (2010) showed that after the breakdown of the Bretton Woods system in the 1970s, most developed countries embraced flexible exchange rates as they slowly moved towards greater financial integration and monetary policy independence. Beginning in the early 1990s, financial integration accelerated and has since been very high for most countries in this income group, as noted by Aizenman (2010), Aizenman & Ito (2011) and Aizenman et al. (2008; 2009; 2010). At the same time, however, according to Aizenman (2010) and Aizenman et al. (2010), monetary policy independence started to decline. Towards the end of the 1990s, as monetary policy independence continued to decline and financial integration continued to accelerate, exchange rate stability for this group increased significantly, reflecting the introduction of the Euro in 1999 (Aizenman, 2010; Aizenman & Ito, 2011; Aizenman et al., 2008; 2009; 2010). Developed countries outside the Eurozone still however, maintained some degree of monetary policy independence and flexible exchange rates.

Country-specific studies have, however, shown varying patterns for this income group. Hsing (2012a) found that for Greece, monetary policy independence and exchange rate stability has been the dominant combination over the study period (1970 to 2010). As a member of the Eurozone, however, Greece is moving towards greater financial integration and exchange rate stability while giving up monetary policy independence. In another country-specific study, Hsing (2013b) found that in Poland the policy combination of monetary policy independence and exchange rate stability had been prevalent since 1991. This is probably because, during the study period, Poland was pursuing inflation targeting while planning to join the ERM II.

The varying results from panel-data and country-specific studies indicate that, while insights can be drawn from panel-data studies, country specific studies are necessary if the aim is to understand the trilemma in a specific country.

2.2.3.2 Emerging Market Developing Countries

The level of exchange rate stability improved across countries from all income groups after the breakdown of the Bretton Woods system in the 1970s. For emerging market developing countries, however, Aizenman et al. (2008; 2009; 2010) observed that the degree of exchange rate stability improved only until the early 1990s when it started to deteriorate, financial integration continued to increase, albeit slowly compared to developed countries, and monetary policy independence lagged within intermediate levels, especially since the early 2000s.

Aizenman & Ito (2011) note that, over the last few decades, most emerging market developing countries have moved away from corner positions of the trilemma policy variables to pursue intermediate levels in each variable. This is to say, unlike developed countries, most emerging market developing countries have retained some degree of monetary policy independence and have moved towards an intermediate level of exchange rate flexibility in form of either managed flexible exchange rates or crawling pegs while allowing for a middle level of capital mobility. Aizenman & Ito (2011) believe that this intermediate position in emerging market countries has been made possible by accumulating sizeable amounts of foreign exchange reserves which central banks could use as a buffer against unfavourable economic fluctuations. The convergence in the trilemma intermediate policy goals and the resultant accumulation of international reserves, according to Aizenman et al. (2009), accelerated in the wake of the 1997-1998 East Asian crisis.

These developments have, however, been uneven among the emerging market developing economies. Aizenman et al. (2008; 2009) observed that Asian economies have exhibited more policy convergence and hold larger amounts of international reserves compared to Latin American emerging economies. On the other hand, Latin American emerging market economies have liberalised their financial markets more rapidly at the cost of monetary policy independence and exchange rate stability compared to their Asian counterparts. Aizenman & Sengupta (2013) studied the evolution of the trilemma in China and India from 1990 to 2010. A unique pattern for the evolution of the trilemma in China relative to other emerging market economies was observed. China prioritised exchange rate stability as a tool for macroeconomic management over monetary independence and financial integration during the study period. India, on the other hand, exhibited a pattern similar to that found using panel data for emerging markets; that is, intermediate levels (Aizenman & Sengupta, 2013). India's pursuit of intermediate levels of the trilemma configurations was also confirmed by Sengupta

and Sengupta (2013; 2014), using updated data and a different method for measuring exchange rate stability.

Hsing (2013a) analysed the evolution of trilemma policy configurations in Brazil. His results also showed that over the study period, on average, Brazil placed approximately equal weights on all the three trilemma intermediate policy goals, thereby confirming the patterns revealed for overall emerging market economies using panel-data studies.

2.2.3.3 Non-emerging Market Developing Countries

The evolution of the trilemma for non-emerging market developing countries has been different from the other two income groups. Aizenman (2010), Aizenman et al. (2010) and Aizenman & Ito (2011) found that while developed countries and emerging market developing countries have greatly increased their capital account openness over the last few decades, non-emerging market developing countries have lagged behind. Instead, non-emerging market developing countries have prioritized exchange rate stability, with some fluctuations, since the 1970s (Aizenman et al., 2010; Aizenman & Ito, 2011). A higher level of monetary policy independence compared to both developed countries and emerging market developing countries has been pursued. Sub-Saharan African countries, especially, have pursued higher levels of monetary policy independence and exchange rate stability (with some fluctuations) while lagging considerably in financial integration compared to other regions. Recently though, Sub-Saharan African countries have started to embrace flexible exchange rates and financial integration, but the progress is less marked (Aizenman et al., 2009).

Currently there are a few, if any, known single-country studies that have analyzed the evolution of the trilemma intermediate policy goals in non-emerging market developing countries. Single country studies would be important to confirm the results found by panel-data studies. As seen in developed and emerging market developing countries, the results that were found for an income group as a whole may not necessarily be true for individual countries. This is why, apart from determining the position where Malawi currently stands in terms of the trilemma, this study would provide some insight into the evolution of the trilemma configurations in Sub-Saharan Africa. Recent single-country studies on the trilemma concept in this region are especially lacking.

2.2.4 Previous Research Findings on the Impact of the Trilemma Intermediate Policy Goals on the Economy

Section 2.1.6 considered theoretical aspects of how each of the trilemma intermediate policy goals influences the macro-economy, especially with regards to inflation and output. This section reviews the empirical support of the theory. Both panel and single-country studies are covered.

2.2.4.1 Impact of Monetary Policy Independence on the Macro-economy

Monetary Policy Independence and Inflation

Empirical studies on the effects of monetary policy independence on the level and volatility of inflation found mixed results. To begin with, Aizenman et al. (2008) found that greater monetary policy independence had a positive effect on inflation volatility, especially for commodity exporters. This is not surprising, as greater monetary policy independence should give policy makers the ability to use monetary policy as a tool to control fluctuations in inflation. Aizenman et al. (2008) also found that, in the medium term, countries with greater monetary policy independence experienced higher levels of inflation compared to those with lower levels of independence. The effect was also found to be more pronounced in developing countries (including both emerging and non-emerging economies) than in developed countries.

On the contrary, Hutchison et al. (2012), who applied the Aizenman et al. (2008) methodology to a single country-study (India) for the period between 1996 and 2009, found that greater monetary independence has a positive effect on the level of inflation in India, but no significant effect on inflation volatility. Hsing (2012b; 2013b), also using the Aizenman et al. (2008) methodology in single-country studies (Bulgaria and Poland) found no significant effect of monetary policy independence on either the volatility or the level of inflation.

Monetary Policy Independence and Output

Regarding the impact of monetary policy independence on output, empirical studies also produced mixed results. Aizenman et al. (2008) found a significant dampening effect of monetary policy independence on output volatility. That is, countries with greater monetary policy independence experience less output volatility in comparison to countries with a lower degree of monetary policy independence. This output-volatility-decreasing effect of monetary policy independence seems to complement the inflation-volatility-decreasing effect found in

the same study, as mentioned in the preceding section. As previously mentioned in section 2.1.6.1, theory predicts that with monetary policy independence, stabilisation measures should reduce inflation volatility, increasing certainty in the economy and hence reducing fluctuations in output. Aizenman et al. (2010) pointed out that this output-volatility-decreasing effect of monetary policy independence may be the reason developing countries, especially non-emerging market ones, are reluctant to give up their monetary policy independence.

A similar result was found in a single-country study for Greece. Hsing (2012a) found that greater monetary policy independence reduced output volatility. As for the level of output, Hsing (2012b) found that monetary policy independence reduced the output growth rate in both Bulgaria and (Hsing (2013a)) in Brazil. Hsing (2013b), however, found no significant effect of monetary policy independence on either the level or volatility of output in Poland. Similarly, Ihnatova & Căpraru (2014) found no significant impact of monetary policy independence on macroeconomic volatility in non-euro European countries over the period between 1999 and 2010.

Empirical studies have, thus, provided mixed results on the effect of monetary policy independence on the economy, particularly on levels and volatility of inflation and output. This tends to be in line with theory which predicts that monetary policy independence can yield positive effects at times and negative effects at other times.

2.2.4.2 Impact of Exchange Rate Stability on the Macro-economy

Exchange Rate Stability and Inflation

As mentioned above, exchange rate stability has been the preferred choice for many countries, including those in the Euro-zone as well as some emerging market and non-emerging market developing economies. Whether exchange rate stability has yielded positive benefits or not is an empirical question.

Aizenman et al. (2008) observed that countries with higher levels of exchange rate stability experience lower levels of inflation; these results were confirmed in later panel studies (Aizenman, 2010; Aizenman et al., 2010). A few single-country studies also found the negative relationship between exchange rate stability and the level of inflation rate: One such is Hsing (2013a) which found that more exchange rate stability is associated with lower levels of inflation rate in Brazil.

Regarding the effect on inflation volatility, Hutchison et al. (2012) found that exchange rate stability had a dampening effect on inflation volatility in India; higher levels of exchange rate stability reduced volatile fluctuations in inflation. Hutchison et al. (2012) further observed that this inflation-volatility-dampening effect of exchange rate stability in India worked through stabilising the prices of imports commodities. These results support the theory which predicts the ability of stable exchange rates to reduce and stabilise inflation.

Other studies, however, found no significant relationship between exchange rate stability and inflation. For instance, Hsing (2012a) reported that in Greece exchange rate stability is not a significant factor in determining either the level of or the volatility in, inflation. Likewise, Ogbuagu & Ewubare (2015) found no significant short-run impact of exchange rate stability on either the inflation rate or inflation volatility in Nigeria. Empirical studies thus indicate that the impact of exchange rate stability on the level and volatility of inflation can vary across countries, probably because of the different circumstances under which the policy operates in each country.

Exchange Rate Stability and Output

Regarding the effects of exchange rate stability on output, the evidence is also mixed. While some studies indicated that exchange rate stability contributed to high output growth and reduced output volatility, others found either the opposite or no significant effect at all. Hsing (2012b; 2013b) found that greater exchange rate stability increased real output growth rate in Bulgaria and Poland. Similarly, Ogbuagu & Ewubare (2015) found a significant positive impact of exchange rate stability on output in Nigeria, albeit with a lag. These results are consistent with a theoretical proposition that stable exchange rates should enhance investment and consumption and hence output.

Contrary to the above, Hsing (2012a) found no significant effect of exchange rate stability on either the level of, or volatility in, output in Greece; this was despite the country attaining a relatively high level of exchange rate stability during the study period. Other single-country and panel studies also found no significant effect of exchange rate stability on output volatility; for instance, Ogbuagu & Ewubare (2015) for Nigeria in the short-run and Ihnatova & Căpraru (2014) for non-Euro European countries. Ogbuagu & Ewubare (2015), however, found that in the long-run, exchange rate stability reduced output volatility in the long-run. Somewhat counterintuitively, Hsing (2013b) found that exchange rate stability led to increased output volatility in Poland.

Aizenman et al. (2008) also considered the role of other factors in enhancing the impacts of the trilemma intermediate policy goals on macroeconomic variables. Regarding the effect of exchange rate stability on output, it was found that exchange rate stability has a significant favourable impact on output volatility only when coupled with international foreign exchange reserves, but on its own more exchange rate stability has no significant impact. This is to say countries with stable exchange rates are able to reduce output volatility by holding international reserves which they use to maintain the value of the exchange rate. Further, the mere existence of high levels of reserves may serve to deter speculation against the currency and thus maintain stability. In countries with inadequate levels of foreign exchange reserves, exchange rate stability is not an effective output stabilisation tool.

Aizenman et al. (2008) also found that the impact of exchange rate stability on output volatility also depended on a country's level of financial sector development; exchange rate stability pursued under medium-level financial development increased output volatility. In most emerging markets, however, according to Aizenman et al. (2008), the effect is mitigated by holding sizeable amounts of foreign exchange reserves (levels higher than 19% - 20% of GDP).

It would seem that the effect of exchange rate stability on output is complicated. Several factors play a role on how exchange rate stability affects the macro economy. As such countries tend to experience different effects depending on their unique needs and circumstances.

2.2.4.3 Impact of Financial Integration on the Macro-economy

Financial Integration and Inflation

As mentioned earlier, theoretical literature postulates that financial integration can be a double edged sword insofar as its effects on inflation are concerned; it can lead to either reductions or increases in the level of, and volatility in the inflation rate.

A majority of empirical studies on the subject found that financial integration reduces the level of inflation. This is probably because, as previously mentioned, policy makers in financially open economies have greater discipline enforced upon them so as to remain competitive in global markets. Aizenman et al. (2010) argue that this is especially the case in emerging market developing countries. Other examples of empirical studies that found the inflation-reducing effect of financial integration include Hsing (2012a) in Greece, Hsing

(2013a) in Brazil, Hsing (2013b) in Poland, Mandilaras (2014) in various country groups and Ogbuagu & Ewubare (2015) in Nigeria.

Regarding the effect of financial integration on inflation volatility, most studies found that financial integration reduces volatility in inflation. To mention a few, Hsing (2012a; 2013a; 2013b) found that more financial integration reduced inflation volatility in Greece, Brazil and Poland. Ihnatova & Căpraru (2014) found the same effect of financial integration in a panel-data study for Central and Eastern Europe countries. Similarly, Ogbuagu & Ewubare (2015) came to the same conclusion for Nigeria.

Contrary to the above, Hutchison et al. (2012) found financial integration to be associated with higher inflation volatility in India. This, according to Aizenman et al. (2008), could be a result of the country's exposure to volatile short-term international capital flows which are common in open emerging market developing countries.

Depending on country characteristics, much as financial integration can reduce both the level of and volatility in inflation, it also has the potential to increase inflation volatility.

Financial Integration and Output

The impact of financial integration on output has been explored in quite a number of studies. An overview of these indicates support for the theoretical proposition that the effect of financial integration on output, like the other two trilemma intermediate policy goals, is ambiguous. In some circumstances it can enhance output growth and stability while in other cases it can inhibit growth and induce volatility in output.

Beginning with an example of studies that found a positive effect of financial integration on the level of output, Klein & Olivei (2008), in a panel-data study for the period 1976 to 1995, found that countries with open capital accounts grew faster than those with closed accounts. It was indicated, however, that this result may have been driven by a relatively large share of developed countries in the sample. For some countries, financial integration is no guarantee of economic growth; it may instead be a recipe for low growth. For instance, Hsing (2012b) showed that financial integration in Bulgaria reduced the output growth rate. For still others, financial integration is not even a significant factor on output. Ogbuagu & Ewubare (2015) found that financial integration did not have a significant influence on output growth in Nigeria.

As regards the impact of financial integration on output volatility, the findings are also mixed. In single-country studies, Hsing (2012a; 2013a; 2013b) found that financial integration

reduced output volatility in Greece, Brazil and Poland. Ihnatova & Căpraru (2014) found the same result for Central and Eastern Europe countries in a panel-data study. Similarly, Aizenman et al. (2008) showed that more financially integrated commodity exporting countries were associated with reduced volatility in output. Ogbuagu & Ewubare (2015), however, found no significant effect of financial integration on output volatility in the short-run but had the predicted effect in the long-run.

Aizenman et al. (2008) argued that the effect of financial integration on output volatility depended on a country's level of financial development. For developing countries, the study showed that greater financial integration has an output-volatility-reducing effect in countries with a high degree of financial development but a volatility-increasing effect in countries with a low degree of financial development.

Thus, as theoretical literature predicts, the impact of financial integration on output varies across countries. Some may benefit from financial integration through increased output growth or reduced output volatility while others may be severely affected by reduced output growth levels or increased volatility.

It is worth mentioning that Aizenman et al. (2008) compared the economic performance of emerging and non-emerging market developing countries; emerging markets outperformed non-emerging markets in terms of average economic growth rates. Aizenman & Ito (2011) also found that emerging market developing countries, on average, experience lower output volatility than non-emerging markets. It was also found that emerging market countries with higher levels of international reserves experienced lower output volatility compared with emerging markets with lower levels of international reserves. As discussed previously, most studies, including Aizenman et al. (2008), revealed that emerging market developing countries have been pursuing intermediate levels of all the trilemma intermediate policy goals while holding large amounts of international reserves. Aizenman et al. (2008) accordingly proposed that it could be the pursuit of intermediate levels of the trilemma intermediate policy goals coupled with accumulation of international reserves that contributes to the high economic performance in emerging markets. Although this issue is currently one of the focus areas of research relating to the trilemma, it is not taken further here.

2.3 Summary and Conclusion

The trilemma hypothesis, also called the 'impossible trinity' is one of the few macroeconomic policy frameworks that have stood the test of time. It is a hypothesis that has been relevant,

and is becoming more so, in today's world. This is mostly because the trade-offs among monetary policy independence, exchange rate stability and financial integration, implied by the trilemma, have been observed throughout history. Also, most studies that assessed its validity found the trilemma to be a binding constraint, even though empirical evaluation of the concept is just gaining momentum. Some theoretical literature, however, argues against the validity of the trilemma, pointing out that it is based on assumptions or arguments that may not be true in the real world. But there is yet to be convincing empirical evidence to dispute the trilemma trade-offs.

Some studies analyzed the evolution of country choices of the trilemma intermediate policy goals over time and found that developed countries, emerging market and non-emerging market developing countries have differed in their choices. On aggregate, developed countries, largely influenced by countries in the Eurozone, have moved towards greater financial integration and exchange rate stability at the expense of monetary policy independence. Emerging market developing countries have moved towards intermediate levels of all the trilemma intermediate policy goals whereas non-emerging market developing countries have prioritized exchange rate stability and monetary policy independence over financial integration. Single country studies, however, have shown varying results.

It has also been observed that empirical studies that assessed the impact of the trilemma intermediate policy goals on the macro economy produced mixed results. As predicted by theory, while each of the trilemma intermediate policy goals may contribute to low and stable inflation, they all also have the potential to induce high and volatile inflation. Similarly, much as the trilemma intermediate policy goals may each lead to high and stable output growth, they may also hinder growth and lead to volatility in output. Thus, it is not obvious what is best. The impact of the trilemma intermediate policy goals on the economy depends on country-specific factors; this indicates the importance of single-country studies if the aim is to understand the constraints of the trilemma and their effects in particular economies.

Empirical studies on the validity, evolution and macroeconomic effects of the trilemma have been concentrated in developed and emerging market developing countries. There are a few studies focused on non-emerging market developing countries, most of which use panel-data; the results of panel-data studies may, however, not be generally applicable.

The rest of the thesis focuses on the trilemma in Malawi. The next chapter describes how the three policies (monetary policy, exchange rate policy and financial liberalization or integration) have evolved in Malawi over the last few decades. It also analyzes how the

macro-economy in terms of levels and volatility of inflation and output has performed over the review period. This sets the broad context for the study before econometric analyses are conducted to assess the trade-offs of the trilemma and the impacts of the trilemma intermediate policy goals on the economy in Malawi.

CHAPTER 3

MALAWI'S ECONOMY AND THE EVOLUTION OF MONETARY AND EXCHANGE RATE POLICIES AND FINANCIAL LIBERALISATION

Introduction

Malawi has pursued different forms of monetary and exchange rate policy, and financial liberalisation, since the country gained independence from colonial rule in 1964. The choice in the macroeconomic policies at particular points in time has been driven by various factors, both internal and external. Despite numerous changes in their design and implementation, however, macroeconomic policies in Malawi have always been aimed at achieving macroeconomic stability in form of stable prices and exchange rates which are believed to promote investment, employment and hence sustainable economic growth.

This chapter describes how the three macroeconomic policies: monetary policy, exchange rate policy and financial liberalisation, have evolved in Malawi over the last few decades while highlighting how the economy has performed in different periods of the evolution. It also describes the structure of Malawi's economy and financial system. The aim is to illuminate the environment or context in which this study is set; the chapter should assist in understanding the rationale for assessing the extent and macroeconomic effects of the trade-offs between monetary policy independence, exchange rate stability and financial integration in Malawi, as implied by the trilemma. It should also provide a basis for understanding the results of the study.

The chapter is divided into two main sections. The first section describes the evolution of the three policies mentioned above, and the second provides an overview of Malawi's economy and financial system.

3.1 Evolution of Monetary Policy, Exchange Rate Policy and Financial Liberalisation in Malawi (1964-2015)

The evolution of monetary policy, exchange rate policy and financial liberalisation in Malawi can be described in terms of four distinct periods: the pre-liberalisation period (from 1964 to mid-1980s), the financial liberalisation period (from late 1980s to 1994), the post-liberalisation period (from 1995 to 2012) and the most recent period or current state (2012 to 2015).

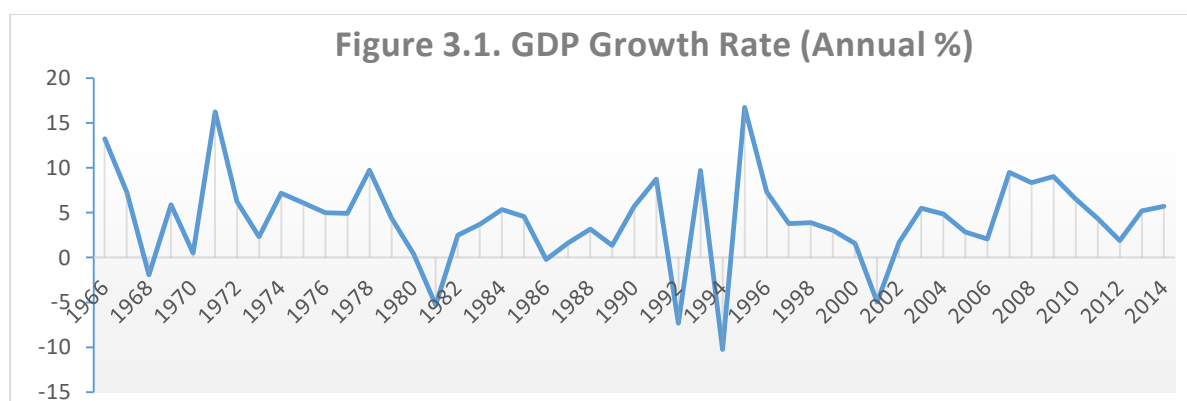
3.1.1 Pre-Liberalisation Period (1964 to mid-1980s)

When Malawi gained independence in 1964, the financial system that the country inherited was perceived to be tailored towards serving the needs of the expatriate community. The banking system, especially, was perceived to exclude local entrepreneurs by imposing unfavourable lending rates and collateral requirements on small businesses and unreasonably high charges for normal banking services (Gondwe, 2001 in Ngalawa & Vieg, 2011).

In an effort to correct the distortions and hence promote local entrepreneurs, the newly independent government adopted policies that allowed the government to exercise direct control over the financial system. For instance, the new government imposed direct controls on interest rates and credit. Chipeta & Mkandawire (1991) note that the government dictated commercial bank lending and deposit rates, as well as assigning credit quotas to borrowers. The agricultural sector, according to Chipeta & Mkandawire (1991), was particularly favoured with regard to lending rates and credit quotas as government aimed to promote the country's economic growth through agricultural production. During this time, a fixed exchange rate regime was adopted by pegging the Kwacha to the British Pound. According to Ngalawa & Vieg (2011), the government also imposed ceilings on prices of selected commodities and onerous exchange controls to limit cross border flows.

In summary, after obtaining independence in 1964, the Malawi government adopted more direct tools for monetary policy, a fixed exchange rate system and onerous exchange and financial controls. This was in an effort to stabilise domestic prices and exchange rates, to promote output growth, and to maintain sustainable balance of payments.

To some extent, these objectives were achieved in the 1970s. The country registered relatively high growth in output, averaging above 6 percent in the 1970s and reaching a record high of 16.2 percent in 1971, as shown in Figure 3.1.



Data Source: International Monetary Fund (IMF)

Towards the end of the 1970s, however, the country's economy experienced negative internal and external shocks. Some of the notable shocks mentioned by Mangani (2011) include the global oil crisis in 1979 and drought in 1980. Most importantly, civil war in the neighbouring country, Mozambique, intensified during this time which not only triggered an influx of refugees into Malawi but also disrupted the country's cost-effective rail route to the Beira and Nacala ports in Mozambique (Mwanamvekha, 1994 in Mangani, 2011). These factors triggered a deep recession in Malawi which persisted from the late 1970s through to the early 1980s, with the economy's output shrinking by 5.3 percent at the bottom of this down-turn in 1981, as indicated in Figure 3.1.

The persistence of the recession and failure of the economy to adjust to these shocks forced the government to review the country's macroeconomic policy framework; from the mid-1980's the government embarked on a process of liberalising the financial system, moving away from direct government control.

3.1.2 Financial Liberalisation Period (from late 1980s to 1994)

Financial liberalisation was aimed at enhancing not only the competitiveness of the financial sector but also its efficiency. The programme was a phased process that started with the abandonment of direct for indirect monetary controls by the government in the late 1980s. Lending and deposit rates, according to Mwabutwa (2014), were partially deregulated in July 1987 and April 1988; commercial banks were given the authority to determine their own lending and deposit rates, but were mandated to seek prior approval from the central bank before effecting any changes to the rates. Chipeta & Mkandawire (1991) note that credit ceilings were scrapped in 1988 and preferential lending rates to the agricultural sector abolished in January 1990. Complete deregulation of interest rates which gave commercial banks full independence in setting their own interest rates without prior approval from the Reserve Bank was formally effected in May 1990, as indicated by Ngalawa & Viegi (2011).

The reforms necessitated a review of the RBM Act of 1964 and the Banking Act of 1965 in May 1989 and December 1989, respectively. With the revised RBM and Banking Acts and the reforms on interest rates, the Reserve Bank changed monetary policy tools from direct to indirect. Two monetary policy instruments, the Liquidity Reserve Requirement (LRR) and the Discount Window Facility, were introduced (Ngalawa & Viegi, 2011). The Liquidity Reserve Requirement is the proportion of total deposits that the commercial banks are mandated to hold as reserves with the central bank for liquidity purposes. The Discount Window, now called the Lombard Facility is, according to Ngalawa & Viegi (2011), the facility that enables

banks and discount houses to borrow from the Reserve Bank when faced with liquidity shortages. The Bank Rate was simultaneously introduced as the interest rate on short-term RBM loans to banks or discount houses. Ngalawa & Viegli (2011) note that the Bank Rate, now called the Policy Rate, became a very powerful indicator of the monetary policy stance and a benchmark for all other rates in the financial system, including commercial banks' lending and deposit rates and yields on government securities.

During this time, the Reserve Bank was targeting the level of reserve money as a framework for monetary policy (Banda, 2004 in Ngalawa & Viegli, 2011). Depending on its objectives, the RBM would set a reserve money target and use the Liquidity Reserve Requirement and the Bank Rate to achieve that target. Banda (2004) in Ngalawa & Viegli (2011) argues that the rationale for the use of reserve money targeting was to balance the demand for, and supply of, money in the market with the aim of achieving price stability. However, according to Ngalawa & Viegli (2011), the system operated as if the Reserve Bank also targeted short-term interest rates through adjustments in the Bank rate.

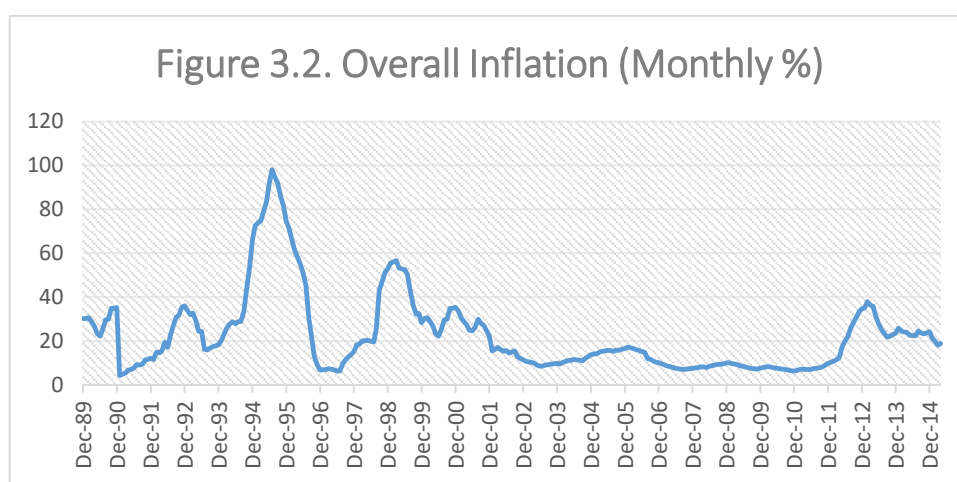
Besides monetary policy, exchange rate policy was also revised during this reform period. Mangani (2012) notes that the country moved from a fixed to a floating-rate regime in February, 1994. Simwaka & Mkandawire (2011) argue that this became necessary due to economic instability arising from acute foreign exchange shortages that hit the country when donors suspended their balance of payments support in order to coerce the country to adopt multiparty democratic political system away from the existing dictatorship. Figure 3.1 indicates that the output instability experienced during this time was perhaps the worst in the country's history.

According to Simwaka & Mkandawire (2011), it was believed that, among other benefits, a flexible exchange rate system would reduce economic instability as it would improve the country's export competitiveness on the international market, allow efficient allocation of foreign exchange, reduce speculative attacks on the Kwacha and restore or improve investor and donor confidence in the country.

Indeed the floatation of the exchange rate opened the country to international markets. Among other things, as mentioned in Mangani (2012) and Ngalawa & Viegli (2011), the flexible exchange rate led to the relaxation of some exchange control regulations and the establishment of foreign exchange bureaux (bureaux de change), foreign currency denominated accounts (FCDAs), a forward foreign exchange market, foreign exchange

options and currency swaps. Besides, Mangani (2012) noted that, immediately after the country adopted multiparty democracy in 1994, donor support resumed.

Nominal output growth picked up between 1994 and 1995, with the highest point recorded at 16.7 percent in 1995 as shown in Figure 3.1. However, as depicted in Figure 3.2, the free floating exchange rate was associated with high inflation which reached a record high of 98.1 percent in July 1995. This reflects, as Simwaka & Mkandawire (2011) argue, that Malawi has a high pass-through of exchange rate fluctuations to inflation because of the high proportion of import prices in the CPI.



Data Source: Reserve Bank of Malawi (RBM)

3.1.3 Post-Liberalisation Period (1995 to 2012)

Towards the end of 1995, in order to curb inflation, monetary authorities decided to adopt a managed-float instead of a freely-floating exchange rate (Mwabutwa, 2014). The Kwacha was allowed to fluctuate within a specified band and the central bank managed the value of the Kwacha by intervening in the foreign exchange market when deemed necessary.

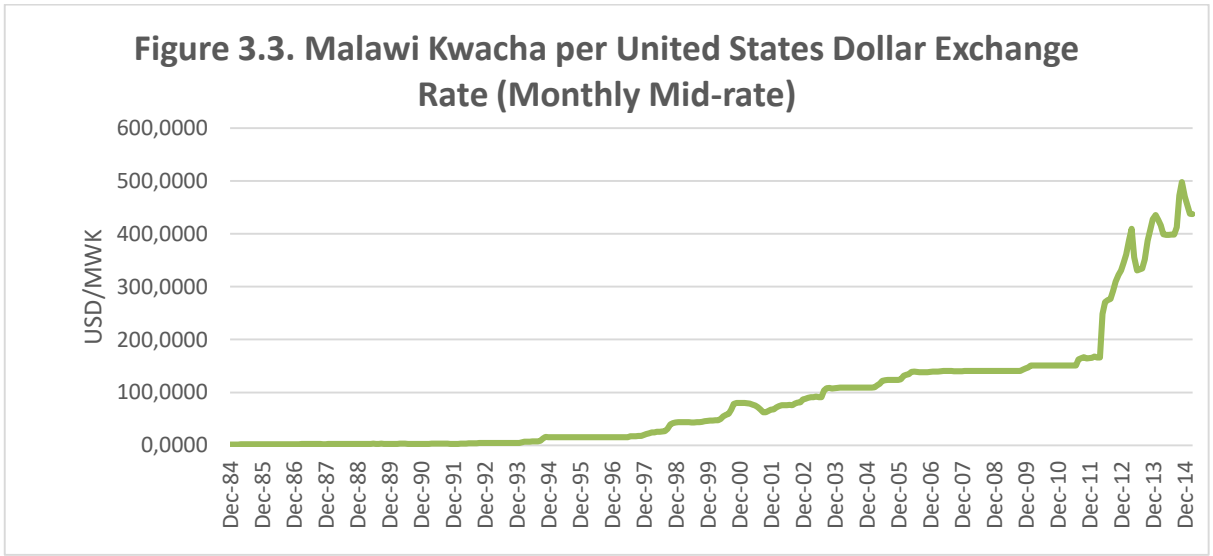
The Kwacha floated within a narrow band until towards the end of 1997, by which time inflation had been lowered to desirable levels (as low as 6.3 percent in July 1997 in Figure 3.2). Having achieved the inflation target, monetary authorities relaxed their stance to promote the country's competitiveness; this took the form of a crawling-peg, according to Simwaka & Mkandawire (2011).

By 1998, when the monetary authorities were satisfied that the country had gained sufficient international competitiveness, the exchange rate was once again allowed to float; the exchange

rate was to be determined by market forces of demand and supply, and Authorised Foreign Exchange Dealers (AFEDs) played a larger part in determining the exchange rate.

During this time, however, especially in late 1990s and early 2000s, the exchange rate became more volatile; this was accompanied by volatility in the inflation rate and an economic contraction (as indicated in Figures 3.1 and 3.2). Simwaka & Mkandawire (2011) believe that the economic instability during this time emanated from (i) opening the economy to international markets, (ii) droughts that hit the country in early 2000s and (iii) the suspension of the first IMF Poverty Reduction Growth Facility (PRGF). The latter, as noted by Mangani (2011), may have been contributed to by the fact that the country had developed a culture of laxity in fiscal discipline; this led to high levels of fiscal deficits (as high as 11.6 percent of GDP in 2002), higher domestic borrowing, increased interest rates and the crowding out of private investment.

Consequently, as argued by Mangani (2011), the country reverted to a fixed exchange rate regime in August 2003. The Kwacha was devalued and pegged to the US dollar at K108 per dollar. As shown in Figure 3.3, the peg was maintained until April 2012, albeit with some adjustments necessitated by economic factors. For instance, the exchange rate was recorded at USD/MWK123 in July 2005, USD/MWK139 in May 2006, USD/MWK151 and USD/MWK166 in April 2012. This is why the exchange rate system that existed between 2003 and April 2012; the regime, according to Lungu (2015), is often referred as a *de facto* peg.



Data Source: Reserve Bank of Malawi (RBM)

In terms of economic performance, between 2003 and 2009, the economy did reasonably well. Inflation averaged 10.9 percent during the period, as indicated in Figure 3.2. Output growth first declined from 5.5 percent in 2003 to 2.1 percent in 2006 but picked up between 2007 and 2009, registering 9.5 percent in 2007, 8.3 percent in 2008 and 9.0 percent in 2009, as shown in Figure 3.1.

Mangani (2011) suggests that the positive economic performance during this period was attributable to major policy shifts in economic management (including improved fiscal discipline) following a change of government in 2004, the country's improved relations with donors and favourable weather conditions for agriculture.

In 2010 and 2011, however, the situation turned around. The economy started to contract as relations with some major donors soured which led to acute shortages of foreign exchange. According to Lungu (2015), it was believed that the Kwacha was overvalued and authorities made a decision to float the currency and further liberalise the foreign exchange market in May 2012.

Thus, during the financial liberalisation period and the period up to 2012, monetary policy evolved from direct tools to indirect ones with the introduction of the bank rate, the liquidity reserve requirement and the discount window facility. This may imply that monetary policy during this time would still be independent but the possibility of reduced independence increased. The exchange rate regime changed back and forth between fixed-rate, managed-float, crawling-peg and free-float. Exchange controls were gradually loosened, indicating the country's embrace of integration with the international community. These changes in monetary policy, exchange rate policy and financial liberalisation/integration possibly had an impact on macroeconomic variables. One of the goals of this study is to assess the impact of the three policies on inflation and output.

3.1.4 Most Recent Period and the Current State (2012 to 2015)

3.1.4.1 Exchange Rate Policy

As mentioned in the preceding section, in May 2012 a significant policy shift happened in the Malawian foreign exchange market. The Malawi Kwacha was devalued by nearly 50 percent from K169 to K250 per US\$ and was allowed to freely float (Lungu, 2015). In the year preceding the devaluation and floatation, Malawi's economy was in a bad shape. Donors had suspended budget support as their relationship with the country soured. As such the country faced one of the worst foreign exchange shortages in its history. Foreign exchange reserves

were so low huge arrears were accumulated in foreign exchange payments by both government and the private sector, estimated to be in excess of US\$600 million, according to a press statement by RBM (2016, January 28). With the acute foreign exchange shortages, most foreign exchange bureaux (bureaux de change) closed down, making it difficult for the private sector to access forex. Critical imports such as oil were in persistent short supply. To support the exchange rate misallocation, exchange controls were intensified, such that access to foreign exchange through the formal system was extremely difficult, as stated by RBM (2016, January 28). Consequently, parallel markets for both forex and oil flourished. The economy was in such a precarious state that devaluation and floatation of the local currency were inevitable.

According to an RBM Press Statement (2016, January 28), the most recent devaluation and the liberalisation of the foreign exchange market (including floating the Kwacha and loosening exchange controls) in 2012 were aimed at correcting the exchange rate misallocation once and for all. The RBM Press Statement (2016, January 28) stated that intention behind the devaluation and liberalisation was to create a long-term conducive environment for a more resilient, productive and exporting country.

A floating exchange rate system and a liberalised foreign exchange market in general implies that the value of the local currency is allowed to be determined by market forces of demand and supply. The Reserve Bank or government does not dictate the value of the local currency. Depending on the availability of foreign exchange reserves and cost implications, however, the RBM intervenes in the market by selling and buying forex when demand and supply are temporarily mismatched. That way, the RBM can indirectly maintain stability in the foreign exchange rate; even though the current exchange rate system in Malawi is officially a free float, it is in fact a managed float.

The liberalisation of the foreign exchange market, including the floatation of the Kwacha, had some positive effects on the economy. Within a period of one year after the floatation, the foreign exchange position greatly improved. According to the RBM Press Statement (2016, January 28), all outstanding external payment arrears were settled by September 2013. Fuel shortages also eased off. The Reserve Bank's net foreign exchange reserves grew from negative US\$161.1 million in June 2012 to US\$147.5 million in June 2013 and US\$158 million by end June 2015 (RBM Press Statement, 2016 January 28). Also important, with the loosening of most current account exchange controls and some capital account controls, the

economy became more integrated into regional and global markets. The economy seemed to be moving on the right track.

As shown in Figure 3.3, however, since the exchange rate was floated in May 2012, the Malawi Kwacha has been exhibiting a volatile upward trend. After barely one year, in June 2013, the Kwacha depreciated by a further 20 percent to US\$/K330 from US\$/K250 in May 2012. It continued to depreciate to US\$/K437 in June 2015, US\$/K581 in November 2015 and US\$/K740 in January 2016. The Malawi Kwacha had lost value by 338 percent by January 2016 from US\$/K169 before floatation in May 2012.

When exchange rate policy changes, it is commonly accompanied by changes in financial liberalisation policy. For instance, when the exchange rate was floated in 2012 and again in 1994, the country embraced financial liberalisation by loosening financial and exchange controls. When the exchange rate was pegged in the 2000s and in the period before 1994, tight financial and exchange controls were in place. This could indicate possible trade-offs between these intermediate policy goals as postulated by the trilemma hypothesis.

It can also be observed from Figure 3.2 that, after the floatation of the currency and the liberalisation of the foreign exchange market in 2012, the inflation rate became volatile, rising significantly from 12.5 percent in April 2012 prior to the policy change, to 37.9 percent in February 2013. It was previously mentioned (and can be observed in Figure 3.2) that inflation also rose significantly and became volatile when the exchange rate was floated and the financial system was liberalised in 1994. The same trend was observed in 1998 when the exchange rate was also floated. This would suggest a strong influence of exchange rate policy and financial liberalisation on macroeconomic performance, especially on inflation.

3.1.4.2 Monetary Policy

Current Objectives of Monetary Policy in Malawi

According to an RBM Monetary Policy Statement No.3 (2016, January 06), monetary policy in Malawi is currently conducted through the Reserve Bank of Malawi (RBM) with two major objectives: achieving low and stable prices and financial system stability. These objectives are meant to promote exchange rate stability, investment, employment creation and hence sustainable economic growth.

The Reserve Bank also aims at building foreign exchange reserves, as stated in RBM Monetary Policy Statement No.3 (2016, January 06). Foreign exchange reserves enable the

RBM to manage exchange rate fluctuations in order to cushion the foreign exchange market against shocks and ultimately anchor inflation expectations. Additionally, the RBM takes a long-term stand regarding the direction of the economy that is consistent with the government's vision, including commitments to regional integration (RBM Monetary Policy Statement No.3, 2016, January 06).

Monetary Policy Framework and Instruments

Currently, the monetary policy stance in Malawi is guided by an inflation target. As stated by Simwaka & Mkandawire (2011), the inflation target is set by the National Economic Management Committee (NEMC) under the leadership of the Treasury. It is based on a thorough assessment and projection of the economic environment, including expectations of economic growth. The Minister of Finance, Economic Planning and Development announces the inflation target together with projected macroeconomic framework for a particular financial year in a budget statement presented to Parliament. With the financial year in Malawi running from July to June of the following year, the RBM determines a calendar year inflation target from the financial year target.

According to Simwaka (2011), the Reserve Bank further translates the calendar year inflation target to intermediate operating monetary measures for monetary policy based on its own assessment of indicators that entail price developments such as Gross Domestic Product (GDP), Consumer Price Index (CPI), monetary growth and credit expansion. The RBM then issues a Monetary Policy Statement to key stakeholders and the general public on the stance of monetary policy consistent with the projected macroeconomic environment and the fiscal stance, especially the inflation target and the planned financing of any budget deficit (RBM Monetary Policy Statement No.3, 2016, January 06).

The previous operating framework for monetary policy involved the Reserve Bank setting targets on monetary aggregates such as reserve money. Monetary policy actions would then be directed towards achieving the reserve money target. Beginning in January 2014, however, the monetary policy operating framework changed to interest rate targeting, as stated in the RBM Monetary Policy Statement No.3 (2016, January 06).

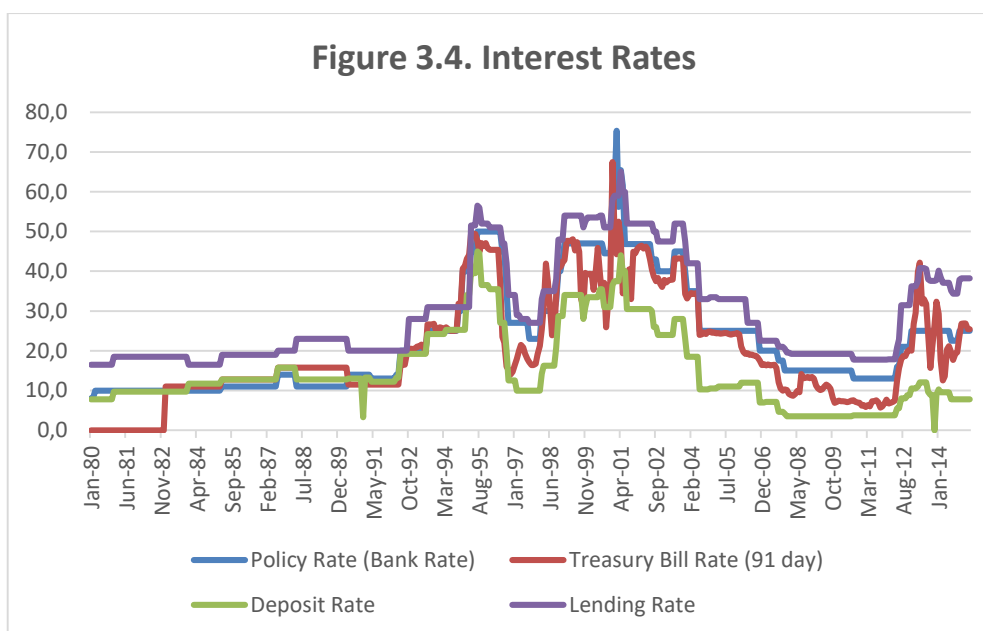
In an interest rate targeting framework, the monetary authorities (monetary policy committee) set a Policy Rate (PR), previously called the Bank Rate, that is consistent with the inflation target. Changes in the Policy Rate signal the stance of monetary policy. The Policy Rate is meant to influence all other short-term interest rates in the money market such as the Inter-

Bank Market rate, Treasury bill rate, Prime rate and eventually lending and deposit rates. The Policy Rate is made effective by using monetary policy instruments such as the Liquidity Reserve Requirement (LRR) and Open Market Operations (OMO).

As mentioned previously, the Liquidity Reserve Requirement (LRR) is the proportion of a commercial bank clients' deposits that the commercial bank is mandated to keep as reserves at the Reserve Bank. The reserves are meant to be a buffer against liquidity shortages. Any commercial bank's reserves at the Reserve Bank over and above the required reserves are excess reserves. When excess reserves are too high it implies that the banking system is awash with liquidity which can potentially increase inflation; and when they are negative, it indicates a liquidity shortage. The Reserve Bank manages liquidity levels by changing the LRR or by implementing Open Market Operations (OMO).

Open Market Operations are purchases and sales of securities such as Treasury bills, RBM bills, Treasury notes and Treasury bonds by the central bank to commercial banks, other financial institutions and non-bank institutions. The RBM can also lend to commercial banks when they are experiencing a liquidity shortage by using the Lombard Facility which is maintained at 2.0 percentage points above the Policy Rate, according to RBM Monetary Policy Statement No.3 (2016, January 06).

Activating these monetary policy instruments affects commercial banks' reserves with the central bank and hence liquidity in the financial system. Liquidity in turn influences short-term interest rates such that an increase (decrease) in the Policy Rate leads to an increase (decrease) in money market rates. Consequently, money market rates are kept close to the Policy Rate. Thus, the current monetary policy framework involves active management of commercial bank reserves with the central bank in order to ensure that short-term interest rates such as Treasury bills and Inter-Bank Market Rates are always close to the Policy Rate. Figure 3.4 provides evidence of the close relationship between the Policy Rate and money market rates.



Data Source: Reserve Bank of Malawi (RBM)

The RBM Monetary Policy Statement No.3 (2016, January 06) states that the Reserve Bank of Malawi also observes the position of Net Foreign Assets (NFA) and Net Domestic Assets (NDA) as per the requirement of the IMF Extended Credit Facility (ECF) Program. Net Foreign Assets (NFA) are the central bank's foreign exchange reserves plus any other assets it may own outside the country less any domestic assets held by foreigners with the central bank. Net Domestic Assets (NDA) comprise of central bank's loans to commercial banks (and other financial institutions) and to central government. Usually, as stated in the RBM Monetary Policy Statement No.3 (2016, January 06), the Reserve Bank, guided by the provisions of the ECF program, puts a ceiling on NDA and a floor on NFA. Open Market Operations and purchases and sales of foreign exchange are then used to manage levels of NDA and NFA, respectively, which in turn affect reserve money (sum of commercial bank deposits with the Reserve Bank and currency in circulation) and ultimately the money supply.

According to the RBM Monetary Policy Statement No.3 (2016, January 06), the Reserve Bank also recently started to use communication as a strategy for increasing the effectiveness of monetary policy. The Reserve Bank issues a Monetary Policy Statement to stakeholders and the general public after the monetary policy stance is decided. The Bank also periodically publishes minutes of the Monetary Policy Committee on its website.

In brief summary, the Reserve Bank currently uses a variety of instruments for monetary policy including the Policy Rate (PR), the Lombard Rate (LR), Liquidity Reserve

Requirement (LRR), Open market Operations (OMO), sales and purchases of foreign exchange and communication. The focus of monetary policy is now on interest rate targeting where as previously it was on reserve money targeting. Nevertheless, Ngalawa & Vieg (2011) argue that even in periods where the official framework for monetary policy was monetary targeting, the Bank Rate was a more effective tool of monetary policy than reserve money in Malawi.

As was discussed in Chapter 2, monetary policy independence and central bank credibility go hand-in-hand insofar as affecting macroeconomic stability is concerned. If the central bank is influenced by the government, it could use monetary policy as a tool for financing fiscal deficits; a lack of independence will reduce credibility and, in turn mean that announcements regarding inflation targets and the like will not be believed. According to the World Bank Report (2015, October 19), weak fiscal discipline is a major contributor to Malawi's macroeconomic instability and the prospects for improvement remain poor. The World Bank Report (2015, October 19) reported that the Malawi government has been running large fiscal deficits due to expenditure pressure emanating from rising cost of servicing debt, the need to settle outstanding arrears, ever increasing wage demands and high cost of agricultural subsidy schemes. Besides, with the country's heavy reliance on foreign aid, any shocks to donor budget support forces the government to continue borrowing heavily from domestic sources in order to finance budget deficits. Heavy government borrowing crowds out private sector investment and pushes up lending rates and inflation, thereby constraining economic growth; empirically assessing the effect of monetary policy independence on economic performance is relevant in Malawi.

3.2 Overview of Malawi's Economy and Financial System

3.2.1 Country Overview

Malawi (officially known as the Republic of Malawi) is a small landlocked country in Sub-Saharan Africa. It covers an area of over 118 000km², approximately one third of which is Lake Malawi. It is bordered by Tanzania to the northeast, Zambia to the northwest and Mozambique to the east, south and west. As at the end of 2014, the population was estimated at 16.8 million (World Bank, 2016). It is thus one of the most densely populated countries in Africa.

3.2.2 Overview of Malawi's Economy

Over the past few decades, as mentioned in preceding sections, Malawi has made various economic and structural reforms aimed at promoting economic growth. Although the country has managed to maintain its economic growth rates, it is still one of the least-developed countries in the world. Poverty and income inequality are still very high. The World Bank (2016) estimates that about 85 percent of the country's population live in rural areas.

Malawi's economy is undiversified and largely agro-based which makes it vulnerable to climate or weather changes. The 85 percent of the population who live in the rural areas mostly depend on subsistence agriculture. Also, as indicated in Mangani (2011), about one third of the country's Gross Domestic Product (GDP) and 90 percent of its export revenue come from the agriculture sector. Other important sectors, according to Mangani (2011), include the services sector (dominated by wholesale and retail trade) which contributes between 45 to 50 percent of GDP and the manufacturing sector (dominated by agro-processing) which contributes about 10 percent to GDP.

The country's main exports include tobacco, tea and cane sugar and its main imports are oil, farm inputs (such as fertiliser) and wholesale and retail products. This makes the country vulnerable to external shocks such as oil and fertiliser prices. With imports exceeding exports, a perpetual current account deficit is faced. Additionally, being a landlocked country, importing and exporting is time consuming and relatively costly. The average tariff rate for the country is 3.8 percent, according to the World Bank (2008). Also, as a small economy, most of the country's international transactions are done in foreign currencies, making it vulnerable to volatility in foreign currencies.

Further, Malawi is still facing challenges to build and expand the economy and hence become financially independent. It is also having difficulties with improving the education system, providing adequate health care and protecting the environment. The Malawi government still depends heavily on foreign aid and loans from the World Bank, International Monetary Fund (IMF), African Development Bank (ADB), the United States Government, the European Union, the United Kingdom and other partners for development projects, even though this need has subsided in recent years. This makes the economy vulnerable to shocks in capital flows in form of aid such that when donors suspend aid, the country faces large fiscal deficits which end up crowding out private sector investment.

In addition, despite macroeconomic policies that are directed towards promoting private sector investment, the country still has a relatively weak private sector. While privatisation has been progressing, state-owned enterprises still operate in some sectors of the economy. Mangani (2011) indicates that the private sector usually contributes approximately only 20 percent of total annual investment for the country.

In terms of growth in recent years, the Malawi Government Budget Statement for the 2016/2017 fiscal year indicates that the country registered real growth rates of 6.2 percent in 2014 and 3.1 percent in 2015, compared to the average growth rates in Sub-Saharan Africa of 5.4 percent in 2014 and 5.5 percent in 2015. Annual average inflation was at 21.8 percent in 2015 and 23.8 percent in 2014. Macroeconomic instability is one of the greatest challenges that the country has been facing for a long time and is one of the factors impeding development of the private sector.

Malawi participates in a number of international organisations including the United Nations, Commonwealth of Nations, Common Market for East and Southern Africa (COMESA) and Southern African Development Community (SADC).

3.2.3 Financial System Overview

Malawi's financial system is small even when compared to other countries in Sub-Saharan Africa. It has basic financial institutions including 11 banks, 11 insurance companies and 71 microfinance institutions - 25 deposit-taking and 46 non-deposit taking - according to the IMF (2015, December). On average the financial sector contributes slightly above 50 percent to the country's Gross Domestic Product (GDP). It registered 51 percent in both 2013 and 2014.

Banks dominate the financial system, accounting for more than 60 percent of total assets in the financial sector. As indicated in Table 3.1 below, banks accounted for 61 percent and 64 percent of total financial sector assets in 2014 and 2013, respectively. The banks also collectively accounted for 95 percent of the economy's credit as at end-2014 and 97 percent as at end-2013 as shown in Table 3.2. However, the banks' credit extensions are mostly short to medium term and concentrated among few large borrowers in a narrow range of economic activities. According to IMF (2015, December), as at the end of 2014, more than 60 percent of total bank loans were made to the wholesale and retail industry, agricultural sector and manufacturing industry. Also, six of the eleven banks had more than 25 percent of their total credit exposures to their first largest single borrower; and four banks also had their second largest borrower with a credit exposure of more than the regulatory norm of 25 percent, as

indicated by the IMF (2015, December). Two largest banks accounted for more than half of total bank capitalisation, assets and deposits as at end-2014.

The government is a significant player in the banking system. As at end-2014, the government held around 20 percent of banks outstanding credits and 3.5 percent of total banking system deposits. The banks had 24 percent of their total assets invested in government securities, according to IMF (2015, December). This exposes the banks to fiscal developments.

Insurance companies are divided into three categories, namely, general insurance, life insurance and re-insurance companies. Four Life insurance companies dominate the sector, accounting for about 89 percent of total assets for the insurance sector. Pension funds have increased in recent years, following the country's adoption of a new Pensions Act in 2011. The IMF (2015, December) indicates that as at end-2014 there were 1,500 pension funds mostly operated by four pension administrators and 13 stand-alone pension funds. Total assets for the pension funds, as indicated by IMF (2015, December) accounted for 10 percent of GDP (K259 billion) in 2015 which were invested in equities, government securities, fixed deposits and properties.

The microfinance sector is small but growing. It is divided into financial cooperatives and non-deposit taking institutions. The sector accounted for about 18 percent of total assets of the financial sector and 5 percent of total financial sector credit to the economy as at end-2014 as shown in Table 3.2.

Table 3.1. Total Assets for Malawi's Financial Institutions				
	2013		2014	
	Billion Kwacha	Percent of Total	Billion Kwacha	Percent of Total
Banks	653	64%	796,1	61%
General Insurance	18,9	2%	25,1	2%
Life Insurance	170,5	17%	223,3	17%
Pension Funds	170,8	17%	247	19%
Micro-Finance Institutions (MFIs)	11,6	1%	17,8	1%
Total	1024,8	100%	1309,3	100%
Percent of GDP	51%		51%	
Source: International Monetary Fund				

Table 3.2. Financial Sector Credits to the Economy				
	2013		2014	
	Billion Kwacha	Percent of Total	Billion Kwacha	Percent of Total
Credit from banks	256,6	97%	304,9	95%
Credit from non-deposit taking MFIs	5,5	2%	12,6	4%
Credit from deposit taking MFIs	2,7	1%	3,2	1%
Total credit to the economy	264,8	100%	320,7	100%
Source: International Monetary Fund				

Lastly, the capital market (the Malawi Stock Exchange (MSE)) is nascent and undergoing development⁶. It has a few listed companies, a limited variety of trading instruments and low retail investor participation. Currently only 14 companies are listed on the exchange with total market capitalisation at K7, 473.31 billion (US\$10.95 billion) as at end March 2016 (RBM, 2016, March). Although the number of listed companies has not changed in a while, market capitalisation has been increasing in recent years. As shown in Table 3.3, the MSE market capitalisation closed at K7,489.36 billion in 2014, K7,179.93 billion in 2013, K3,562.2 billion in 2012 and K2,681.0 billion in 2011. Besides, the Malawi government recently (in 2014) listed three government bonds for the first time on the stock exchange in a bid to build the yield curve. No corporate bonds have been listed yet. The MSE currently faces two major risks: low liquidity and consumer confidence.

Table 3.3. Malawi Stock Exchange Statistics				
	2011	2012	2013	2014
Market capitalization (billion Kwacha)	2681	3562,2	7179,93	7489,36
<i>Market capitalisation as a percent of GDP</i>	214	237,2	357	291,4
Volume of shares traded (billion)	1,6	0,67	4,41	1,72
Value of shares traded (billion Kwacha)	6,9	3,97	13,33	10,87
Malawi All Share Index (MASI)	5369,4	6015,5	12531,04	14,886,12
Domestic Share Index (DSI)	4238,4	4725,5	9850,19	11720,43
Foreign Share Index (FSI)	535,4	854,7	1709,34	1759,61
<i>(Percentage Change)</i>				
Malawi All Share Index (MASI)	8,4	12	108,3	18,8
Domestic Share Index (DSI)	8,1	11,5	108,4	19
Foreign Share Index (FSI)	52,1	59,6	100	2,9
Source: International Monetary Fund				

⁶ The Malawi Stock Exchange was established in 1996 and started equity trading in November, 1996.

The shallowness and lack of diversity of Malawi's economy, as well as financial system constraints, challenge macroeconomic policy making. The three policies, monetary policy, exchange rate policy and financial integration, are mostly inefficient and costly to implement in this kind of environment. This could explain why the macroeconomic policy framework for Malawi has changed frequently over the years as authorities try out different policy combinations depending on the country's needs at specific times. This reinforces the point that an empirical examination of the trilemma trade-offs and effects in Malawi is vital; results of panel studies that have dominated the existing empirical literature may not be true for individual countries.

3.3 Summary and Conclusion

The macroeconomic policy framework for Malawi has changed a great deal since the country gained independence in 1964. Monetary policy has evolved from the use of direct tools such as direct controls on interest rates and credit by the government, to indirect ones; first with the adoption of reserve money targeting framework and later with the adoption of interest rate targeting framework in an inflation target context.

Exchange Rate Policy has also gone through a series of reforms, starting with a fixed exchange rate system when the country just gained independence, to adoption of a floating exchange rate regime in 1994, a managed floating rate regime in 1995, a crawling peg in 1997, a free float in 1998, a fixed rate with some adjustments in 2003, and eventually to a free floating rate again in 2012.

Financial integration has also been progressing as the country opens up to international markets. The country has moved from a heavily controlled financial system during early years of independence to one that is more liberalised with less onerous exchange and financial controls and an almost completely liberalised foreign exchange market.

Despite all the macroeconomic policy reforms Malawi has gone through, however, macroeconomic instability has been a big challenge for the country. Inflation, output and exchange rates, especially, have been volatile. Several factors could have contributed to this macroeconomic instability, including the country's dependence on often volatile foreign aid, an undiversified economy, a weak private sector and an underdeveloped financial system. Besides these factors, the country's pursuit of independent monetary policy, exchange rate stability and financial integration could also have contributed a great deal to this

macroeconomic instability. The Trilemma hypothesis of International Finance and Macroeconomic Policy (or the Impossible Trinity) posits that these three intermediate policy goals cannot be pursued simultaneously due to trade-offs among them. This is why this study empirically examines the trade-offs between the three intermediate policy goals in Malawi and analyses their impact on macroeconomic performance in terms of levels and volatility of inflation and output growth over the last three decades.

CHAPTER 4

METHODOLOGY

Introduction

As a starting point, it is important to reiterate the goals of the study. It was mentioned previously that the study aims to achieve the following three goals:

1. to empirically evaluate trade-offs between monetary policy independence, exchange rate stability and financial integration and hence find out if the macroeconomic policy trilemma is a binding constraint in Malawi;
2. to determine the combination of the intermediate policy goals of the trilemma that has been dominant or prevalent in the country in the last three decades;
3. to assess the extent to which pursuing the trilemma intermediate policy goals has affected macroeconomic performance in Malawi, in terms of the level and volatility of inflation and output growth in the last three decades.

This fourth chapter describes in detail the methodology employed to achieve the three goals. The study takes a positivist quantitative approach and adopts an existing methodology in the literature that was introduced by Aizenman et al. (2008) using multiple countries. The methodology was also used in other multi-country studies by Aizenman et al. (2009; 2010; 2011; 2012), and in single-country studies by Hsing (2012a; 2012b; 2013a; 2013b), Hutchison et al. (2012), Jian et al. (2011) and Sengupta (2015), among others. The use of an existing methodology in literature would make results of this study comparable with those of other studies that applied the same methodology to other countries.

Briefly, the approach involves, first, constructing indices that measure Malawi's level of achievement in each of the three intermediate policy goals of the trilemma. Second, the trilemma is tested by estimating a linear model where a constant (one) is regressed on the three constructed indices using the Ordinary Least Squares (OLS) method. Third, the most prevalent combination of the trilemma intermediate policy goals over the study period is determined by analyzing the means and graphs of predicted values of the indices from the trilemma equation. Lastly, linear regressions are estimated using the OLS method to assess the impact of the trilemma intermediate policy goals on the level and volatility of inflation and output growth. Each of these steps is described in greater detail in subsequent sections.

4.1 Construction of Measures for the Intermediate Policy Goals of the Trilemma

Empirical analysis of the validity of the macroeconomic policy trilemma is a difficult task and still a work in progress. The difficulty arises from a number of reasons, one being the fact that there are no direct measures for monetary policy independence, exchange rate stability and financial integration. Most of the literature agree on the proxy measures for monetary policy independence and exchange rate stability but often vary on the measure for financial integration. This study adopts formulae developed by Aizenman et al. (2008) to construct indices for monetary policy independence and exchange rate stability. The measure for financial integration is constructed using a formula that was used by Jian et al. (2011).

4.1.1 Measure for Monetary Policy Independence (MI)

As mentioned in Chapter 3, money market interest rates, especially the Policy Rate, have always indicated the stance of monetary policy in Malawi. There have been episodes of interest rate targeting as the official monetary policy framework. In other episodes such as reserve money targeting framework, where interest rates are not the main policy instrument, changes in monetary policy have always directly affected interest rates. Moreover, as pointed out in Chapter 3, Ngalawa & Vieg (2011) established that even during the reserve money targeting framework, interest rates were a more effective tool of monetary policy than reserve money. It would make sense, therefore, to measure the degree of monetary policy independence in Malawi as the extent to which interest rates in Malawi follow interest rates in the base country. In other words, the measure for monetary policy independence is based on correlations between Malawian interest rates and the base country's (South Africa⁷) interest rates.

The correlations are then normalized to yield an index whose values lie between zero and one. Normalization makes the monetary policy independence index (MI) comparable with the indices for exchange rate stability and financial integration.

The monetary policy independence index (MI) was developed by Aizenman et al. (2008) and was later used by Aizenman et al. (2010; 2011; 2012), Hutchison et al. (2012) and Jian et al. (2011), among others. It is defined as follows:

$$MI = 1 - \left(\frac{Corr(i, j) - (-1)}{1 - (-1)} \right)$$

⁷ South Africa is chosen as the base country because Malawi's monetary policy framework is more likely to follow South Africa's framework. Besides, similar studies such as Aizenman et al (2008) used South Africa as a base country for Malawi.

Where i stands for the interest rate variable for Malawi and j stands for the interest rate variable for the base country, South Africa, so that $Corr(i,j)$ is the correlation between the Malawian interest rate and the South African interest rate.

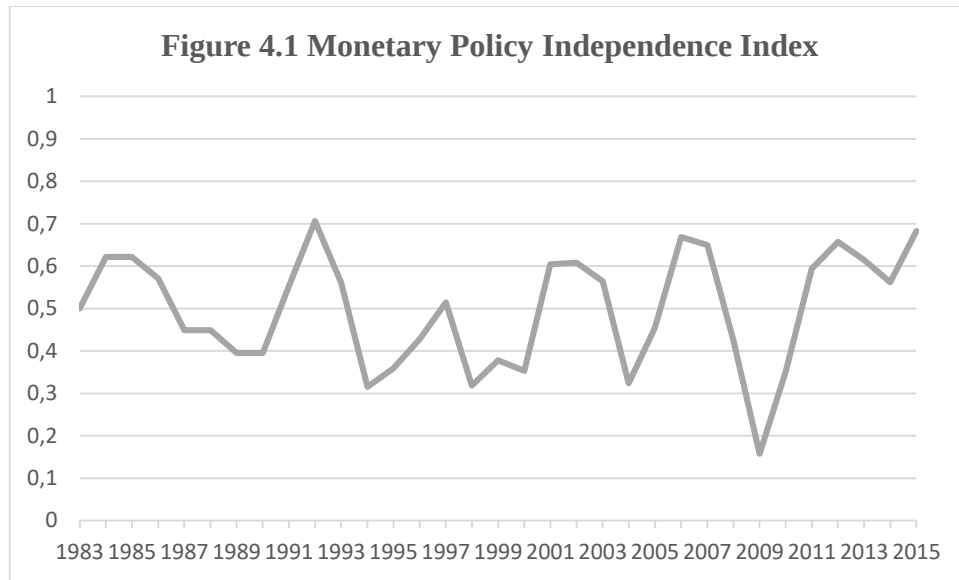
Following Aizenman et al. (2011) and Algu & Creamer (2016), the index is smoothed by taking the average of the value of the index in current period (t), the preceding period ($t-1$) and the following period ($t+1$). Smoothing the index makes the trend more defined.

Higher values of the index indicate greater monetary policy independence and lower values indicate lower monetary policy independence.

Monthly nominal 90-days Treasury bill rates are used. The choice to use Treasury bill rates is based on the fact that they are defined in the same way in both Malawi and South Africa. The Policy Rate, being an official and a better indicator of the stance of monetary policy, would be preferred to the Treasury bill rate but the former is defined differently and used for different purposes in Malawi and South Africa. As mentioned in Chapter 3 and depicted in Figure 3.4, however, there is a close relationship in movements of the Policy Rate and the Treasury bill rate such that a change in the Policy Rate is almost instantaneously followed by a similar change in the Treasury bill rate. The Treasury bill rate would thus effectively measure the stance of monetary policy. Hutchison et al. (2012) also used Treasury bill rates in a single country study for India. Aizenman et al. (2008), and Shambaugh (2004) used Treasury bill rates for some countries and money market rates for other countries in panel studies.

Nominal rates are used because of the fact that the central bank uses nominal interest rates, not real rates, to indicate the stance of monetary policy, as Obstfeld et al. (2005) pointed out. Also, the argument of the trilemma hypothesis, as discussed in Chapter 2, applies to nominal interest rates, not real rates.

Figure 4.1 depicts the monetary policy independence index for the study period (1983 to 2014). This index is discussed in more detail in the next chapter.



4.1.2 Measure for Exchange Rate Stability (ERS)

The measure for the degree of exchange rate stability is also adopted from Aizenman et al. (2008). It is represented by the volatility of the exchange rate between the local currency and the base country's currency. Exchange rate volatility is measured as the annual standard deviation of the monthly rate of depreciation of the Malawi Kwacha relative to the United States Dollar. The exchange rate volatility variable is normalized to make its values lie between zero and one so that the index is comparable with the monetary policy independence and the financial integration indices. The exchange rate stability index (ERS) is, thus, computed as follows:

$$ERS = \frac{0.01}{0.01 + stdev(\Delta(\log(exchangerate)))}$$

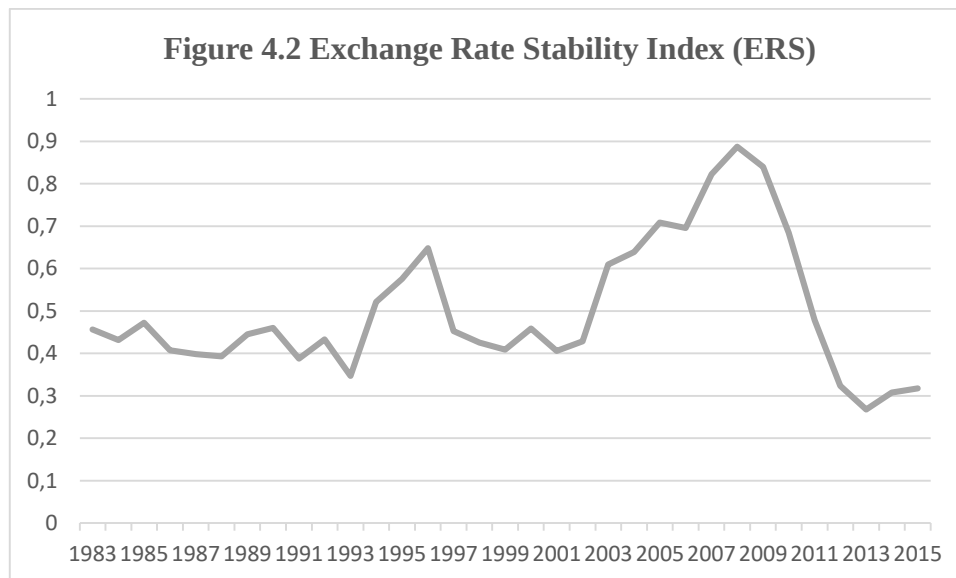
Where $stdev(\Delta(\log(exchangerate)))$ is the exchange rate volatility variable. Higher values of the index indicate higher levels of exchange rate stability and lower values indicate lower stability.

The United States Dollar is chosen as the base currency since in most episodes of fixed exchange rates the Malawi Kwacha was pegged to the United States Dollar. Additionally, most of Malawi's international transactions are quoted in US\$.

Nominal exchange rates are used for the same reason mentioned previously, namely that the trilemma hypothesis applies primarily to nominal variables. As with the monetary policy

independence index, the exchange rate stability index is smoothed to make the trend more defined.

Figure 4.2 plots the exchange rate stability index (ERS) for the period under review. This index is also discussed in greater detail in the next chapter.



4.1.3 Measure for Financial Integration (FI)

Most authors agree on the measures for monetary policy independence and exchange rate stability but differ on the measure for financial integration or capital account openness. This is because the degree of financial integration is quite difficult to measure.

There are two types of measures for financial integration in literature: *de jure* and *de facto* measures. According to Obstfeld et al. (2005), *de jure* measures are based on a country's formal / legal commitments to financial integration. They are based on policies or controls on capital flows deliberately adopted by countries. One such measure is the KAOPEN that was developed by Chinn and Ito (2007). It is based on country information regarding restrictions on international flows reported in the *Annual Report on Exchange Arrangements and Exchange Rate Restriction (AREAER)* of the International Monetary Fund.

De jure measures for financial integration have mostly been used in multi-country studies relating to the trilemma concept, such as Aizenman et al. (2008; 2010). Their use in multi-country studies emanates from the fact that they are convenient for making comparisons regarding the level of financial integration between countries since they are based on standard information.

De jure measures, however, have a number of shortcomings. Jian et al. (2011), argue that they do not accurately reflect the level of a country's capital account openness since they are partially based on restrictions on foreign exchange flows which may not necessarily impede capital flows. Jian et al. (2011), further argue that *de jure* measures do not reflect the effectiveness of enforcement efforts of capital controls. This is due to the fact that *de jure* measures do not change when controls do not change on paper even though enforcement efforts do change over time. Additionally, Jian et al. (2011) also argue that some countries may have strict controls but may not be effective in enforcing them. Lastly, according to Kose et al. (2006), because *de jure* measures are standardized, they may fail to include some capital controls that are actually effective in some countries. Thus, the main shortcoming of *de jure* measures is that they may fail to fully reflect what actually happens in reality compared to what is on paper.

De facto measures on the other hand are based on observed behaviour of capital flows. As suggested by Kose et al. (2006), they tend to reflect reality in terms of a country's level of financial integration better than *de jure* measures. Besides, Jian et al. (2011) and Kose et al. (2006) note that they take into account not only policy restrictions but also effectiveness and changes in enforcement efforts of the restrictions. Chen (2006 in Jian et al., 2011), however, argues that *de facto* measures are prone to measurement errors since they may be influenced by other macroeconomic factors such as interest rate spreads, expectations on exchange rate changes and a country's economic growth potential, among other factors.

Despite the shortcomings, this study uses a *de facto* measure of financial integration. The choice is mainly based on the ability of *de facto* measures to closely capture what is actually on the ground relative to *de jure* measures. A *de jure* measure may not accurately reflect how the level of financial integration has changed in Malawi over the years due to the fact that the country has had issues with effectiveness and enforcement of some restrictions such as declaration of export proceeds. A *de facto* measure for financial integration also allows for uniformity since the measures for both monetary policy independence and exchange rate stability used in the study are *de facto*. Moreover, this is a single country study and so using a *de jure* measure may not be necessary since comparing the level of financial integration in Malawi with other countries may not be important.

There are various *de facto* measures of financial integration in literature. Hutchison et al. (2012) and Globan (2014) measured capital account openness as the ratio of the sum of actual gross investment inflows and outflows to Gross Domestic Product (GDP). Chen (2006 in Jian et al., 2011) and Hutchison et al. (2012), however, point out that this measure is prone to

measurement errors since investment flows may be influenced by other macroeconomic factors, and not necessarily by market openness.

Another *de facto* measure of financial integration is the ratio of the sum of gross stocks of foreign assets and liabilities to GDP. This measure was introduced by Kose et al. (2006) and was also used by Jian et al. (2011). It is a modified version of the preceding measure and is believed to mitigate the measurement errors. For this reason, this study adopts this measure.

The financial integration index (FI) used in this study is thus defined as the ratio of the sum of Malawi's gross stock of foreign assets (FA) and gross stock of foreign liabilities (FL) to gross domestic product (GDP) as follows:

$$FI = \frac{FA + FL}{GDP}$$

Like the measures for monetary policy independence and exchange rate stability, the financial integration measure is normalised to produce an index whose values lie between zero and one. The formula for normalisation is defined as follows:

$$X_{i, 0 \text{ to } 1} = \frac{X_i - X_{Min}}{X_{Max} - X_{Min}}$$

Where:

X_i = each data point i

X_{Min} = minimum value among all the data points

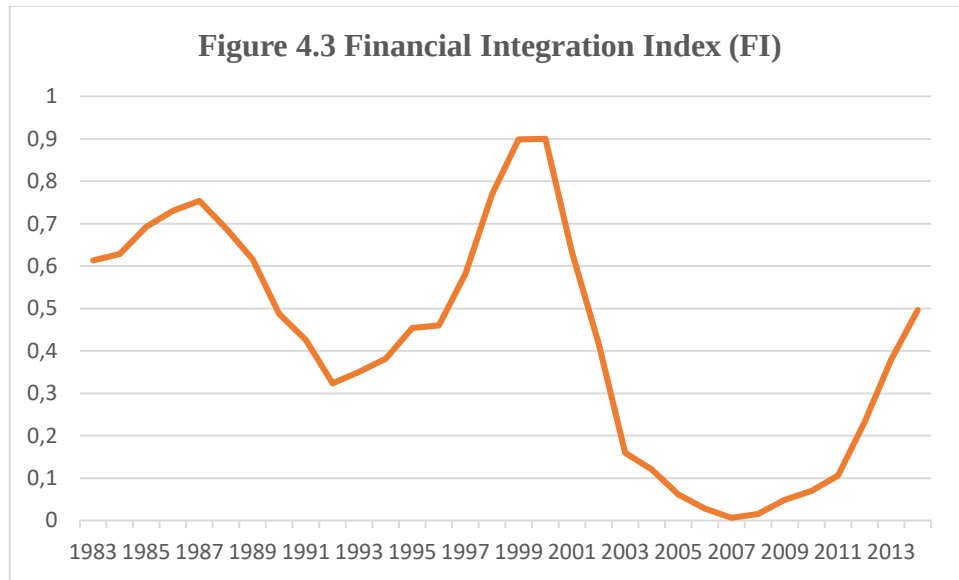
X_{Max} = maximum value among all the data points

$X_{i, 0 \text{ to } 1}$ = data point i normalized between 0 and 1

Higher values of the index indicate greater financial integration and lower values indicate lower levels of financial integration.

Like the other two indices, the financial integration index is smoothed by taking the average of the value of the index in current period (t), the preceding period ($t-1$) and the following period ($t+1$).

Figure 4.3 depicts the constructed financial integration index. Again, the index is discussed in more detail in Chapter 5.



4.2 Testing if the Trilemma is binding in Malawi

Previously it was mentioned that one of the reasons the macroeconomic policy trilemma is difficult to test empirically lies in the difficulty in measuring a country's level of achievement in each of its components. Aizenman & Ito (2011), add that the difficulty in empirically testing the validity of the trilemma is also due to the fact that the hypothesis does not explicitly impose a functional form for the associations between the three intermediate policy goals.

To assess if the trilemma is binding in Malawi, that is, to evaluate the tradeoffs between the trilemma intermediate policy goals, the study adopts Aizenman et al. (2008) approach. Using OLS, a linear model is estimated by regressing a constant (one) on the constructed indices for monetary policy independence, exchange rate stability and financial integration. According to Hutchison et al. (2012), the rationale for estimating this linear model is that if there are indeed trade-offs between the trilemma intermediate policy goals, the weighted sum of the three constructed indices should equal a constant (one in this study) since there is an overall constraint on the indices. This is to say, if Malawi faced the trilemma over the study period, increasing one trilemma variable should have induced a balanced decrease in one or the weighted sum of the other two variables.

The trilemma equation is thus expressed as:

$$1 = \beta_1 MI_t + \beta_2 ERS_t + \beta_3 FI_t$$

Where:

MI_t , ERS_t and FI_t are the monetary policy independence, exchange rate stability and financial integration indices, respectively, at a point in time. β_1 , β_2 and β_3 represent the weights assigned to each of the three intermediate policy goals.

The regression that is estimated is, therefore, defined as follows:

$$1 = \hat{\beta}_1 MI_t + \hat{\beta}_2 ERS_t + \hat{\beta}_3 FI_t + \hat{\varepsilon}_t$$

Where:

$\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ are estimates of the weights β_1 , β_2 and β_3 assigned to monetary policy independence, exchange rate stability and financial integration, respectively, over the sample period. $\hat{\varepsilon}_t$ is an error term representing the proportion of the three variables that was not fully utilised or to what extent the trilemma was not binding at a point in time.

Following Aizenman et al. (2008), assessing if the trilemma is binding involves, first of all, examining the explanatory power or the goodness of fit of the estimated regression. If the goodness of fit (R^2) is high enough, it would mean that the trilemma is binding, implying that there are trade-offs between the three intermediate policy goals in Malawi. If the goodness of fit is low, it would mean that either the trilemma is not applicable to Malawi or the association between the three intermediate policy goals is not linear.

Secondly, the assessment involves analyzing the coefficients in the estimated regression. For the trilemma constraints to be binding, according to Aizenman et al. (2012), all the coefficients of the estimated regression should be significant and positive since it is proposed that the weighted sum of the indices equals a constant. The coefficients also provide approximate estimates of the weights assigned to each intermediate policy goal.

Lastly, the assessment also involves analyzing contributions of each of the indices to the total (one). The contributions indicate the proportion of each of the policy variables that was actually implemented. They are obtained by multiplying the estimated coefficients with corresponding values of the indices as follows:

$$\widehat{MI}_t = \hat{\beta}_1 * MI_t$$

$$\widehat{ERS}_t = \hat{\beta}_2 * ERS_t$$

$$\widehat{FI}_t = \hat{\beta}_3 * FI_t$$

Where $\widehat{MI}_t$, $\widehat{ERS}_t$ and $\widehat{FI}_t$ are the contributions for monetary policy independence (MI_t), exchange rate stability (ERS_t) and financial integration (FI_t), respectively, at a point in time. $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ are as defined previously.

According to Aizenman et al. (2008) and Hutchison et al. (2012), analysing the sum of these contributions over the sample period should provide inferences about how binding the trilemma is. They propose that if the trilemma is binding, the sum of the contributions (i.e. the predicted values) should hover around a constant (one in this study). That is, the following should hold:

$$\widehat{MI}_t + \widehat{ERS}_t + \widehat{FI}_t \approx 1$$

The mean of the predicted values (the sum of the contributions) is also assessed to determine if it equals unity, as the trilemma postulates.

Correlations between individual contributions of the three indices to the total are also computed to further analyse the trade-offs between the trilemma intermediate policy goals.

4.3 Determining the Dominant Combination in the Last Three Decades

The second goal of the study is to determine the combination of the trilemma intermediate policy goals that has been prevalent in Malawi in the last three decades. First of all, following Aizenman et al. (2008), examining the coefficients $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ of the estimated regression should provide some inference regarding which of the three intermediate policy goals received priority over the other two. The higher the value of the coefficient, the more weight its corresponding policy variable was given on average during the review period. Aizenman et al. (2008), however, point out that the coefficients alone would not be enough to determine the prioritised policy goal. They argue that the contributions $\widehat{MI}_t$, $\widehat{ERS}_t$ and $\widehat{FI}_t$ would be more informative. The intermediate policy goal with the highest mean contribution would be the most pursued goal over the sample period.

Second, as earlier mentioned, the impossible trinity theory predicts that a country faced by the constraints of the trilemma would have to choose two of the three intermediate policy goals at a particular point in time (Globoi, 2014; Jian et al., 2011). This means that the country would have the following three possible policy combinations to choose from: monetary policy independence and exchange rate stability; monetary policy independence and financial integration; and exchange rate stability and financial integration. To determine which of the

three policy combinations was dominant in Malawi over the study period, therefore, the three possible policy combinations are constructed using the individual contributions as follows:

$$\widehat{MIERS}_t = \widehat{MI}_t + \widehat{ERS}_t$$

$$\widehat{MIFI}_t = \widehat{MI}_t + \widehat{FI}_t$$

$$\widehat{ERSFI}_t = \widehat{ERS}_t + \widehat{FI}_t$$

Where $\widehat{MI}_t$, $\widehat{ERS}_t$ and $\widehat{FI}_t$ are, as defined in the preceding section, contributions of monetary policy independence, exchange rates stability and financial integration, respectively, to the total (one) at a point in time.

The three cumulative contribution variables $\widehat{MIERS}_t$, $\widehat{MIFI}_t$ and $\widehat{ERSFI}_t$, are then analysed, beginning with a comparison of their means. The cumulative variable with the highest mean indicates the dominant combination of the trilemma intermediate policy goals, on average, over the review period.

The cumulative variables are then plotted on a graph for a more comprehensive analysis. The graph with the highest point at a particular time indicates the dominant combination at that time. The graph will also indicate if the dominant combination changed over time.

Aizenman et al. (2008; 2010; 2012) and Hutchison et al. (2012), divided their samples into two or more sub-samples to analyse the evolution of the trilemma configuration over time. This study does not divide the sample into sub-samples because the sample size is already small due to limited availability of data. The evolution of the trilemma configuration in Malawi is determined by using graphical analysis only.

4.4 Examining the Impact of the Trilemma Intermediate Policy Goals on Macroeconomic Performance

The last goal of the study relates to how pursuing each of the trilemma intermediate policy goals in Malawi affected the country's macroeconomic performance over the study period, specifically with regards to output growth rate and the level and volatility of inflation. In addressing this goal three linear regressions are estimated using the OLS method. The regressions are defined as follows:

$$Y_t = \lambda_0 + \lambda_1 MI_t + \lambda_2 ERS_t + \lambda_3 FI_t + \sum_{i=4}^n \lambda_i G_{it} + \omega_t$$

$$IR_t = \alpha_0 + \alpha_1 MI_t + \alpha_2 ERS_t + \alpha_3 FI_t + \sum_{i=4}^n \alpha_i Q_{it} + \mu_t$$

$$IV_t = \delta_0 + \delta_1 MI_t + \delta_2 ERS_t + \delta_3 FI_t + \sum_{i=4}^n \delta_i Z_{it} + v_t$$

The regressions that are fitted are, therefore, the follows:

$$\hat{Y}_t = \hat{\lambda}_0 + \hat{\lambda}_1 MI_t + \hat{\lambda}_2 ERS_t + \hat{\lambda}_3 FI_t + \sum_{i=4}^n \hat{\lambda}_i G_{it} + \hat{\omega}_t$$

$$\widehat{IR}_t = \hat{\alpha}_0 + \hat{\alpha}_1 MI_t + \hat{\alpha}_2 ERS_t + \hat{\alpha}_3 FI_t + \sum_{i=4}^n \hat{\alpha}_i Q_{it} + \hat{\mu}_t$$

$$\widehat{IV}_t = \hat{\delta}_0 + \hat{\delta}_1 MI_t + \hat{\delta}_2 ERS_t + \hat{\delta}_3 FI_t + \sum_{i=4}^n \hat{\delta}_i Z_{it} + \hat{v}_t$$

Where Y , IR , and IV stand for output growth rate, inflation rate, and inflation volatility variables, respectively; $\hat{Y}$, $\widehat{IR}$ and $\widehat{IV}$ are their estimated values. MI , ERS and FI are, as defined previously, the trilemma indices. G_i , Q_i and Z_i , $i = 4$ to n , are control variables which include lags of the dependent variables and other variables such as international reserves. λ_i , α_i and δ_i , $i = 0$ to n , are coefficients; $\hat{\lambda}_i$, $\hat{\alpha}_i$, and $\hat{\delta}_i$, $i = 0$ to n , are their estimated values, respectively. ω_t , μ_t , and v_t are error terms and $\hat{\omega}_t$, $\hat{\mu}_t$ and $\hat{v}_t$ are their estimates.

Significant coefficients of the trilemma indices in the fitted models estimate the effects of the trilemma intermediate policy goals on the macroeconomic performance indicators.

The output growth rate is represented by the annual growth rate of Gross Domestic Product (GDP), Inflation is represented by the annual Consumer Price Index (CPI) and Inflation volatility is measured by the annual standard deviation of the monthly inflation rate.

Since the trilemma indices are smoothed, for uniformity purposes all other variables, including the macroeconomic performance indicators, are also smoothed.

4.5 Unit Root and Diagnostic Tests

The OLS method which is used to analyze economic relationships between variables is based on some assumptions. The most important ones are that the variables used in the regression are stationary, there is no multicollinearity in the explanatory variables and that the error terms of the regression are free from serial correlation and heteroskedasticity. To ensure that the findings of the study are reliable, therefore, all the variables, including the constructed trilemma indices, are tested for stationarity (or unit root) before being used in the regressions. The Augmented Dickey Fuller test is used in this regard.

The estimated models are tested for serial correlation using the Breusch-Godfrey Serial Correlation LM Test. Heteroskedasticity is tested using the Breusch-Pagan-Godfrey Test and multicollinearity is tested using Variance Inflation Factors.

Results for all these tests are presented in the next chapter. Where there are problems, appropriate measures, such as using robust standard errors, are taken to correct them.

4.6 Data Sources and Analysis Tools

The study uses monthly data spanning from January 1983 to December 2014 to construct the annual trilemma indices. Output growth rate and inflation rate are annual variables. Annual Inflation volatility is computed from monthly inflation figures.

The data are obtained from the Reserve Bank of Malawi, the Malawi National Statistics Office, the Board of Governors of the Federal Reserve, the International Monetary Fund and the World Bank.

Eviews and Excel are used for econometric analysis and mathematical computations.

4.7 Summary and Conclusion

The study adopts an existing methodology in literature that was developed by Aizenman et al. (2008). The methodology involves, first, constructing indices that measure Malawi's level of achievement in each of the trilemma intermediate policy goals: monetary policy independence, exchange rate stability and financial integration.

Second, to assess if Malawi has been facing the trade-offs implied by the trilemma, a linear model is estimated using the Least Squares method. A constant (one) is regressed against the three constructed indices.

Third, to determine the combination of the trilemma intermediate policy goals that was dominant over the study period, individual contributions of the trilemma indices to the total (one) from the trilemma regression are used to construct three cumulative contribution variables of possible combinations of the intermediate policy goals. The cumulative variables are then plotted on a graph to determine which combination was dominant over the study period. The means of the cumulative variables are also analysed to determine which combination had the highest mean.

Lastly, to evaluate how the trilemma intermediate policy goals affected macroeconomic performance during the study period, three linear regressions are estimated using the Ordinary Least Squares method. Macroeconomic performance indicators (output growth rate, inflation and inflation volatility) are regressed on the constructed trilemma indices and some control variables.

Results for the estimated regressions are presented and discussed in the next chapter.

CHAPTER 5

EMPIRICAL RESULTS AND DISCUSSION

Introduction

This chapter presents and discusses the findings of the study following the procedure described in Chapter 4. It starts by describing some preliminary observations in the constructed indices for monetary policy independence, exchange rate stability and financial integration. It then moves on to discuss empirical results relating to the validity of the trilemma in Malawi. Another section follows to discuss what the data reveals about the combination of the trilemma intermediate policy goals that was dominant over the study period. The last main section discusses the results relating to the impact of the trilemma intermediate policy goals on macroeconomic performance indicators. Unit root test results for the variables used and diagnostic tests of the estimated regressions are also presented.

5.1 Preliminary Observations in the Constructed Trilemma Indices

Figures 4.1, 4.2 and 4.3 in the preceding chapter depict the trilemma indices that have been constructed using the procedure described in section 4.1. This section presents descriptive statistics of the indices and describes the trends that can be observed in the indices.

5.1.1 Descriptive Statistics of the Trilemma Indices

Table 5.1 presents summary statistics for the constructed indices for monetary policy independence, exchange rate stability and financial integration.

Table 5.1 Summary Statistics of the Trilemma Indices

	Monetary Policy Independence	Exchange Rate Stability	Financial Integration
Mean	0.491318	0.507139	0.422821
Median	0.507147	0.454910	0.439904
Maximum	0.706141	0.887655	0.900420
Minimum	0.157347	0.267822	0.006516
Standard Deviation	0.132374	0.158637	0.273789
Skewness	-0.396779	0.891101	-0.051192
Kurtosis	2.430870	2.919269	1.862402
Jarque-Bera Probability	1.271523 0.529532	4.243682 0.119811	1.739481 0.419060
Observations	32	32	32

From the table it can be observed that the exchange rate stability index has the highest mean of 0.51, monetary policy independence follows with a mean of 0.49 and financial integration comes last with a mean of 0.42. This could indicate that on average Malawi pursued a higher level of exchange rate stability compared to the other two intermediate policy goals. This is further examined later when weights assigned to each intermediate policy goal are taken into consideration.

It can also be observed from the table that only exchange rate stability has a mean (0.51) that is higher than its median (0.45). The means for monetary policy independence (0.49) and financial integration (0.42) are less than their medians 0.51 and 0.44, respectively. This could indicate that only the exchange rate stability variable is skewed to the right whereas monetary policy independence and financial integration variables are skewed to the left. The positive skewness for exchange rate stability (0.89) confirms that the variable is skewed to the right, whereas the negative skewness for monetary policy independence (-0.40) and for financial integration (-0.05) confirm that the two variables are skewed to the left. The high mean and the positive skewness of exchange rate stability could indicate that on aggregate exchange rate stability dominated monetary policy independence and financial integration over the study period. That is, on average the country pursued higher levels of exchange rate stability than monetary policy independence and financial integration.

Maximum values of 0.71 for monetary policy independence, 0.89 for exchange rate stability and 0.90 for financial integration could mean that over the study period, Malawi never pursued extreme levels⁸ of any of the trilemma intermediate policy goals. The minimum value for monetary policy independence (0.16) could indicate that over the study period, Malawi's monetary policy was never fully dependent on the base country's monetary policy, and the minimum value for exchange rate stability (0.27) could indicate that Malawi's exchange rate was never fully floated over the study period. The minimum value for financial integration (0.007), however, could mean that at least at one point Malawi was almost a completely closed economy.

Lastly, the standard deviations indicate that the financial integration variable has the highest spread (0.27) compared to exchange rate stability (0.16) and monetary policy independence (0.13). This can be observed in Figure 5.1.

⁸ As mentioned in Chapter four, the highest level for each of the policy variables would be 1 and the lowest level would be 0.

5.1.2 Preliminary Observations on the Trends of the Trilemma Indices

Figure 5.1 below plots the trilemma indices in a single graph.

Figure 5.1 Trilemma Indices



Trade-offs between the three indices that are implied by the trilemma can be observed from the graph. As one variable increases (decreases) at least one of the other two variables decreases (increases). For instance between 1983 and 1989 financial integration is higher than monetary policy independence and exchange rate stability. Between 1990 and 1994, however, financial integration declines, monetary policy independence becomes the highest pursued goal, whereas exchange rate stability fluctuates within low levels. From 1995 to 1997 exchange rate stability overtakes the other two goals. Between 1998 and 2001 financial integration increases significantly while the other two fluctuate in the opposite direction. From 2002 to 2008 exchange rate stability rises significantly while financial integration falls to almost zero and monetary policy independence fluctuates. From 2009, exchange rate stability starts to fall, giving room for monetary policy independence and financial integration to rise. In 2012, while exchange rate stability is at its lowest level, financial integration rises tremendously and monetary policy independence, though higher than both indices, starts to fall.

Preliminary observation on the behaviour of the three indices relative to each other, thus, suggests that Malawi could be facing the trilemma between monetary policy independence, exchange rate stability and financial integration such that the pursuit of one intermediate policy goal could be trading off with at least one of the other two goals.

5.2 Validity of the Macroeconomic Policy Trilemma in Malawi

5.2.1 Unit Root Tests for Trilemma Indices

It was stated in Chapter 4 that the study empirically tests the validity of the macroeconomic policy trilemma using OLS and that the method assumes that the variables in the regression are stationary. Before estimating the trilemma equation, therefore, the constructed indices are tested for stationarity using the Augmented Dickey-Fuller Test. Table 5.2 presents the results of the test.

Table 5.2 Augmented Dickey-Fuller Test Results for the Trilemma Indices

		t-Statistic	p-value
Monetary Policy Independence (MI) Index	Augmented Dickey-Fuller test statistic	-5.979209	0.0000***
	Test critical values: 1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	
Exchange Rate Stability (ERS) Index	Augmented Dickey-Fuller test statistic	-2.794295	0.0715*
	Test critical values: 1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	
Financial Integration (FI) Index	Augmented Dickey-Fuller test statistic	-2.882159	0.0593*
	Test critical values: 1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*** indicates stationarity at 1% level

* indicates stationarity at 10% level

The table shows that monetary policy independence index is stationary at 1% level of statistical significance, whereas exchange rate stability and financial integration indices are both stationary at 10% level. The indices are thus, used in regressions in their level form.

The next section presents results of the formal test of the trilemma.

5.2.2 Empirical Test Results for the Validity of the Trilemma in Malawi

Following the procedure described in Chapter 4, section 4.2, a linear form of the trilemma is tested using the Least Squares method by regressing a constant (one) on the constructed indices for the three intermediate policy goals. Table 5.3 provides a summary of the estimated regression output.

Table 5.3 Estimated Trilemma Equation Output

	Coefficients	Standard Error	t Statistic	P-value
Monetary Policy Independence Index (MI)	0.719192	0.134129	5.361954	0.0000***
Exchange Rate Stability Index (ERS)	0.897575	0.079196	11.33361	0.0000***
Financial Integration Index (FI)	0.430407	0.077066	5.584907	0.0000***
R Square	0,99053198			
Adjusted R Square	0,95539625			
Standard Error	0,10221288			
F	1011,31379			
Significance F	1,2339E-28			
Number of Observations	32			

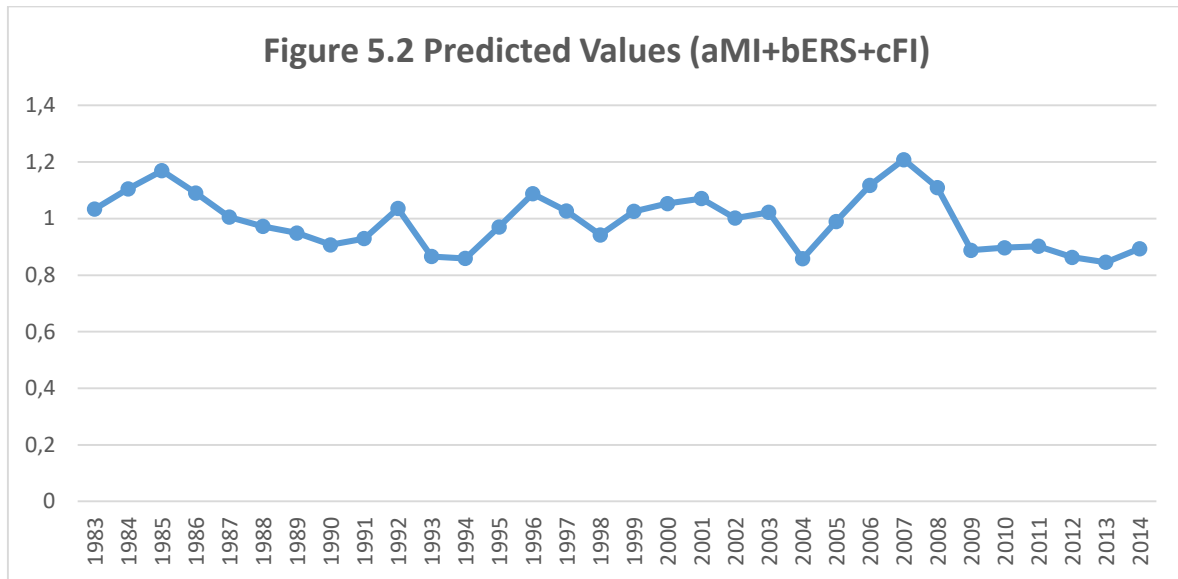
*** indicates that coefficient is significant at 1% level

According to Aizenman et al. (2008) and Hutchison et al. (2012), as mentioned in the preceding chapter, if the trilemma is binding so that the linear associations between the macroeconomic intermediate policy variables hold, the estimated linear regression should satisfy three key conditions: first, the model should fit the data well; second, all coefficients of the indices should be positive and significant; and third, the predicted values of the regression (i.e. the weighted sum of the indices: $\hat{\beta}_1 MI_t + \hat{\beta}_2 ERS_t + \hat{\beta}_3 FI_t$) should hover around the value of one.

It is evident from Table 5.3 that the estimated linear model fits the data well. First of all, the R^2 and Adjusted R^2 (measures of goodness of fit of the model) are sufficiently high at 99% and 96%, respectively. Second, the F-statistic, which shows the joint significance of the explanatory variables, is highly significant at 1% level, indicating that the coefficients of the three indices are on aggregate different from zero. The low standard error of 0.102 of the regression is also another indication that the regression is a good fit.

Table 5.3 also shows that the second condition for the validity of the trilemma is satisfied. All three coefficients of the trilemma variables are positive and highly significant as indicated by low standard errors, large t-statistics (greater than 2) and low p-values (less than 1%).

Regarding the third condition, Figure 5.2 depicts the predicted values of the regression. The figure indicates that the third condition for the trilemma to be considered binding is also satisfied: the predicted values hover around the value of one. Most importantly, their average is essentially one (0.99) as indicated in Table A1 (column $aMI+bERS+cFI$)⁹ of the Appendix.



Correlations between individual contributions of the indices to the total (one) or to the predicted values (i. e. $\hat{\beta}_1 MI_t$, $\hat{\beta}_2 ERS_t$, and $\hat{\beta}_3 FI_t$) also provide evidence that there are trade-offs between the trilemma variables. As presented in Table 5.4 below, the three variables are negatively correlated with each other. This indicates that an increase in one variable is associated with a decrease in the other two variables, which is basically what the trilemma is based on.

Table 5.4 Correlations between the Trilemma Indices

	MI	ERS	FI
MI	1.000000		
ERS	-0.344059	1.000000	
FI	-0.084329	-0.665213	1.000000

^{9 9} Note that $aMI = \hat{\beta}_1 MI_t$; $bERS = \hat{\beta}_2 ERS_t$; and $cFI = \hat{\beta}_3 FI_t$

Sufficient empirical evidence exists, therefore, that the macroeconomic policy trilemma is binding in Malawi. There are indeed trade-offs between monetary policy independence, exchange rate stability and financial integration. This confirms the preliminary observations in the indices discussed in section 5.1.2. The results also confirm that the relationship between the intermediate policy goals of the trilemma is linear as proposed by Aizenman et al. (2008).

The correlations in Table 5.4 further indicate that the largest trade-off exists between exchange rate stability and financial integration in Malawi. This implies that the pursuit of financial integration in the country is associated with a greater level of instability in the exchange rate. This finding is in line with what happened in the country over the review period. The exchange rate was the most volatile in periods where the country pursued more financial integration, for instance from 2012, as discussed in Chapter 3.

There are a number of single country studies that also found support for the trilemma using Aizenman et al. (2008) methodology. These include Algu & Creamer (2016) in South Africa, Hutchison et al. (2012) in India, Hsing (2012a; 2012b; 2013a; 2013b) in Greece, Bulgaria, Brazil and Poland respectively and Jian et al. (2011) in China. Cortuk et al. (2012) also found that the trilemma is a binding constraint in Turkey but used a different method. Similarly, using different approaches Bleaney et al. (2013), Frankel et al. (2004), Mandilaras (2014), Obstfeld et al. (2005) and Shambaugh (2004) found support for the trilemma in panel studies.

5.2.3 Diagnostic Tests for the Trilemma Regression

In order to ensure that the results of the trilemma test are reliable, as mentioned in Chapter 4, the original OLS model was tested for serial correlation, heteroskedasticity and multicollinearity. The results presented in Table 5.5 indicate that multicollinearity is the only problem that can be ruled out confidently as indicated by the low variance inflation factors (less than 10). Serial correlation is present in the model, probably because the indices were smoothed. Heteroskedasticity can also not be ruled out. Accordingly, the OLS model presented in Table 5.3 and discussed above was estimated using robust standard errors that take into account the presence of heteroskedasticity and autocorrelation. That is, heteroskedasticity and autocorrelation consistent (HAC) standard errors & covariance (Bartlett kernel, Newey-West) were used instead of ordinary standard errors.

Table 5.5 Diagnostic Tests for the Trilemma Regression

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	10.00237	Prob. F(2,27)	0.0006
Observed R-squared	13.61887	Prob. Chi-Square(2)	0.0011
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.351716	Prob. F(3,28)	0.0937
Observed R-squared	6.440273	Prob. Chi-Square(3)	0.0920
Scaled explained SS	2.869167	Prob. Chi-Square(3)	0.4122
Multicollinearity Test: Variance Inflation Factors			
<i>Variable</i>	<i>VIF</i>		
Monetary Policy			
Independence	7.454007		
Exchange Rate Stability	5.190393		
Financial Integration	2.839425		

5.3 Determining the Dominant Combination

Having found that the trilemma is a binding constraint in Malawi, it is useful to find out which combination of the three intermediate policy goals was prevalent over the study period. Following Aizenman et al. (2008), as stated in Chapter 4, determining the dominant combination involves analyzing the weights assigned to each policy goal of the trilemma during the review period and the contributions of the indices to the total (one) obtained from the trilemma regression.

The weights assigned to each intermediate policy goal are represented by the coefficients of corresponding variables in the trilemma regression. From Table 5.3 it can be observed that exchange rate stability, with a coefficient of 0.90, received the highest weight during the review period compared to monetary policy independence and financial integration which have coefficients of 0.72 and 0.43, respectively. As earlier mentioned, however, Aizenman et al. (2008) point out that the coefficients alone are not enough to indicate the intermediate policy goal that was actually prioritized. They are more informative when combined with the actual values of corresponding indices. That is, the contributions ($\hat{\beta}_1 MI$, $\hat{\beta}_2 ERS$ and $\hat{\beta}_3 FI$) provide more information.

A full set of the contributions and the predicted values is presented in Table A1 in the Appendix. Only the mean values are reproduced in Table 5.6.

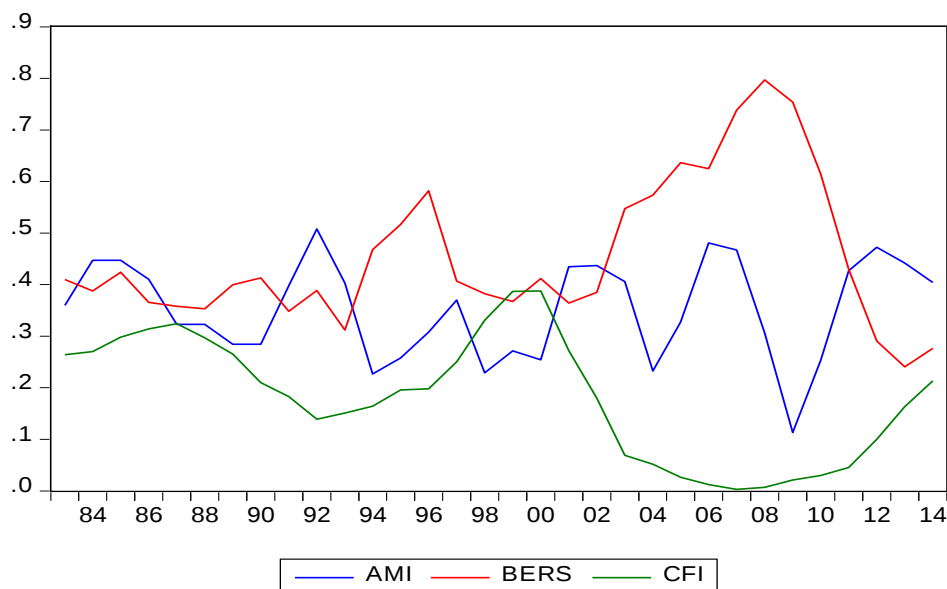
Table 5.6: Means of Individual and Cumulative Contributions of the Trilemma Indices to the Total

Individual Contributions			
$\hat{\beta}_1 MI$	$\hat{\beta}_2 ERS$	$\hat{\beta}_3 FI$	
0,353351	0,455195682	0,181984835	
Cumulative Contributions			
$\hat{\beta}_1 MI + \hat{\beta}_2 ERS$	$\hat{\beta}_1 MI + \hat{\beta}_3 FI$	$\hat{\beta}_2 ERS + \hat{\beta}_3 FI$	$\hat{\beta}_1 MI + \hat{\beta}_2 ERS + \hat{\beta}_3 FI$
0,808547	0,535336295	0,637180517	0,990531977

The means of the individual contributions in the top section of Table 5.6, like the coefficients, reveal that, on average, exchange rate stability was prioritized over monetary policy independence and financial integration.

Figure 5.3¹⁰ is a graphical representation of the individual contributions from Table A1. The figure provides specific periods in which exchange rate stability dominated: 1983, 1987-1990, 1994-1998, 2000, 2003-2011. Monetary policy independence dominated in some periods: 1984-1986, 1991-1993, 2001-2002, and more recently from 2012 to 2014. Financial integration dominated only in 1999.

Figure 5.3 Individual Contributions of the Trilemma Indices to the Total



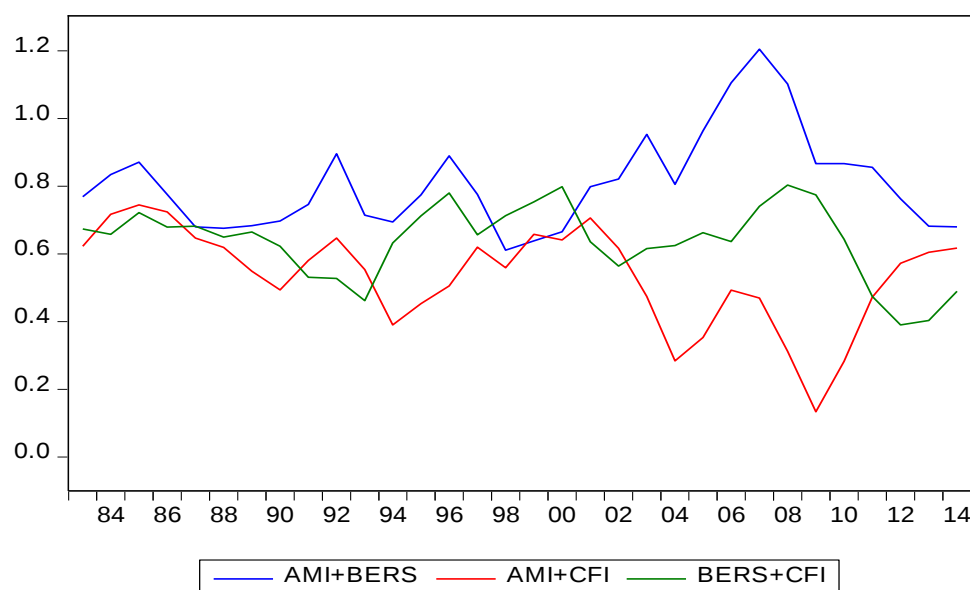
Regarding the combination which was dominant during the study period, the bottom section of Table 5.6 presented above, provides cumulative contributions of possible pairs of the trilemma intermediate policy goals. The table indicates that the combination of monetary

¹⁰ Note that $AMI = \hat{\beta}_1 MI_t$; $BERS = \hat{\beta}_2 ERS_t$; and $CFI = \hat{\beta}_3 FI_t$

policy independence and exchange rate stability was dominant among the three possible combinations.

Figure 5.4 below confirms the dominance of the combination of monetary policy independence and exchange rate stability throughout the study period, except between 1998 and 2000 when the combination of exchange rate stability and financial integration dominated.

Figure 5.4 Cumulative Contributions of the Trilemma Indices to the Total



Indeed, the data reveals what happened in Malawi with regards to the three macroeconomic intermediate policy goals. As described in Chapter 3, for the most part of the review period, the exchange rate was either fixed or allowed to float within a small band. It was briefly fully floated in 1994 and 1998, according to Mangani (2012), Ngalawa & Vieg (2011) and Simwaka & Mkandawire (2011), when the country was considering financial liberalization. Both periods of free float, however, coincided with great macroeconomic instability in the country which rendered the full float unsustainable (Mangani, 2011; Mwabutwa, 2014; Simwaka & Mkandawire, 2011). It was only after the foreign exchange market reforms of 2012 that the country stayed committed to a floating exchange rate.

The country also managed to maintain an intermediate level of monetary policy independence during the review period. Mwabutwa (2014) and Ngalawa & Vieg (2011) noted that the monetary authorities changed the framework and conduct of monetary policy from targeting monetary aggregates to targeting interest rates and more recently, to targeting inflation. The need to maintain monetary policy independence was, perhaps, driven by the need to maintain a fixed or managed exchange rate. Without monetary policy independence it would have been

difficult for the monetary authorities to intervene in the foreign exchange market to keep the exchange rate stable.

The dominance of the combination of exchange rate stability and monetary policy independence is in line with the earlier finding that there is a high tradeoff between exchange rate stability and financial integration. As the country pursued more of exchange rate stability, they had to give up financial integration

This finding regarding the dominance of exchange rate stability and monetary policy independence over financial integration in Malawi is consistent with what Aizenman (2010), Aizenman et al. (2008; 2009; 2010) and Aizenman & Ito (2011) found for non-emerging market developing countries in general. As stated in Chapter 2, using aggregated data, these studies found that while developed and emerging market developing countries have markedly increased their level of financial integration since the 1970s, non-emerging market developing countries have lagged behind. Non-emerging market developing countries have instead prioritized exchange rate stability and monetary policy independence. Aizenman et al. (2008; 2009) further found that Sub-Saharan African countries have especially held onto monetary policy independence and exchange rate stability while lagging considerably in financial integration, relative to other regions. The Sub-Saharan African countries have, however, recently started to open up their capital accounts and to embrace flexible exchange rates even though the progress is less marked (Aizenman et al., 2009).

5.4 Examining the Impact of the Trilemma Intermediate Policy Goals on Macroeconomic Performance

The last goal of the study is to examine the impact of the trilemma intermediate policy goals on macroeconomic performance over the review period. Specifically, the study looks at how output growth and the level and volatility of inflation have been affected by each of the trilemma intermediate policy goals. As previously mentioned, three Ordinary Least Squares regressions are estimated in this regard. The results are presented and discussed in section 5.4.2. Section 5.4.1 presents results for unit root tests of the macroeconomic performance indicators and control variables and section 5.4.3 presents diagnostic test results for the estimated regressions.

5.4.1 Unit Root Test Results for Macroeconomic Indicators and Control Variables

The ADF test is also used to test for the presence of a unit root in the macroeconomic performance indicators and control variables. The results presented in Table 5.7 indicate that

GDP growth rate is stationary in levels, inflation is stationary at first difference, whereas the inflation volatility variable is stationary at second difference.

The table also includes stationarity test results for total reserves which are measured in months of imports. The results indicate that the total reserves variable is stationary at first difference. The change in total reserve variable enters the regressions as a control variable and represents the effect of central bank intervention in the foreign exchange market. It is argued in literature (Altinkemer, 1998; Grenville, 2011; Hutchison et al., 2012; Sengupta, 2015) that the effects of the trilemma intermediate policy goals on macroeconomic performance is affected by the level and effectiveness of central bank intervention in the foreign exchange market.

Table 5.7 Unit Root Test Results for Macroeconomic Performance Indicators - Augmented Dickey-Fuller Test

	Level		First Difference		Second Difference	
	t-statistic	p-value	t-statistic	p-value	t-statistic	p-value
GDP growth rate	-3.181806	0.0308**				
Inflation	-1.698119	0.4216	-4.858648	0.0005***		
Inflation Volatility	-2.275463	0.1879	-2.327859	0.1730	-13.98922	0.0000***
Total Reserves in Months of Imports	-2.172986	0.2199	-3.862430	0.0066***		

*** indicates stationarity at 1% level
 ** indicates stationarity at 5% level

5.4.2 Regression Results and Discussion

Tables 5.8(a), (b) and (c) present estimation results for the three linear regressions. As previously mentioned, the macroeconomic performance indicators that are assessed are output growth rate, inflation rate and inflation volatility. The independent variables are the trilemma indices, lags of the dependent variables and the change in reserves variable. Not many control variables are included in the regressions because the sample size is small. Including too many control variables would have decreased the degrees of freedom.

Table 5.8(a): The Impact of the Trilemma on Macroeconomic Performance – Output Growth Rate

Variable	Coefficient	S E	t-stat	p-value
Monetary Policy Ind	-0.892388	3.014558	-0.296026	0.7696
Exchange Rate Stability	7.244818	3.310272	2.188587	0.0378***
Financial Integration	-3.176140	1.880933	-1.688599	0.1033
Δ in Reserves to GDP Ratio	2.365078	0.813810	2.906179	0.0074***
R ²	0.565985	F - Stat	8.476441	
Adjusted R ²	0.499213	F - Sign	0.000162	
SE (Regression)	1.836464	DW Stat	1.664648	

Table 5.8(b): The Impact of the Trilemma on Macroeconomic Performance – Inflation

Variable	Coefficient	SE	t-stat	p-value
Monetary Policy Ind	-7.604128	9.649285	-0.788051	0.4384
Exchange Rate Stability	10.53286	15.71264	0.670343	0.5090
Financial Integration	33.72189	16.60956	2.030270	0.0536*
Δ in Reserves to GDP Ratio	-5.653164	3.632784	-1.556152	0.1328
Lag of Inflation	0.452926	0.187251	2.418820	0.0235**
R ²	0.390298	F - stat	3.072695	
Adjusted R ²	0.263276	F –Significance	0.027765	
Standard Error	5.848251	D-W Statistic	1.713564	

Table 5.8(c): The Impact of the Trilemma on Macroeconomic Performance – Inflation Volatility

Variable	Coefficient	SE	t-stat	p-value
Monetary Policy Ind	-2.136128	3.951244	-0.540622	0.5958
Exchange Rate Stability	-3.388792	3.972166	-0.853134	0.4054
Financial Integration	-4.267167	2.406181	-1.773419	0.0941*
Lag of Inflation Volatility	-0.852979	0.130663	-6.528061	0.0000***
R ²	0.725582			
Adjusted R ²	0.661012			
Standard Error	2.019454			
F – stat	11.23730			
Sign F – stat	0.000121			

*** coefficient is significant at 1% level

** coefficient is significant at 5% level

* coefficient is significant at 10% level

5.4.2.1 Results on the Impact of the Trilemma Intermediate Policy Goals on the Output Growth Rate:

The estimation results in Table 5.8 indicate that exchange rate stability is the only variable of the trilemma variables that has a significant effect on output growth rate in Malawi. It is positively related to the output growth rate; the pursuit of exchange rate stability contributes to faster economic growth in the country. The level of monetary policy independence and financial integration are not necessarily significant in determining the rate of output growth.

The positive relationship between exchange rate stability and the rate of output growth is in line with the theoretical prediction that, according to Aizenman & Glick (2009), Aizenman & Ito (2011), Hsing (2013a) and Ogbuagu & Ewubare (2015), stability in the exchange rate

enhances certainty and hence boosts consumer and investor confidence in the economy which in turn encourages spending, investment and eventually output growth.

This result emphasizes the importance of having stable exchange rates in Malawi. The inconsistency of exchange rate policy over the review period could well be the reason why output growth has been insignificant in the country (Figure 3.1 above).

Hsing (2012b; 2013b) and Ogbuagu & Ewubare (2015) also found a positive relationship between the level of exchange rate stability and output growth in Bulgaria, Poland and Nigeria, respectively. Hsing (2012a), however, found no significant impact of exchange rate stability on output in Greece.

The level of monetary policy independence may not be a significant factor in the rate of output growth because of the level of development of Malawi's financial system. As mentioned previously, Malawi is a small economy with a financial system that is still developing. It can, therefore, not compete with the base country's financial system which is more advanced. Whether Malawian interest rates follow South African interest rates or not, this would not necessarily have a large effect on investment or spending in the country. Investors would invest in Malawi because of other factors, not necessarily because of interest rate differentials between the two countries.

No known single country study has yet analyzed the impact of monetary policy independence on output growth in Malawi. Studies done in other countries, however, produced mixed results, as mentioned in Chapter 2. Hsing (2013b) and Ihnatova & Căpraru (2014), as in the present case, found no significant impact of monetary policy independence on output in Poland and non-Euro European countries, respectively. Hsing (2012b; 2013a), however, found that monetary policy independence significantly reduced output growth rate in Bulgaria and Brazil, respectively.

The level of financial integration being insignificant in determining the rate of output growth would be an indication that having controls or being open to cross boarder financial flows on its own does not necessarily translate into economic growth. It is mainly what happens to the exchange rate when the country pursues more or less financial integration that has an impact on the rate of output growth in Malawi; there are large tradeoffs between financial integration and exchange rate stability so that an increase (decrease) in the level of financial integration is associated with a decrease (increase) in the exchange rate.

Ogbuagu & Ewubare (2015) analysed the impact of financial integration and exchange rate stability on output growth in Nigeria. Their results also indicted no significant effect of financial integration on output growth. Klein & Olivei (2008) and Hsing (2012b), however, found significant effects of financial integration on output growth. Klein & Olivei (2008) in a panel study found that countries with open capital accounts grow faster than those with closed capital accounts. They noted, however, that this was especially the case for developed economies. Hsing (2012b) found that the pursuit of financial integration in Bulgaria reduced the rate of output growth.

As far as output growth is concerned, the estimation results suggest that, of the three intermediate policy goals of the trilemma, Malawi should concentrate on having stable exchange rates since stability in the exchange rate contributes to faster output growth. It can pursue fixed exchange rates or have floating exchange rates and allow the central bank to intervene in the foreign exchange market so that the exchange rate is kept stable. After all, an intervention variable, included in the model for output growth rate as a control variable, has a significant positive coefficient which means that central bank intervention in the foreign exchange market contributes to output growth.

5.4.2.2 Results on the Impact of the Trilemma Intermediate Policy Goals on the Level and Volatility of Inflation

With regards to the impact of the trilemma intermediate policy goals on inflation, the results in Table 5.8 indicate that only the level of financial integration significantly influences the level and volatility of inflation in Malawi. Higher levels of financial integration are associated with higher but less volatile inflation. The level of monetary policy independence and exchange rate stability are not necessarily significant in determining the level or volatility of inflation in the country.

These results would seem to mean that it is the opening of borders to international financial flows that contributes to high inflation in Malawi, and not necessarily the independence of monetary policy or the pursuit of floating exchange rates. Financial integration exposes the country to rampant cross border financial flows. As mentioned previously, Malawi is a net importer. This means that with free capital mobility the country ends up importing international prices through imports which push up local prices, hence inflation. Additionally, the fact that financial integration is associated with exchange rate instability would mean that as the country pursues more financial integration, the exchange rate becomes volatile. This

increases uncertainty in the country and in turn low production. Low production increases inflation, argued from the principle of demand and supply.

The positive relationship between the level of financial integration and inflation is line with the country's experience during the study period. It can be observed in the inflation series, in Figure 3.2, and in the financial integration index graph in Figure 5.1 that periods of high levels of financial integration coincide with periods of high inflation. For instance, around 1987, 1998 and 2012, the government loosened a lot of controls in a bid to open up the country's economy to international markets; these are the same periods when inflation spiked as shown in Figure 3.2 and as also noted by Mangani (2012), Ngalawa & Vieg (2011) and Simwaka & Mkandawire (2011). Additionally, exchange controls were tight during the period between 2002 and 2011, coinciding with a time of low inflation (Mangani, 2011).

This result is contrary to what Aizenman et al. (2008) and Mandilaras (2014) found for a combination of countries. Their results indicated that more financial integration is associated with lower levels of inflation. Aizenman et al. (2008), however, noted that this is especially the case in emerging market economies. Some single country studies such as Hsing (2012a; 2013a; 2013b) in Greece, Brazil and Poland, respectively, and Ogbuagu & Ewubare (2015) in Nigeria obtained similar results.

Regarding the effect of financial integration on inflation volatility, this study's results compare with most studies, both panel and single country. To mention a few, Ihnatova & Căpraru (2014) found that more financial integration reduced inflation volatility in Central and Eastern European countries. Single country studies Hsing (2012a; 2013a; 2013b) and Ogbuagu & Ewubare (2015) found similar results in Greece, Brazil, Poland and Nigeria, respectively. Hutchison et al. (2012), however, obtained contrary; financial integration was found to be associated with higher inflation volatility in India.

The result regarding the effect of monetary policy independence on inflation could also be due to the level of development of the financial system in Malawi, as discussed earlier. The level of monetary policy independence being an insignificant factor in the level of inflation and inflation volatility would be due to the fact that the country's financial system is small and underdeveloped, so that interest rate differentials between Malawi and South Africa would matter less in international investors' and consumers' decisions.

This result would also raise questions on the effectiveness and prudence of monetary policy in Malawi. The most important function of monetary policy is to control inflation. Monetary policy independence should, therefore, give a country the ability to control domestic inflation.

If this is not the case, it would mean that either monetary authorities are not effective in their efforts to control inflation in the country, or they are not prudent enough in their conduct of monetary policy. They could be using monetary policy for other purposes such as financing fiscal deficits. Both of these are a possibility for Malawi. As mentioned in Chapter 3, the World Bank Report (2015, October 19) indicates that weak fiscal discipline is a major contributor to Malawi's macroeconomic instability. The report states that the Malawi government has been running large fiscal deficits due to expenditure pressure emanating from rising cost of servicing debt, the need to settle outstanding arrears, ever increasing wage demands and high cost of agricultural subsidy schemes. It was also mentioned in Chapter 3 that Malawi relies heavily on foreign aid such that any shocks to donor budget support forces the government to continue borrowing heavily from the domestic market to finance fiscal deficits. Thus, the insignificance of the effect of monetary policy independence on inflation in Malawi could be an indication of the need for further investigation on the effectiveness and prudence of monetary policy in the country.

The study's results regarding the effect of monetary policy independence on the level and volatility of inflation differ from the results found in panel studies that included Malawi, such as Aizenman (2010) and Aizenman et al. (2008; 2010). While this study has found an insignificant negative effect of monetary policy independence on both the level and volatility of inflation in Malawi, Aizenman (2010) and Aizenman et al. (2008; 2010) found that countries with greater levels of monetary policy independence experience significantly higher levels of inflation compared to countries with lower levels of independence and that this effect is more pronounced for developing countries relative to developed countries. For the effect on inflation volatility, Aizenman et al. (2008) found a significant negative effect of monetary policy on inflation volatility.

A number of single country studies also found contrary results to what was found by Aizenman et al. (2008) using aggregated data. Hutchison et al. (2012) applied the same Aizenman et al. (2008) methodology in India and found that greater monetary policy independence has a significant effect on lowering the level of inflation but no significant effect on inflation volatility. Hsing (2012b; 2013b) also applying Aizenman et al. (2008) methodology in Bulgaria and Poland, respectively, found no significant effect of monetary policy independence on either the level or the volatility of inflation, similar to the results of this study.

As regards the effect of exchange rate stability on the level and volatility of inflation, Table 5.8 indicates that exchange rate stability has no significant effect on the level and volatility of

inflation in Malawi. This result is surprising. Exchange rate stability should contribute to low and stable inflation through stabilizing international prices. The insignificance of the impact of exchange rates stability on inflation could mean that inflation in Malawi is a function of other factors such as food prices and financial integration as already discussed, and not necessarily the level of exchange rate stability.

This result contrasts with what Aizenman (2010) and Aizenman et al. (2008; 2010) found for an aggregate of countries and what Hsing (2013a) and Hutchison et al. (2012) found for some individual countries. Aizenman (2010) and Aizenman et al. (2008; 2010) found that countries with greater levels of exchange rate stability experience lower levels of inflation whereas those with lower levels of exchange rate stability experience higher levels of inflation. Hsing (2013a) found that in Brazil greater levels of exchange rate stability are associated with lower levels of inflation; and Hutchison et al (2012) found that exchange rate stability has a dampening effect on inflation volatility in India.

The result, however, compares with those of Hsing (2012a) and Ogbuagu & Ewubare (2015) who also found no significant effect of exchange rate stability on the level and volatility of inflation in Greece and Nigeria, respectively.

Thus, the results of this study indicate that of the trilemma intermediate policy goals, only exchange rate stability has a significant effect on the rate of output growth. Higher levels of exchange rate stability contribute to faster output growth. The results also indicate that only financial integration has significant effects on the level and volatility of inflation. The pursuit of financial integration is associated with higher but less volatile inflation in Malawi.

5.4.3 Diagnostic Tests

As mentioned in the preceding chapter, the credibility of the results depends on whether the assumptions of the OLS method are satisfied in the estimated models. For this reason this section presents results of some of the important diagnostic tests that were carried out on the estimated models on the impact of the trilemma intermediate policy goals on output growth and inflation.

Table 5.9 presents results for Breusch-Godfrey test for serial correlation and Breusch-Pagan-Godfrey test for heteroskedasticity.

Table 5.9 Tests for Serial Correlation and Heteroskedasticity

Output Growth Rate Regression	Breusch-Godfrey Serial Correlation LM Test:			
	F-statistic	0.319932	Prob. F(2,24)	0.7292
	Observed R-squared	0.805027	Prob. Chi-Square(2)	0.6686
	Heteroskedasticity Test: Breusch-Pagan-Godfrey			
	F-statistic	0.138501	Prob. F(4,26)	0.9665
	Observed R-squared	0.646761	Prob. Chi-Square(4)	0.9577
	Scaled explained SS	0.533017	Prob. Chi-Square(4)	0.9702
Inflation Regression	Breusch-Godfrey Serial Correlation LM Test:			
	F-statistic	1.832190	Prob. F(2,22)	0.1837
	Observed R-squared	4.283422	Prob. Chi-Square(2)	0.1175
	Heteroskedasticity Test: Breusch-Pagan-Godfrey			
	F-statistic	1.091621	Prob. F(5,24)	0.3904
	Observed R-squared	5.558509	Prob. Chi-Square(5)	0.3516
	Scaled explained SS	4.512513	Prob. Chi-Square(5)	0.4782
Inflation Volatility Regression	Breusch-Godfrey Serial Correlation LM Test:			
	F-statistic	0.039353	Prob. F(2,15)	0.9615
	Observed R-squared	0.114833	Prob. Chi-Square(2)	0.9442
	Heteroskedasticity Test: Breusch-Pagan-Godfrey			
	F-statistic	0.970534	Prob. F(4,17)	0.4491
	F-statistic	0.970534	Prob. F(4,17)	0.4491
	Observed R-squared	4.089954	Prob. Chi-Square(4)	0.3940
	Scaled explained SS	1.469200	Prob. Chi-Square(4)	0.8321

The large probability values indicate that the null hypotheses of no serial correlation and no heteroskedasticity in the estimated regressions for the impact of the trilemma variables on output growth rate, level of inflation and inflation volatility cannot be rejected.

Table 5.10 presents Variance Inflation Factors from multicollinearity tests for the three estimated regressions.

Table 5.10 Multicollinearity Tests: Variance Inflation Factors

<i>Variable</i>	<i>VIFs for Output Growth Rate Regression</i>	<i>VIFs for Inflation Regression</i>	<i>VIFs for Inflation Volatility Regression</i>
Monetary Policy Independence	1.463486	1.687433	1.627406
Exchange Rate Stability	2.526218	1.897741	2.640354
Financial Integration	2.398501	2.941679	2.427926
Change in Reserves to GDP Ratio	1.196813	1.384558	
Lag of Output Growth Rate	N/A		
Lag of Inflation		2.350885	
Lag of Inflation Volatility			1.047607

From the table, it can be observed that the variance inflation factors for all the three regressions are low (less than 10). This indicates that multicollinearity is also not a problem in the data.

The absence of serial correlation, heteroskedasticity and multicollinearity in the estimated regressions render the results presented and discussed in the preceding sections reliable so that inferences can be drawn from the models.

5.5 Summary and Conclusion

The study has found that the macroeconomic policy trilemma is a binding constraint in Malawi. There are indeed trade-offs between monetary policy independence, exchange rate stability and financial integration; Malawi cannot pursue optimal levels of all the three intermediate policy goals of the trilemma simultaneously. It can pursue at most only two at a point in time.

The study has also found that the largest trade-off exists between exchange rate stability and financial integration in Malawi. This implies that as the country pursues more of financial integration, exchange rates become volatile. In other words, the pursuit of stable exchange rates in the country is associated with a greater loss in financial integration relative to a loss in monetary policy independence.

Another important finding is that during the study period (1983-2014) on aggregate Malawi prioritised stable exchange rates compared to monetary policy independence and financial integration. The combination which was dominant over the review period is exchange rate stability and monetary policy independence. Financial integration was the least pursued intermediate policy goal.

As regards how the three intermediate policy goals affect economic performance in Malawi, it has been found that exchange rate stability is the only intermediate policy goal that affects the rate of output growth. Greater levels of exchange rate stability are associated with higher rates of output growth. Monetary policy independence and financial integration are not significant factors in the growth rate of output. This result would imply that the indifferent output growth experienced in the country over the review period could be the result of inconsistent pursuit of exchange rate stability in the country. If high growth is to be realised and sustained, Malawi should, therefore, concentrate on having stable exchange rates.

On the effect of the intermediate policy goals on inflation, the estimation results indicate that financial integration significantly influences both the level and volatility of inflation. Greater levels of financial integration are associated with high but less volatile inflation. Monetary policy independence and exchange rate stability have no significant impacts on inflation.

The data, thus, has revealed that exchange rate stability is the most important of the three macroeconomic intermediate policy goals. The Malawi economy would really benefit in terms of economic growth if the country keeps its focus on stable exchange rates.

CHAPTER 6

SUMMARY AND CONCLUSION

6.1 Summary of the Study

The study set out to empirically examine the prevalence and macroeconomic effects of the trilemma between monetary policy independence, exchange rate stability and financial integration in Malawi. It was observed that since independence in 1964, the country has had several reforms relating to the three intermediate policy goals of the trilemma. The framework and conduct of monetary policy have over the years evolved from the use of direct tools such as direct controls on interest rates and credit by the government during the early years of independence, to indirect ones such as targeting monetary aggregates in the late 1980s and in the 1990s, and targeting interest rates within the context of an inflation target in more recent years. Exchange rate policy has fluctuated a great deal; beginning with a fixed rate regime when the country just gained independence to a floating rate regime in 1994, managed float in 1995, crawling peg in 1997, free float in 1998, fixed rate with periodic adjustments in 2003 and eventually free float in 2012. Financial integration policy has also changed over the years, with more onerous exchange controls in some periods and relatively more open borders in other periods.

These macroeconomic policy reforms were directed towards achieving high and sustainable economic growth. It was observed, however, that despite the reforms, in the last three decades Malawi has barely achieved desirable macroeconomic performance. The country has registered indifferent economic growth and relatively high and unstable inflation.

In view of this, the study was based on the proposition that the numerous macroeconomic policy reforms that Malawi has gone through over the years could be due to the constraints of the trilemma between monetary policy independence, exchange rate stability and financial integration; and that the trilemma could have contributed to the indifferent macroeconomic performance the country has registered over the years. The ‘trilemma’ theory (also known as the ‘impossible trinity’) in the field of International Finance and Macroeconomics, according to Aizenman et al. (2008), Hutchison et al. (2012) and Obstfeld et al. (2005), predicts that a country cannot simultaneously achieve optimal levels of monetary policy independence, exchange rate stability and financial integration; there are trade-offs between these three intermediate policy goals such that an improvement in one intermediate policy goal has a negative impact on at least one of the other two. Countries are, therefore, faced with a

challenge of having to choose at most two of the three intermediate policy goals at a point in time.

Accordingly, the study set out to achieve three specific goals: first, to empirically evaluate the trade-offs between monetary policy independence, exchange rate stability and financial integration in Malawi in a bid to ascertain if the trilemma is a binding constraint in the country; second, to determine the combination of the trilemma intermediate policy goals that has been dominant in the country in the last three decades, given the constraints of the trilemma; and third, to assess how the pursuit of the trilemma intermediate policy goals has affected macroeconomic performance in Malawi, specifically with regards to the rate of output growth and the level and volatility of inflation.

The study adopted an existing methodology in literature that was developed by Aizenman et al. (2008) and also used by Aizenman et al. (2009; 2010; 2011; 2012), Hsing (2012a; 2012b; 2013a; 2013b), Hutchison et al. (2012) and Jian et al. (2011), among others. It is a positivist quantitative approach. It involved, first of all, constructing indices that measure Malawi's level of achievement in each of the three intermediate policy goals of the trilemma. The validity of the trilemma in Malawi (the first goal of the study) was then tested by applying OLS techniques to estimate a linear model in which a constant (one) was regressed on the three constructed indices. The results of this model showed support for the trilemma: there are indeed trade-offs between monetary policy independence, exchange rate stability and financial integration in Malawi so that the pursuit of one policy goal is associated with a decrease in at least one of the other two. Correlations between the indices of the trilemma intermediate policy goals further indicated that the largest trade-off (-0.66) exists between exchange rate stability and financial integration. This means that as the country pursues more of exchange rate stability, financial integration declines by a larger magnitude compared to monetary policy independence.

Having found that the trilemma is a binding constraint in Malawi, it was imperative to find out which combination of the trilemma intermediate policy goals the country prioritised over the study period (1983 to 2014). Understanding the dominant combination would shade more light on how the economy performed during the period. This second goal of the study was explored by analysing the means and graphs of individual and cumulative contributions of the trilemma intermediate policy goals to the total (one) obtained from the estimated trilemma regression. It was found that on average Malawi prioritised exchange rate stability over monetary policy independence which was in turn prioritised over financial integration. That

is, the combination of exchange rate stability and monetary policy independence was dominant during the review period.

This finding is in line with the results Aizenman (2010), Aizenman et al. (2008; 2009; 2010) and Aizenman & Ito (2011) obtained in panel studies, that since the 1970s non-emerging market developing countries, especially Sub-Saharan African countries, have prioritised exchange rate stability and monetary policy independence at the expense of financial integration. They, however, noted that the non-emerging market developing countries have recently started to embrace financial integration even though the progress is less marked.

To assess how the trilemma affected macroeconomic performance in Malawi during the review period (the third goal of the study), the study specifically analysed the impact of the trilemma intermediate policy goals on output growth rate and the level and volatility of inflation. The aim, as alluded to, was to find out if the country's macroeconomic performance over the last three decades could be attributed to the pursuit of the trilemma intermediate policy goals. The Ordinary Least Squares method was used in this regard. Three linear models were estimated in which each of the macroeconomic performance indicator variables were regressed on the trilemma intermediate policy goals, lags of the dependent variables and international reserves.

The results indicated that, of the three intermediate policy goals of the trilemma, only exchange rate stability has a significant impact on the rate of output growth in Malawi. Greater levels of exchange rate stability are associated with faster output growth. This could explain why the country prioritised exchange rate stability during the review period. It was noted, however, that the country was not consistent in its pursuit of exchange rate stability. The exchange rate policy changed a great deal over the period. This could explain why output growth has been indifferent in the country.

This result compares with those of Hsing (2012b; 2013b) and Ogbuagu & Ewubare (2015) who also found a positive relationship between the level of exchange rate stability and output growth in Bulgaria, Poland and Nigeria, respectively. The result, however, contrasts with Hsing (2012a) who found no significant impact of exchange rate stability on output in Greece.

As regards the impact of the trilemma intermediate policy goals on inflation, the study found that between monetary policy independence, exchange rate stability and financial integration, only financial integration significantly influences the level and volatility of inflation in Malawi. The pursuit of financial integration is associated with high but less volatile inflation.

This could explain why financial integration has been a slow process in the country in the last three decades.

The result differs from those of Aizenman et al. (2008) and Mandilaras (2014) who found a negative relationship between financial integration and inflation in a cross section of countries. A number of single-country studies also found a negative relationship between financial integration and inflation. These include Hsing (2012a; 2013a; 2013b) in Greece, Brazil and Poland, respectively, and Ogbuagu & Ewubare (2015) in Nigeria. The differences in the findings confirm that the effects of the trilemma intermediate policy goals on macroeconomic performance depend on country-specific factors. Country-specific studies are, therefore, necessary if the aim is to understand the effects of the trilemma in specific countries.

It would have been of great value to compare the findings of this study, especially on the impact of the trilemma intermediate policy goals on macroeconomic performance, with findings of other single-country studies in non-emerging market developing countries. The literature review, however, revealed that there are very few single-country studies on the trilemma concept in this income group. Most studies are concentrated in developed and emerging market countries. Single-country studies on the subject are, however, needed in non-emerging market developing countries especially now that most countries in this income group, as earlier stated, are starting to embrace financial integration. This study could help to narrow the literature gap, especially in Sub-Saharan Africa.

The study is especially relevant for Malawi because, as previously mentioned, the country has gone through numerous reforms over the years trying to find the policy mix that would encourage macroeconomic stability for sustainable economic growth. The findings of this study not only bring to light the prevalence and nature of the trilemma between monetary policy independence, exchange rate stability and financial integration in the country, but also point out the potential impacts of each of these three intermediate policy goals on macroeconomic performance, and thereby suggest the intermediate policy goals that are beneficial for the country.

6.2 Policy Recommendations

In general, the study found that the trilemma between monetary policy independence, exchange rate stability and financial integration is a binding constraint in Malawi; in light of the trilemma, the country has, in the last three decades, prioritised exchange rate stability and

monetary policy independence at the expense of financial integration. The study also found that, of the three intermediate policy goals of the trilemma, exchange rate stability is the most important as it contributes to faster economic growth; whereas financial integration increases inflation. Monetary policy independence was consistently found to have no significant effect on output growth rate and inflation.

There are a number of policy recommendations that can be drawn from these findings. To begin with, the trilemma being a binding constraint means that the simultaneous pursuit of the three intermediate policy goals can lead to economic instability in the country. Caution should, therefore, be taken when pursuing these three intermediate policy goals.

Secondly, the significant positive relationship between exchange rate stability and the rate of output growth emphasises the importance of having stable exchange rates in Malawi. The indifferent economic growth that the country has registered in the last three decades could have emanated from the fact that the country has not been consistent in its pursuit of exchange rate stability. As previously mentioned, exchange rate policy has gone back and forth between fixed and flexible regimes. If the country hopes to achieve faster and sustainable economic growth, therefore, the authorities should focus on having stable exchange rates consistently.

Currently Malawi has a floating exchange rate regime. At the same time the country is encouraging financial integration. The findings of this study could be a caution to policy makers to take special care in the pursuit of the combination of floating exchange rates and financial integration. The finding that exchange rate stability has a direct relationship with output growth rate implies that unstable exchange rates are associated with slow economic growth. It has also been found that financial integration is associated with high inflation in the country. The pursuit of financial integration combined with floating exchange rates could, therefore, be a recipe for an era of slow economic growth and high inflation in the country. The authorities should question the extent to which these macroeconomic policies, which are mostly based on theory and conditions prevailing in developed countries, are directly applicable to a small developing economy like Malawi.

Further, the finding that monetary policy independence has no significant effect on output growth and inflation means that it does not matter much whether Malawian interest rates follow South African interest rates. International investors and consumers would not base their decisions on interest rate differentials between the two countries. This is an indication that Malawi's financial system cannot compete on the international market, especially with South Africa's financial system. Financial integration will, therefore, not achieve much in the

country with the current level of development of the financial system. The development of the financial system, through for instance, encouraging competition, product innovation and modern payment systems, should, therefore, be one of the priority goals for policy makers in the country.

Lastly, the insignificance of the effect of monetary policy independence on output growth rate and inflation would also raise concerns on the effectiveness of monetary policy in the country. A review of the tools for monetary policy would, therefore, be recommended.

6.3 Study Limitations

The study was not without limitations. The most notable challenges encountered relate to data availability. Some data for the years before 1983 and for the year 2015 were not available. Also, GDP is available only in annual frequency in Malawi. Using annual figures coupled with the unavailability of some data in some years meant that the study had to use a small number of observations. This could have affected the results. Additionally, with the small sample size, the regressions for the impact of the trilemma intermediate policy goals on macroeconomic performance did not control for all determinants of output growth rate and inflation.

6.4 Areas for Further Research

Most small open economies in Sub-Saharan Africa like Malawi are facing challenges with regards to monetary policy, exchange rate policy and financial integration. These policies are actually becoming complicated in today's world where globalisation is greatly encouraged. Studies on these policies, however, remain scant in Sub-Saharan Africa. Research on these policies is, therefore, encouraged in this region.

Future research on the trilemma concept in Malawi or in other non-emerging market developing countries could compare the performance of different measures of the three intermediate policy goals of the trilemma. For instance, this study used a *de facto* measure of financial integration; future research could compare the performance of the *de facto* measure with a *de jure* measure such as the Chinn-Ito Index. Similarly, monetary policy independence in this study was measured by using correlations between Malawian interest rates and South African interest rates; future research could use correlations of Malawian interest rates with average interest rates of SADC countries.

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Appendix
Table A1. Predicted Values

	aMI	bERS	cFI	aMI+bERS+cFI	aMI+bERS	aMI+cFI	bERS+cFI
1983	0,3595958	0,4099603	0,2638429	1,03339893	0,769556021	0,623438679	0,673803159
1984	0,447288	0,3877499	0,2703215	1,10535935	0,835037893	0,717609494	0,658071311
1985	0,447288	0,4241392	0,2980617	1,169488944	0,87142723	0,745349752	0,722200906
1986	0,4104871	0,3657396	0,3141715	1,090398265	0,776226759	0,724658622	0,679911149
1987	0,3227948	0,3578768	0,3243955	1,005067139	0,680671677	0,647190311	0,68227229
1988	0,3227948	0,3531692	0,2966262	0,97259024	0,675964009	0,61942108	0,649795391
1989	0,2842802	0,3995015	0,265345	0,949126632	0,683781673	0,549625127	0,664846466
1990	0,2842802	0,413105	0,2098461	0,907231309	0,697385194	0,494126282	0,622951142
1991	0,3979759	0,348237	0,1830852	0,929298159	0,746212934	0,581061153	0,531322231
1992	0,5078504	0,3886884	0,1391855	1,035724239	0,896538731	0,647035858	0,527873888
1993	0,4030323	0,3118369	0,1508724	0,865741635	0,714869237	0,553904723	0,462709311
1994	0,2265884	0,4681258	0,1644062	0,859120452	0,694714204	0,390994611	0,63253209
1995	0,2579379	0,5168411	0,1955902	0,970369173	0,774778964	0,45352809	0,712431291
1996	0,3078338	0,5820486	0,1980213	1,087903733	0,889882464	0,505855108	0,780069893
1997	0,3698758	0,4066712	0,2502262	1,026773215	0,776547065	0,620101998	0,656897367
1998	0,2289595	0,3823507	0,3309599	0,94227011	0,611310214	0,559919363	0,713310644
1999	0,2716688	0,3673887	0,3866667	1,025724254	0,639057536	0,658335508	0,754055462
2000	0,2541045	0,4115389	0,387547	1,053190319	0,665643354	0,641651469	0,799085816
2001	0,434698	0,3641328	0,2721136	1,070944371	0,798830819	0,706811572	0,636246352
2002	0,4371119	0,3848742	0,1798676	1,001853772	0,821986153	0,616979555	0,564741837
2003	0,4057448	0,547357	0,0687933	1,021895091	0,953101832	0,474538047	0,616150302
2004	0,232519	0,5735312	0,0517974	0,857847584	0,806050207	0,284316359	0,625328601
2005	0,3272275	0,6363595	0,0264217	0,990008699	0,963586957	0,353649236	0,662781205
2006	0,4808677	0,6247013	0,0123941	1,117963139	1,105569029	0,493261811	0,637095437
2007	0,4669006	0,7384455	0,0028045	1,208150626	1,205346108	0,469705134	0,741250011
2008	0,3059784	0,7967376	0,0068647	1,109580646	1,102715988	0,312843036	0,803602269
2009	0,1131626	0,7539608	0,0208772	0,888000606	0,867123413	0,134039813	0,774837985
2010	0,2532236	0,6140543	0,0300597	0,897337557	0,867277845	0,283283275	0,644113994
2011	0,4270152	0,4295048	0,0456165	0,902136536	0,856520037	0,472631744	0,475121292
2012	0,4724663	0,290731	0,09996	0,863157298	0,763197281	0,572426269	0,390691046
2013	0,4417636	0,2403907	0,1632923	0,845446543	0,682154272	0,605055842	0,403682971
2014	0,4039313	0,2765122	0,2134813	0,893924692	0,680443425	0,617412526	0,489993433
Average	0,3533515	0,4551957	0,1819848	0,990531977	0,808547141	0,535336295	0,637180517