

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**THE ROLE OF INTERNAL AND EXTERNAL SHOCKS IN BUSINESS
CYCLE FLUCTUATIONS IN LOW AND UPPER MIDDLE INCOME
COUNTRIES**



A thesis submitted to The Superior College, Lahore, in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy in Economics

Submitted by: Shazia Kousar
Roll # PHDE 14206
Session 2013–2016
Department of Economic and Commerce

Supervised by: Dr. Muhammad Ilyas

Author's Declaration

I Shazia Kousar hereby state that my PhD thesis titled “**The Role of Internal and External Shocks in Business Cycle Fluctuations in Low and Upper Middle Income Countries**” ” is my own work and has not been submitted previously by me for taking any degree from this University **The Superior College, Lahore** Or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after I Graduate, the university has the right to withdraw my PhD degree.

Name of Student: ShaziaKousar

Date: _____

Plagiarism Undertaking

I solemnly declare that research work presented in the thesis titled “**The Role of Internal and External Shocks in Business Cycle Fluctuations in Low and Upper Middle Income Countries**” is solely my research work with no significant contribution from any other person. Small contribution/help wherever taken has been duly acknowledged and that complete thesis has been written by me.

I understand the zero-tolerance policy of the HEC and University **The Superior College, Lahore** towards plagiarism.

Therefore, I as an Author of the above titled thesis declare that no portion of my thesis has been plagiarized and any material used as reference is properly referred/cited.

I undertake that if I am found guilty of any formal plagiarism in the above titled thesis even after award of PhD Degree, the University reserves the rights to withdraw/revoke my PhD degree and that HEC and the University has the right to publish my name on the HEC/University Website on which names of students are placed who submitted plagiarized thesis.

Student/Author Signature: _____

Name: Shazia Kousar

Certificate of Approval

This is to certify that the research work presented in this thesis, entitled “**The Role of Internal and External Shocks in Business Cycle Fluctuations in Low and Upper Middle Income Countries**” was conducted by Shazia Kosuar Under the supervision of Dr. Muhammad Ilyas.

No Part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the Faculty of Business and Management Sciences, The Superior College, Lahore in partial fulfillment of the requirements for the degree of Doctor of Philosophy in field of Economics in Faculty of Economics and Commerec at The Superior College, Lahore.

Student Name: Shazia Kousar

Signature: _____

Examination Committee:

- a) **External Examiner 1: Dr. Salman Rizavi**
Associate Professor, Campus Director
University of the Punjab, Gujranwala Campus

Signature: _____

- b) **External Examiner 2: Dr. Hafiz Khalil Ahmad**
Associate Professor, GC Women University,
Sialkot.

Signature: _____

- c) **Internal Examiner: Dr. Ch. Abdul Rehman**
Professor, Faculty of Business Administration
and Management Sciences, The Superior College, Lahore.

Signature: _____

Supervisor Name: Dr. Muhammad Ilyas Signature: _____

Name of Dean/HOD: Dr. Raza S. Khan

Signature: _____

Dedicated To My Family

Acknowledgements

All praise is for Al-Mighty Allah who enabled me to complete my thesis. It was His blessings and mercy on me that gave me the courage to undertake and complete this project. I express my gratitude to Him from the core of my Heart. It is a great pleasure for me to place on record my sincere thanks to Dr. Muhammad Ilyas, my research supervisor, whose kind, generous and duteous guidance paved the way for me to complete this study. I might not have finished my thesis without his guidance, encouragement and comments. I thank all faculty members of the M.S Department, The Superior College, who have been great sources of inspiration, guidance and encouragement to me.

I am unable to express the depth of my indebtedness to my parents and family members, especially my father, for their endless and sincere prayers for my success. I also thank Hassan Bilal, Azan Bilal, Nouman Arshad, H. Muhammad Yasir Zia, Saeed Aas Meo, Shahzad Ali and Tanveer Khalid for their help and care. Very special thanks to Bilal Ahamd Cheema, who encouraged me and helped me a lot in the completion of my PhD. He never refused to help me even at awkward times. I don't have adequate words to express my gratitude to him because such a deep gratitude can only be felt. I would also like to present my gratitude to the Chairman of the Superior Group of Colleges, Chaudhry Abdul Rehman, Mrs Sumaira Rehman and the Registrar of Superior College, Pirzada Sami Ullah Sabri, who have been a source of encouragement and motivation throughout my stay at the campus.

Shazia Kousar

Table of Contents

Declaration of Originality	Error! Bookmark not defined.
Acknowledgements.....	vii
List of Tables	xiv
List of Figures	xvi
List of Acronyms	xvii
Abstract	1
Chapter 1	4
Introduction.....	4
1.1 Background of the Study.....	4
1.2 The Role of Internal Sources in Business Cycle Fluctuation.....	8
1.3 The Role of External Shocks in Business Cycle Fluctuation.....	13
1.4 Definitions of Business Cycle	20
1.5 Objectives of the Study	21
1.6 Main Research Questions.....	22
1.7 Sub-research Questions for the Study	22
1.8 Statement of Research Problem	24
1.9 Significance of the Study	26
1.10 Organization of the Study	28
1.11 Summary	28

Chapter 2.....	30
Literature Review.....	30
2.1 Literature Sources	30
2.1.1 Primary Literature Sources	30
2.1.2 Secondary Literature Sources	30
2.1.3 Tertiary Literature Sources	31
2.2 Business Cycles Framework	31
2.3 Theories Underpinning Conceptual Framework	35
2.3.1 The Classical School of Thought.....	35
2.3.2 Pre-Keynesian Approach.....	37
□ Marshall’s Model	37
□ Austrian Business Cycle Theory	38
2.3.3 Keynesian School of Thought	39
2.3.4 The New Classical School.....	42
2.3.5 Real Business Cycle Theory.....	44
2.3.6 The New Keynesians.....	45
2.3.7 The Monetarist School of Thought.....	47
2.3.8 Summary of Theories of Business Cycle Fluctuations.....	48
2.4 Review of Methodological Literature	50
2.4.1 Atheoretical Statistical Method	50
2.4.2 A Priori-Based Method.....	53

2.4.3 Oil Shocks.....	55
2.4.4 Fiscal Shocks	55
2.4.5 Investment-Specific Technical Shocks.....	56
2.4.6 Monetary Shocks	56
2.4.7 Endogenous Business Cycles Model	57
2.4.8 News Shock	58
2.4.9 Business Cycle Models and the Stylized Facts	58
2.4.10 Estimation Techniques for Business Cycle Models	60
2.5 Empirical Literature Review: Internal Shocks and Business Cycle Fluctuations.....	62
2.5.1 Financial Development and Business Cycle Fluctuation	62
2.5.2 Credit Channels and Business Cycles	63
2.5.3 Monetary Policy and Business Cycle Fluctuations	69
2.5.4 Private Household Savings and Economic Fluctuations	74
2.6 Empirical Literature Review: External Shocks and Business Cycle Fluctuations.....	77
2.6.1 Trade Openness and Business Cycle Fluctuation.....	78
2.6.2 Worker Remittances and Business Cycle	83
2.6.3 Climate and Business Cycle Fluctuation	92
2.6.4 Foreign Aid and Business Cycle	100
2.7 Summary	106
Chapter 3.....	108
Data and Methodology.....	108

3.1 Background	108
3.2 VECM	109
3.3 Econometric Model for Internal Source of Fluctuation	111
3.4 Specific Econometric Model for Internal Sources of Fluctuations	111
3.5 Specific Econometric Model for External Source of Fluctuations	114
3.6 Pre-Estimation.....	116
3.6.1 Lag Order Selection.....	116
3.6.2 Unit Root Test	117
3.6.3 Co-integration Test	118
3.6.4 Fisher Combined Johansen Test	120
3.6.5 Generalized Impulse Response Function	120
3.7 Data	123
3.8 Summary	124
Chapter 4.....	125
Empirical Results and Discussion.....	125
4.1 Introduction	125
4.2 Descriptive Statistics	125
4.3 Multicollinearity Test.....	129
4.4 Empirical Results	131
4.4.1 Unit Root Test	131
4.4.2 Lag Length Criteria	133

4.4.3 Co-integration.....	134
4.5 VECMs for Dynamic Adjustments	138
4.6 Impulse Response.....	166
4.6.1 A Case of LICS	167
4.6.2 A Case of UMICs	171
4.7 Variance Decomposition.....	179
4.8 Granger Causality Test.....	186
4.9 Summary	193
Chapter 5.....	197
Conclusion and Policy Implications	197
5.1 Summary of Findings	197
5.2 Policy Implications and Recommendations of the Study	202
5.3 Limitations and Future Research Directions	206
References.....	207
Appendix.....	241
<i>Low Income Countries (Internal Sources of Fluctuations)</i>	241
<i>Low Income Countries (External Sources of Fluctuations)</i>	247
<i>Upper Middle Income Countries (Internal Sources of Fluctuations)</i>	249
<i>VECM for Internal sources of Fluctuation For Full Sample Model 1</i>	259
<i>VECM for External Sources of Fluctuation for Full Sample</i>	265
<i>Complete Impulse Response Functions in Case of Low Income Countries</i>	268

<i>Complete Impulse Response Functions in Case Of Upper Middle Income Countries.....</i>	271
<i>Complete Analysis of Variance Decomposition in Case of Low Income Countries</i>	275
<i>Complete Analysis of Variance Decomposition in Case of Upper Middle Income Countries</i>	279
<i>Complete Analysis of Variance Decomposition in Case of LICs (External Sources of Fluctuations)</i>	283
<i>Complete Analysis of Variance Decomposition in Case of UMICs (External Sources of Fluctuations)</i>	284
<i>Complete Analysis of Variance Decomposition for Full Sample</i>	286
<i>List of Country Names Included into the Sample</i>	290
<i>Description of Variables</i>	291

List of Tables

Table 1 Descriptive Statistics for Low Income Countries	125
Table 2 Descriptive Statistics for Upper Middle Income Countries.....	126
Table 3 Descriptive Statistics for Full Sample	127
Table 4 Correlation among Variables of Internal Sources of Fluctuation	129
Table 5 Correlation among Variables of External Sources of Fluctuation.....	130
Table 6 LM Test for Autocorrelation (VECM with three lags).....	131
Table 7 Panel Unit Root Results.....	132
Table 8 VAR Lag Order Selection Criteria for Low Income Countries.....	133
Table 9 VAR Lag Order Selection Criteria for Upper Middle Income Countries.....	134
Table 10 Kao Residual Co-integration Test.....	134
Table 11 Pedroni (1999) Panel Co-Integration Tests For Internal Shocks.....	135
Table 12 Pedroni (1999) Panel Co-Integration Tests For External Shocks.....	135
Table 13 Johansen Fisher Panel Co-integration Test (Internal Shock).....	137
Table 14 Johansson co-integration Test for Full Sample (internal Sources of fluctuations).137	
Table 15 Johansen Fisher Panel Co-integration Test (External Shocks)	137
Table 16 Johansen Co-integration Trace Test for Full Sample (External Shocks).....	138
Table 17 Long-run Co-integration Equation Based on Vector Error Correction Model (internal Sources and Business cycle Fluctuation)	139
Table 18 Long-run Co-integration Equation Based on Vector Error Correction Model (External Sources and Business Cycle Fluctuation)	153
Table 19 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 4	179
Table 20 Variance Decomposition of GDP (Model 1)	180

Table 21 Variance Decomposition of GDP Full Sample (Model 1).....	181
Table 22 Variance Decomposition of GDP (Model 2)	181
Table 23 Variance Decomposition of GDP for Full Sample (Model 2).....	181
Table 24 Variance Decomposition of GDP (Model 3)	181
Table 25 Variance Decomposition of GDP Full Sample (Model 3).....	182
Table 26 Variance Decomposition of GDP (Model 4)	182
Table 27 Variance Decomposition of GDP for Full Sample (Model 4).....	182
Table 28 VEC Granger Causality/Block Exogeneity Wald Tests for Low Income Countries	189
Table 29 VEC Granger Causality/Block Exogeneity Wald Tests for Upper Middle Income Countries.....	190
Table 30 Summary of Results.....	193

List of Figures

Figure 1 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in LICs: Model 1.....	168
Figure 2 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in LICs: Model 2.....	168
Figure 3 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in LICs: Model 3.....	170
Figure 4 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in LICs: Model 4.....	171
Figure 5 Response of Economic Fluctuation to Generalized One Standard Internal Source Innovation in UMICs: Model 1.....	172
Figure 6 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in UMICs: Model 2.....	173
Figure 7 Response of Economic Fluctuation to Generalized One Standard Internal Source Innovation in UMICs: Model 3.....	174
Figure 8 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in UMICs: Model 4	175
Figure 9 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 1	176
Figure 10 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 2	177
Figure 11 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 3	178

List of Acronyms

ABCT	Austrian business cycle theory
ADF	Augmented Dickey–Fuller
AIC	Akaike information criterion
AD	Aggregate demand
BP	Band Pass
BIC	Bayesian information criterion
BIS	Bank for International Settlements
DCB	domestic credit by banks
DCP	domestic credit by private sector
DFM	dynamic factor model
ECM	error correction model
ECT	error correction term
ER	exchange rate
FDI	foreign direct investment
FPE	final prediction error
GDP	gross domestic product
GIRF	generalized impulse response function
GNP	gross national product
IMF	International Monetary Fund
LDCs	least developed countries
LICs	low income countries
LR	likelihood ratio
M2	supply of money

NBER	National Bureau of Economic Research
NI	national income
ODA	official development assistance
OECD	Organization for Economic Co-operation and Development
PR	personal remittances
RBC	real business cycle
RGDP	real gross domestic product
SEM	simultaneous equation model
SIC	Schwarz information criterion
SVAR	structural vector auto regression
TFP	total factor productivity
TO	trade openness
UMICs	upper middle income countries
USA	Unites States of America
VAR	vector auto regression
VECM	vector error correction model
WB	World Bank

Abstract

This study examines the role of internal and external shocks in business cycle fluctuation in 25 low income countries (LICs) and 17 upper middle income countries (UMICs) for the period of 1960Q1 to 2014Q4. Data for the study were obtained from the International Financial Statistics, the World Bank, International Monetary Fund and the Organization for Economic Co-operation and Development national accounts data file for selected LICs and UMICs. The study formulates a vector autoregression (VAR) model and uses quarterly time series data to investigate the impact of internal and external shocks on business cycle fluctuations.

The objectives of the study are: First, to examine what type of relationship exists between internal and external shocks and business cycle fluctuations. Second, study finds the relative contribution of internal and external shocks to business cycle fluctuations. Third, study examines causality among time series in VAR system. The fourth is to forecast responsiveness of economic fluctuation to internal and external shocks for 10 forthcoming quarters. The study estimates four models to examine the role of internal and external shocks in business cycle fluctuations in case of LICs and UMICs. In the first three models – with three different proxies of financial development – the study measures the contribution of internal shocks in business cycle fluctuation; the fourth model measures the influence of external shocks to explain business cycle fluctuations.

The study introduces financial development, monetary policy and household savings as internal sources and foreign aid, personal remittances, trade openness and climate change as external sources which can affect business cycle fluctuations. The results indicate that financial development (M2, DCB) has a negative and significant association with business cycle fluctuation in the long run in LICs and DCP has positive and significant long run

association with economic fluctuation while it has insignificant relationship with business cycle fluctuations in the case of UMICs.

Moreover, household savings positively and significantly affect macroeconomic fluctuation in the long run in LICs while in the case of UMICs; household savings are negatively associated with macroeconomic fluctuation in the long run. Furthermore, in LICs monetary policy stabilizes economic fluctuation by lowering lending interest rate while in case of UMICs contractionary monetary policy stabilizes economic fluctuation. Results also indicate that if any adverse shock to internal and external sources of fluctuations causes the economy to deviate from its equilibrium path, the adjustment process is more rapid in LICs as compared to UMICs. In the case of external sources of fluctuation, the study found that foreign aid and personal remittances negatively and significantly affect economic fluctuation while trade openness and climate change positively affect economic fluctuations in the long run in the case of LICs. However, in the case of UMICs, only trade openness plays a positive and significant role in economic fluctuations while all other external shocks have insignificant association with business cycle fluctuations. The study also found that in LICs the relative contribution of external sources to economic fluctuation is greater than the contribution of internal sources, whereas in UMICs, internal sources contribute more to economic fluctuation than external sources.

The study uses a generalized impulse response function to predict the responsiveness of economic fluctuation against one standard deviation to internal and external sources for future 10 quarters. The results of short-run Granger causality indicate that in LICs, supply of money and domestic credit by banks cause economic fluctuations in the short run while in the case of UMICs, household savings, interest rate and trade openness cause economic fluctuation in the short run.

The results of this study may help policymakers to take decisions about financial and real sector development to keep the economy on a certain trend growth path. Moreover, this study will benefit and help future researchers by providing data and information regarding an active set of internal sources- financial development, monetary policy, household savings- that are manageable by a policymaker and a set of external sources- foreign aid, personal remittances, trade openness and climate change - on which policymakers can have little control. Besides, it would also help researchers in the field of banking and economics in further understanding of making use of the VAR framework to find causality dimensions and establish a point of direction for the policymakers with concrete evidence. The study also contributes to the literature by establishing causal relationship between internal and external shocks and business cycle fluctuations.

Keywords: *fluctuations, variance, impulse, VAR, trade openness, foreign aid, M2, DCB, DCP, monetary policy*

Chapter 1

Introduction

1.1 Background of the Study

Economic change is a law of life and is generally associated with business prosperity and recession. The literature refers to this economic variation as business cycles. Economic history discloses endless variations in economic conditions. Humans experienced economic instability when they earned their livelihood by hunting, fishing and cultivating crops and they experience it even now when he using modern tools of commerce, industry and finance. Therefore, the history of economic instability is as old as the economic life of humans.

Before the late 1920s, economic fluctuations were expected to re-occur periodically and were considered normal, so, no serious attempt was made to identify the causes of economic fluctuation or to propose stabilizing policies to regulate these economic variations. However, when the United States of America and, indisputably, the industrial economies of the world experienced a disastrous economic collapse during the 1930s and its tragic effects – 20 to 25% decline in total production, 25% unemployment in USA and Britain and 40% in Germany – engulfed the global economy, economists reviewed their approach to business cycles. They realized that to save the economies of the world from unwanted fluctuation in economic activities they needed to find the sources of economic fluctuation and distinguish internal from external sources of disturbances (Altug, Neyapti, & Emin, 2012).

Since then, the theoretical and empirical literature has been divided into two main standpoints. One standpoint in the literature uses general equilibrium models to assign a distinctive role to neutral technology shocks in the fluctuation of business cycles (King & Rebelo, 1999). The other standpoint uses the structural vector autoregression (SVAR) model

to identify internal and external disturbances as the main sources of the fluctuation of business cycles and finds that neutral technology shock is unable to explain more than one-quarter of output fluctuations (Christiano, Eichenbaum, & Vigfusson, 2004; Cochrane, 1994; Fisher, 2006; Galí & Rabanal, 2005; King & Rebelo, 1999; Shapiro & Watson, 1988; Caldara & Herbst 2015). Therefore, in order to answer the experts' question "What causes a business cycle?" one must recognize the role of governments' decisions, the role of financial market participants and unexpected events, "external shocks", in economic activities.

During the last two decades, the economic growth of developing economies has been highly unstable and economic fluctuation has become more serious and important in low income countries (LICs) and upper middle income countries (UMICs); for example, Loayza and Hnatkovska (2004) stated that the economic performance of 40 developing countries is highly volatile. Among these 40 highly volatile economies not only small economies, such as the Dominican Republic or Togo, but also large countries, such as China and Argentina, are experiencing macroeconomic fluctuations. Moreover, in LICs, a high volatile growth rate can spread chronic poverty among much of the population.

It has been observed that the universality of domestic and unexpected shocks in developing economies causes a high degree of fluctuations in economic activities. To understand why developing nations' economic activities are highly volatile and plunged into critical recession, it is necessary to investigate the internal and external sources of fluctuation in economic activities because any shudders to these fundamentals can cause a sudden collapse of development indicators and push the financial and non-financial sectors into a critical economic setting. Economists identified many kinds of internal and external shocks that played a role in the Asian recessions of 1970 and 2007 to 2008, including collapse of the gold standard (Huffman & Lothian, 1984), global financial imbalance (Matziorinis, 2007), weak economic and financial fundamentals (Zhuang & Dowling, 2002), monetary policy (Kiyotaki

& Moore, 2012), global imbalances (Glick & Rogoff, 1995) and sloppy financial regulation (Verick & Islam, 2010). Conclusively, weak fiscal position, limited export diversification and policy buffers made the low income countries more open to the external shock and strongly reduced their ability to handle these shocks.

The framework of this study assumes that macroeconomic variables have a behavioral relationship, but internal and external shocks have the ability to disrupt this relationship occasionally and destabilize the economy and plunge it into recession. The behavioral relationship between macroeconomic variables guides an economist about returning the economy back to an equilibrium and full employment; the economy reaps the benefits of full employment until another significant internal or external shock upsets the economic scenario.

The structural characteristics of developing nations, such as a higher reliance on foreign direct investment (FDI), remittances, foreign aid, trade openness (TO) and climatic conditions, make them more open to external shocks and structuralism blamed these external shocks implicitly or explicitly for volatile performance in least developed countries (LDCs). The structural characteristics of LDCs highlight the dependence of business activities on factors that are least affected by the policymakers of LDCs. Moreover, inefficient and poor administration fails to utilize these resources appropriately, which upsets economic activities and pushes the economy into recession. Therefore, identification of structural characteristics is important for low developing economies.

The major problem that developing and emerging economies are facing is sharp and persistent economic fluctuations; empirical studies claimed that in developing nations, a reduction in societal welfare (Gavin, Hausmann, Perotti, & Talvi, 1996), low investment in human capital (Flug, Kaliner, & Ribon, 2000; Ramey & Watson, 1997), low private investment in economic growth and increase in poverty rate are possible internal causes of

economic performance diverging from its regular path. However, in poor African nations, external shocks were a more significant source of output fluctuations during the 1990s (Raddatz, 2008); for example, an external oil price shock significantly disturbs the economic performance of poor nations. However, the role of TO, remittances, foreign aid and climatic conditions in the business cycle as external sources is neglected. Moreover, a recent report from international agencies declared that growth, macroeconomic stability, debt sustainability and poverty in developing countries are highly sensitive to these exogenous shocks (IMF, 2006). Additionally, the report claimed that international trade shocks, the vulnerability of these economies, bad climate and other unexpected adverse shocks significantly influence economic growth and the incidence of poverty in LICs.

Therefore, importance of external shocks depicts developing nations as a bystander, inability to achieve a sustainable and stable economic performance without experiencing major changes in their production structures, and portray gloomy perspective of these economies. Moreover, the dependence of economic growth on factors that are beyond the reach of the policymakers of LICs harms the economy and gives birth to economic fluctuation. Consequently, it is critical for LICs to quantify the effects of external shocks on economic performance and their relative importance in large cyclical fluctuations as compared to internal factors.

In the literature on the internal sources of shocks, the absolute as well as relative importance of internal political instability and mismanagement of economic activities is debated (Acemoglu, Johnson, Robinson, & Thaicharoen, 2003; Ahmed, Levin, & Wilson, 2004), but the debate is more divergent on the role of monetary policy and financial development as a possible source of fluctuation in the economic activities of poor nations (Galí, 2002; Iacoviello, 2005a; Nolan & Thoenissen, 2009). Therefore, the quantitative effects of internal and external shocks and their relative importance in macroeconomic fluctuation is a point of

discussion in modern dynamics of macroeconomics. No doubt, external shocks are a potential source of economic fluctuation in LICs (Senhadji, 2003; Sosa, 2008) because policymakers cannot influence these shocks, but the role of internal shocks in poor nations cannot be overlooked (Stock & Watson, 2005). A large number of empirical studies (Christiano & Eichenbaum, 1992; Gali, 1996; Shapiro & Watson, 1988) have been conducted to investigate the sources of business cycle fluctuation to save the poor nation from devastating effects of economic fluctuation during the last three decades but still the consensus on internal and external sources is absent.

The term business cycle has a long tradition in macroeconomics. Burns and Mitchell (1946), founders of the National Bureau of Economic Research (NBER), stated that a business cycle is the alternation between a period of expansion and recession in economic activities. Later, Nelson and Plosser (1982) proposed that a business cycle is a transitory fluctuation of economic activities from trend level; they proposed that a business cycle could be measured by using a time series forecasting model.

This study uses Nelson and Plosser (1982) definition of a business cycle: a temporary fluctuation of economic activities from a certain trend level. The aim of this study is to explain the shocks that cause a business cycle rather than attributing the cycle to shocks. This study improves our understanding of internal and external shocks and explains the majority of fluctuations as an observable and an explainable product so that purposeful economic decisions and predictions can be made to avoid recession.

1.2 The Role of Internal Sources in Business Cycle Fluctuation

After the Great Depression, revolutionary changes in theoretical literature took place. In the 1930s, Keynes severely criticized classical economists who believed that ups and downs in economic activities would recover after a few years of economic decline due to automatic

forces and would produce no disturbance in the economy. Keynes believed that fiscal policy is an effective tool to stabilize economic disturbance by affecting the demand and supply side of the economy and it had the ability to save the economy from undesirable fluctuations. However, in the 1960s, Friedman formulated monetarism; he proposed the famous “K-percent” money growth rule to stabilize economic fluctuation (Woodford, 2001). Therefore, the literature of business cycles recognizes that monetary policy significantly contributes to business cycle fluctuations and, in particular, unexpected monetary decisions have a six times larger impact on output variation than traditional typical assessments (Bernanke & Gertler, 1995). During the past 40 years, macroeconomists have investigated the role of monetary policy on aggregate output and established that great inflation and commodity prices caused the boom of 1970 (Barsky & Kilian, 2002). Friedman and Schwartz (1975) postulated in their influential book- *“Money and business cycles The State of Monetary Economics”*- that there is a link between monetary policy and fluctuations in business activities. Furthermore, empirical as well as theoretical literature refined this postulation by identifying different domestic policy variables as sources of fluctuation; the quantity of money, inflation and lending interest rate were realized to be common internal sources of economic fluctuations (Buckle, Kim, Kirkham, McLellan, & Sharma, 2007; Kingori, 2015).

Although the literature agrees that monetary shocks affect economic fluctuation, the nature of affect and size is still questioned. Moreover, some studies, including that of Sims and Zha (1998), argued that although monetary policy plays a significant role in producing a period of boom, it does not have an effective role in depression and is unable to protect the economy from recession in LICs; however, Canova and Nicolo (2002) disagreed and presented evidence of the significant contribution of monetary policy to generate recession in G7 countries. The lack of consensus led researchers to investigate the role of monetary policy in

business cycle fluctuation (Bernanke, Gertler, & Gilchrist, 1999; Khan & Senhadji, 2003; Schich & Pelgrin, 2002).

During the last few decades the role of financial market development in propelling economic growth has been discussed and debated enormously in the literature. However, the literature reveals divergent opinions on the relevance of financial system to aggregate real economic activities. The first demonstration of the interdependence of real economic decisions and financial considerations was presented by Modigliani and Miller (1958) but after some time this view was not promoted in the macroeconomic literature. However, during the last decades, transaction cost and imperfect information provided the rationale to study financial market behavior in the macroeconomic literature again. In developing economies, financial market imperfection affects the process through which an economy reacts to aggregate disturbance and this disturbance produces business cycle fluctuation in poor nations. The theoretical literature strongly assumed that the creation and promotion of an efficient financial market, amended risk, improved corporate governance, proper mobilization of savings and a reduction in transaction and information costs, are necessary for a genuine and enduring economic growth process (Kunt & Levine, 2008; Levine, 1997).

Although numerous studies provide empirical support for the theoretical conjecture of a positive association between financial development and economic growth, (Kiprop, 2013; Oppong, 2013), but empirical studies neglected the relationship between financial development and macroeconomic fluctuation or business cycle (Darrat, Abosedra, & Aly, 2005). Moreover, some empirical studies found that the availability of credit to the private sector is necessary to reduce economic fluctuations (Easterly, Islam, & Stiglitz, 2001; Huizinga & Zhu, 2006). Other studies documented the relevance of financial factors on firms' investment decisions and emphasized that if credit is fully secured by collateral and agency cost is minimal, then the economy will move on a certain trend growth but any small

shock could have a large and persistent effect on aggregate economic activities (Kiyotaki, 1998; Kocherlakota, 2000). Therefore, it has been observed that a developed financial system stabilizes economic performance in developed economies; it has also been recognized that a developed financial system is a soothing tool for the economy at a time of fluctuation but, in poor nations, the business cycle literature provides rigorous evidence that any shock to financial development generates significant business cycle fluctuation because the money market of poor nations is not well organized and does not follow knitted monetary policies appropriately (Beck, Lundberg, & Majnoni, 2001). Therefore, countries that have a well-developed credit market experience less fluctuation in output and income and are able to control economic disturbance more easily over time as compared to countries that have a less developed financial market. Moreover, smoother fluctuations with a high level of credit as a share of gross domestic product (GDP) are experienced in industrialized economies while LICs with a smaller credit market are at greater risk of investment and output fluctuation. Therefore, credit shocks generate and amplify economic disturbance and the persistence of shock also deviates economic performance from its long-run trend growth.

The emerging literature tries to explain the role of financial development in growth fluctuations and to connect growth fluctuations with business cycle model (Aghion et al., 2010). According to Elbadawi, Schmidt-Hebbel, Soto, and Vergara (2011), high financial development is associated with minor and negligible growth instability, whereas Easterly et al. (2001) find that credit market development and growth unpredictability are linked in a linear way. Moreover, on the one hand, empirical evidence shows a negative association between financial depth and economic fluctuation because the financial sector diminishes output fluctuations by increasing and smoothing possibilities in production and consumption; on the other hand, a large financial system with too much opportunity for private credit may have an opposite effect and increase fluctuation in economic activities (Aghion et al., 2010).

The ambiguous empirical relationship between financial development and fluctuation in macroeconomic activities is a phenomenon that can be investigated. This study also investigates the role of household savings in the dynamic fluctuation of macroeconomic activities of developing economies. During the last decade, the USA, the United Kingdom (UK) and many developed economies experienced financial crises and the resultant great recession of 2007 to 2009 was due to great variation in household saving (Adema & Pozzi, 2015). From the 1960s to the 1980s, the USA experienced a long stability in household saving and in economic activities, but then a decline from the 1980s to 2007 and a considerable increase from 2008 to 2011 in household saving caused massive fluctuation in the macroeconomic activities of the US economy (Carroll, Slacalek, & Sommer, 2012). Similarly, in advanced economies it has been observed that greater labor income uncertainty during the last decade caused a greater variation in household saving, which strongly affected aggregate consumption and GDP growth, and resultantly these economies observed the great recession of 2008–2009 (Mody, Ohnsorge, & Sandri, 2012).

Although, a substantive empirical literature investigated the factors that affect household saving and more generally private saving rates in economies (Edwards, 1996; Loayza, Hebbel, & Servén, 2000; Masson, Bayoumi, & Samiei, 1998), few studies provide direct evidence about the relationship between household saving and macroeconomic fluctuation. If household consumption makes a greater contribution to aggregate demand, then a small change in saving pattern can magnify or dampen variations in economic growth. This study focuses on the way in which household saving affects aggregate economic fluctuation rather than centering on the determinant and cyclical behavior of private savings. The motivation to include household saving in the set of internal sources of macroeconomic fluctuation is based on earlier empirical evidence. Earlier empirical studies reported a significant role of precautionary motives in explaining the accumulation, and variation, of wealth by

individuals. Studies identified that households who have greater income risk have a greater motivation to accumulate (Carroll & Samwick, 1998) and this variation in wealth accumulation may further significantly amplify macroeconomic fluctuations. Therefore, a sound knowledge of the contribution of household saving to macroeconomic fluctuation is crucial because it will provide guidance to policymakers in providing appropriate policies to affect the economic environment.

1.3 The Role of External Shocks in Business Cycle Fluctuation

One of the most prominent features of low and UMICs is fluctuation in their macroeconomic activities. The frequency and magnitude of disturbance in macroeconomic activities has negative effects on welfare (Blyde, Daude, & Fernández-Arias, 2010) as well as deleterious and persistent effects on income distribution and poverty (Calderón & Yeyati, 2009). In developing nations, business cycle fluctuation reflects two important realities, first these countries are more exposed to external shocks such as trade openness, personal remittances, foreign aid, and climate conditions, and second, they have a lower ability to absorb these shocks.

The impact of trade openness affect business cycle fluctuations is higher in developing nations than developed economies because at initial stages of growth, LICs are taking bold steps to accelerate the process of trade liberalization (Tomz & Wright, 2007). The last two decades have witnessed rapid increases in trade integration in general within economies of the world and particularly in developing nations. Among developing nations, the countries that are more integrated horizontally as well as vertically as a result of a tight knit supply chain network across the region have greater exposure to trade shocks. Although, in theory, trade liberalization lifts aggregate economic activities by introducing specialization in production process on the one hand, while on the other hand it may cause a sudden collapse

in domestic production (Charlton & Stiglitz, 2008; Torres & Vela, 2003) if the developing economies lose their access to international markets (Arellano & Mendoza, 2002; Mendoza, 1991; Mendoza & Uribe, 2000).

In the macroeconomic literature, a growing body of empirical work investigated the argument in favor of a link between trade liberalization and macroeconomic disturbance (Wacziarg & Welch, 2008); some authors found that trade and financial liberalization reduce the amplitude of the business cycle, whereas other studies (Romain Ranciere, Tornell, & Westermann, 2006) found that trade liberalization may increase the probability of large but rare crises. Therefore, the impact of TO on output fluctuations is not clear. On the one hand, higher trade integration contributes to potential gain in growth and welfare by providing greater access to international markets and minimizing country-specific risk while, on the other hand, higher trade integration leads to greater fluctuation in output as they lose their share in international markets. Therefore, it has been concluded that higher TO brings vibrant changes in the production pattern of tradable industries and could generate fluctuation in aggregate economic activities because more open economies have a lower ability to react to specific shocks in traded industries and their transmission across countries.

The empirical literature is unable to present a clear picture of the significant impact of trade liberalization on the economy's overall long-term output fluctuations. There has been much discussion in the empirical literature on the view that trade integration causes business cycle synchronization (Baxter & Kouparitsas, 2005; Haan, Inklaar, & Pin, 2008; McKinnon, 1963; Mundell, 1961), but the size of influence of trade integration on country-specific macroeconomic fluctuations is a less researched area. Moreover, as trade and financial integration increases among the economies of the world, concerns about the impact of globalization on economic activities have grown (Abiad, Mishra, & Topalova, 2014) and

efforts have been made to investigate the role of trade integration in economic disturbance in the theoretical literature as well as in the empirical literature.

Another important factor that affects economic activities in LICs is a sizeable migration of labor toward developed economies. Worldwide it has been observed that the number of foreign born residents is increasing over the last few decades, almost 13% of the population of the US economy was foreign-born residents in 2007 while it was less than 6% in 1980. Moreover, a similar pattern exists in several Organizations for Economic Co-operation and Development (OECD) countries (Borjas, Grogger, & Hanson, 2008). Emigrant workers send what money they have left after meeting their own expenses to their families and relatives who were left behind to maintain a certain standard of living. Migrant workers face a range of choices concerning the share of funds to be transferred to their home country. Emigrants also keep a certain percentage of their savings in the form of an investment in their home country that depends on the rate of return on investment on these assets. Therefore, remittances affect economic activities by changing consumption and investment patterns in the home country. During the nineteenth and twentieth centuries, it has been observed that a drastic downward remittances pattern causes recession in US economic activities, while a larger inflow of remittances helps the economy to move toward a revival (Neale, 1932). The importance of remittances in poor nations cannot be overlooked because most emigrants are from poor nations.

The existing literature is mostly concerned with the determinants of remittances (Sakka & McNabb, 1999; Faini, 1994; Lianos, 1997) and the effects of remittances on the economic growth of the home country (Sakka & McNabb, 1999; Sayan, 2004), it pays less attention to whether these remittances have any relationship with macroeconomic fluctuation. The empirical literature agrees on the role of remittances in current accounts of many surplus economies of the Mediterranean and elsewhere in the world, which were persistently facing a

balance of payment deficit. Turkey and Albania are two of the top remittances-receiving countries; Turkey received remittances six times larger than FDI while Albania received remittances that were more than nine times greater than FDI in the 1990s. Therefore, the macroeconomic conditions attracted remittances inflow in the home country; there is no doubt in the literature that these induced remittances significantly help developing economies to improve their balance of payments and other macroeconomic imbalances, whereas a shortage of remittances create imbalance in macroeconomic activities. Thus, in developing economies an inflow of remittances is considered an alternative source of foreign exchange receipts, so a higher share of remittances in current account balance increases the degree of dependence of policymakers on remittances in these countries. Therefore, any swing in remittances flow, produces fluctuation in current account balance with serious macroeconomic effects.

The empirical literature documents that remittance is a more stable component of balance of payments than export, FDI and official development assistance (ODA), but the relationship between the inflow of remittances with economic fluctuations is not clearly described in the existing literature (Gupta, Pattillo, & Wagh, 2009; Marwan, 2011; Neagu & Schiff, 2009; Salahuddin & Gow, 2015). At a macroeconomic level, remittances mitigate bad shocks when remittances are countercyclical while procyclical remittances threaten macroeconomic stability by exacerbating the domestic business cycle (Giuliano & Arranz, 2009; Lueth & Arranz, 2007a). Therefore, in some cases remittances are in alignment with the business cycle (Acosta, Lartey, & Mandelman, 2009). Some studies document that remittances are countercyclical while some document that remittances are more procyclical in countries that have a less developed financial system (Giuliano & Arranz, 2009). Therefore, overall, the role of remittances is ambiguous in the literature.

In LICs, another important exogenous source of fluctuation in output is foreign aid, a flow of financial and non-financial resources from developed countries toward developing economies, because LICs are heavily dependent on foreign aid to execute their developmental projects successfully. It has been observed that most of the time foreign aid is highly volatile and exhibits business cycle properties; foreign aid is strongly and positively correlated with the business cycle in African countries in which 12.5% of GDP is from foreign aid and is a main source of foreign capital. Therefore, irregular ups and downs in the economic activities of less developed countries are more regular than in industrialized countries and the welfare cost of massive macroeconomic disturbance may have larger consequences for the economies of developing nations (Stéphane Pallage & Robe, 2001). However, it is very difficult for developing nations to adopt customary ways to smooth output fluctuation. For example, moral threats and disclaimer risks deprive heavily indebted nations of new loans or they are asked to repay old loans especially when economic activities are suffering adverse shocks (Asiedu & Villamil, 2002). Foreign aid is expected for emergency relief, to fuel economic development and act as an insurance device in a time of need, but it is not clear that one should expect foreign aid to dampen or widen business cycles fluctuations. Therefore, aid disbursement patterns to developing nations contribute to fluctuations in disposable income and output of developing countries.

In development economics, one of the most controversial issues is the effectiveness of foreign aid. The literature identifies three different distinct viewpoints. First, there are studies that proposed that foreign aid is harmful and ineffective for economic progress because it generates Dutch disease (the negative impact on an economy of anything that gives rise to a sharp inflow of foreign currency, such as the discovery of large oil reserves, huge inflow of foreign aid), nurtures corruption and does not allow countries to take advantage of the opportunities provided by the global economy (Booth, 2012; Wright & Winters, 2010). The

second group of scholars suggested that higher levels of foreign assistance help poor nations to alleviate poverty and foster economic progress (Angeles & Neanidis, 2009; Stiglitz, 2002). These evidences require us to rethink about aid effectiveness in macroeconomic activities. The third group of studies although less vocal in the literature, identified an effective and specific role of aid for those countries that are trapped in perpetuating destitution and are trying to foster macroeconomic activities (Banerjee, 2011; Collier & Hoeffler, 2007). Therefore, the literature does identify the role of foreign aid in economic activities but it is silent about the role of foreign aid in business cycle fluctuations.

Another important external source of macroeconomic fluctuation is climate change; the scientific literature agreed on one point that the Earth's atmosphere is rapidly becoming warm because of greenhouse gas emissions, which are changing the Earth's climate. Changes in the Earth's climate are expected to bring changes to economic activities by affecting, specifically, production in the agriculture sector. Traditional theories of business cycle widely acknowledged that climate influences economic performance significantly and that good weather can induce boom while bad weather can cause recession. A few studies discussed various weather and climatic conditions, high temperature, heavy rains and disaster (Dell, Jones, & Olken, 2013) which can disturb economic activities.

Recent literature focuses on the relationship between climate conditions and economic activities because researchers are now concerned about sustainable economic growth rather than only growth. There is no doubt that climatic conditions affect economic activities and play a significant role in the achievement of sustainable economic growth (Jahn, 2013). Moreover, there is dual relationship between sustainable economic growth and climate change: climate change affects the basis for social and economic development (natural and human living condition) but commitment to development can lead to the emission of greenhouse gases which significantly contribute to climate change.

Sudden changes in climate disrupt the economic process and cause fluctuation in economic activities, which may lead toward business cycle fluctuation. The role of climate on the agriculture sector in advanced nations is well documented, but its impact on aggregate economic activities within complex and poor nations is an under-researched area (Mendelsohn & Dinar, 1999; Olesen & Bindi, 2002). In particular, the correlation between climate and aggregate economic activities has been examined, which is observed in microdata from industrialized countries and may or may not be apparent in existing macro-studies. If wealthy nations are unaffected by climate, then it indicates that human-made capital and climate are substitutable in economic activities, but the relationship between climate and aggregate economic activities in poor nations where human capital is not as developed is not properly addressed in the empirical literature.

During the last decades, changes in climate have been documented (Luterbacher, Dietrich, Xoplaki, Grosjean, & Wanner, 2004) and a further future increase in temperature is expected by researchers (Stocker et al., 2013). Therefore, there is a dire need to investigate the impact of climate change on the economic activities of poor nations, so that policies can be designed for future economic activities. Although there has been extensive theoretical discussion in the literature on the general and economic impacts of climate (Bosello et al., 2009; Bosello et al., 2012; Bosetti et al., 2008), few empirical studies have investigated the effects of climate change on aggregate economic activities. A systematic analysis of climate in relation to economic fluctuations is still absent in the literature. Therefore, this study fills the gap in the literature by investigating the effect of climatic conditions on macroeconomic fluctuations. The study used the emission of greenhouse gases to investigate the impact of climatic conditions on business activities because greenhouse gases are the most relevant factor that affects business activities in low and UMICs where orthodox technologies are still being used.

1.4 Definitions of Business Cycle

The sequential movement between a series of clearly identifiable phases in a recurrent or periodic fashion is known as a “cycle”. In the nineteenth and twentieth centuries, economists observed a cyclical pattern in the overall level of economic activities and named these observed regularities as business cycles. The most systematic and still-enduring empirical interpretation of these phases was provided by Mitchell (1927) and Burns and Mitchell (1946). According to Burns and Mitchell (1946), the standard definition of business cycle is:

“Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; in duration, business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar characteristics with amplitudes approximating their own”.

This definition of business cycle has two main features. First, and the centerpiece of Burns and Mitchell’s (1946) definition, is the co-movement among the series taking into account possible leads and lags in timing. The second key feature is the division of a business cycle into two separate regions. In their definition, Burns and Mitchell (1946) considered the historical behavior of hundreds of series in their analysis and used the clusters of turning points in these individual series to determine the monthly dates of the turning points in the overall business cycle. Moreover, on the basis of the general state of business conditions, their analysis classified certain series into leading and lagging indicators of the cycle. However, Tinbergen (1939) used a linear difference equation as a tool of analysis and focused on the time-series properties of few macroeconomic aggregates to define a business

cycle. Another popular approach to defining a business cycle was presented by Lucas (1977). Lucas (1977) stated business cycle as a repeated deviation in aggregate output around a trend which are also associated with co-movements in prices, output and other macroeconomic time series.

According to the NBER, a business cycle has two prominent phases: revival and recession. Revival is considered to be the period between a trough and a peak and a recession is the period that starts at the peak of a business cycle and ends at a trough. Briefly, Leamer (2008) defines a recession as, “a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP (RGDP), real income, employment, industrial production, and wholesale-retail sales.” All the definitions focused on the repeated nature of fluctuations in aggregate economic activity while making attempts to model a business cycle. The objective of business cycle theorists is to develop a theoretical model which can determine the causes that drive business cycle fluctuations.

1.5 Objectives of the Study

The objectives of the study are to:

1. Investigate a long-run/short-run relationship between internal shocks and business cycle fluctuation in LICs & UMICs.
2. Examine a long-run/short-run relationship between external shocks and business cycle fluctuation in LICs & UMICs.
3. Examine the relative contribution of internal and external shocks to business cycle fluctuation in LICs and UMICs.
4. Investigate the direction of causality between internal and external shocks and business cycle fluctuations in LICs and UMICs.

5. Forecast the response of business cycle fluctuation in time $t + n$ when one standard shock is given to VAR, system at time t while no other shock hits the system in LICs and UMICs.

1.6 Main Research Questions

The main purpose of this study is to develop a common set of internal and external forces that causes business cycle fluctuation from the perspective of the combination of business cycle theories and empirical evidence in the context of developing nations.

Thus, the main research questions have been developed and defined as:

1. What are the internal and external driving forces behind the cyclical fluctuations in the aggregate economic activity of LICs and UMICs?
2. What is the relative contribution of internal and external shock in macroeconomic fluctuations?
3. What is direction of causality among internal & external shocks and macroeconomic fluctuations?
4. How do internal and external shocks affect macroeconomic fluctuations in a forecasted period?

1.7 Sub-research Questions for the Study

1. What type of relationship exists between internal shocks – financial development, saving, population and interest rate – and business cycle fluctuation in LICs?
2. What type of relationship exists between external shocks – foreign aid, TO, PR and climate changes – and business cycle fluctuation in LICs?
3. What type of relationship exists between internal shocks – financial development, saving, population and interest rate – and business cycle fluctuation in UMICs?

4. What type of relationship exists between external shocks – foreign aid, TO, PR and climate changes – and business cycle fluctuation in UMICs?
5. What is the relative contribution of internal shocks to business cycle fluctuation in LICs?
6. What is the relative contribution of internal shocks to business cycle fluctuation in UMICs?
7. What is the relative contribution of external shocks to business cycle fluctuation in LICs?
8. What is the relative contribution of external shocks to business cycle fluctuation in UMICs?
9. Is there a long-run/short-run relationship between internal sources and business cycle fluctuation in LICs?
10. What is the direction of causality between internal sources and business cycle fluctuations in LICs?
11. Is there a long-run/short-run relationship between external sources and business cycle fluctuation in LICs?
12. What is the direction of causality between external sources and business cycle fluctuations in LICs?
13. Is there a long-run/short-run relationship between internal sources and business cycle fluctuation in UMICs?
14. What is the direction of causality between internal sources and business cycle fluctuations in UMICs?
15. Is there a long-run/short-run relationship between external sources and business cycle fluctuation in UMICs?

16. What is the direction of causality between external sources and business cycle fluctuations in UMICs?
17. What is the response of business cycle fluctuation in time $t + n$ when one standard shock is given to VAR, system of internal sources at time t while no other shock hits the system in LICs?
18. What is the response of business cycle fluctuation in time $t + n$ when one standard shock is given to VAR, system of internal sources at time t while no other shock hits the system in UMICs?
19. What is the response of business cycle fluctuation in time $t + n$ when one standard shock is given to VAR, system of external sources at time t while no other shock hits the system in LICs?
20. What is the response of business cycle fluctuation in time $t + n$ when one standard shock is given to VAR, system of external sources at time t while no other shock hits the system in UMICs?

1.8 Statement of Research Problem

The empirical literature emphasized the need to understand and distinguish between determinants that cause fluctuation in economic activities in the short run as well as in the long run (Agénor, McDermott, & Prasad, 2000; Lane, 2003). Short-run analysis helps to regulate the economy while long-run analysis provides the basis for a longer term planning process. This study aims to identify the shocks that drive business cycle fluctuations in developing nations and to classify them as internal or external shocks. To have a deeper understanding of and to make reliable predictions about the economic performance of developing nations, it is necessary to investigate the aggregate behavior of macroeconomic variables, the causes of a business cycle and the driving forces of business cycle fluctuation.

The academic literature emphasizes that empirical investigations of business cycle theories should be conducted to develop critical business cycle literature. Although, economists have carried out significant research in the field of empirical evidence on business cycle theory, much empirical literature is still absent. This study will fill the gap within the literature and enhance understanding of business cycles and causes of business cycle fluctuation by introducing a distinction between internal and external shocks that can create an economic disturbance. Specifically, this study investigates the domestic and external shocks that drive business cycle fluctuation in LICs and middle income UMICs.

In LICs, efforts are made to design and implement appropriate policy in response to each event. In LICs, boom and recession periods do not differ very much because the consequences of the preceding period are dragged into the following period. This study contributes to the literature by identifying the variety of exogenous and endogenous shocks that can seriously affect the economic situation, particularly sharp fluctuations in GDP. This study categorizes these shocks into internal shocks – financial development, domestic household saving, interest rate – and external shocks – remittances, TO, foreign aid, and natural climate. This study used population as a control variable to forecast the true impact of internal sources on economic disturbances.

This study helps economists and policymakers who are facing considerable challenges while making appropriate policies for the development of the economy because of the deep economic crises that pervade these economies. This study helps policymakers by classifying the sources of shocks; it identifies sources that policymakers can utilize according to the situation and the sources that are beyond their influence. Therefore, on the basis of this segregation of the sources of economic disturbance they can make more influential policies to keep the economy on a predetermined growth path.

1.9 Significance of the Study

This study examines the short-run and long-run relationship of internal and external sources with macroeconomic fluctuation and the relative contributions of internal and external shocks to economic fluctuations in LICs and UMICs. The study also predicts the future behavior of macroeconomic fluctuations against one standard deviation to internal and external sources.

The study contributes to the existing literature theoretically and empirically in several ways. First, this study extends the work of Raddatz (2007) by incorporating external shocks and internal shocks that are considered empirically relevant for LICs. Second, the study formulates a VAR model incorporating the role of financial development, household saving and monetary policy as internal shocks and foreign aid, TO, PR and climate change as external shocks for 25 LICs and 17 UMICs. Third, we estimate our model with the vector error correction model (VECM) technique for LICs and UMICs separately to capture the heterogeneity that may exist among these economies. Fourth, the thesis evaluates the quantitative significance of the internal and external shocks to business cycle fluctuations in LICs and UMICs. Therefore, this study contributes to the existing literature in four respects. First, the study introduces an active set of internal shocks and external shocks for both LICs and UMICs. Second, the study estimates the relative importance of internal and external shocks to macroeconomic fluctuation. Third, this study forecasts the future behavior of economic fluctuation when a shock is given at one time series in the VAR system. Fourth, the study recognizes leading indicators for economic fluctuation.

Moreover, this investigation is also relevant for practical purposes.

1. *Policymakers*: The empirical results of this study are relevant to the ongoing debate on internal and external source of fluctuations in aggregate economic activities. Among internal sources of fluctuation, the financial sector has strong linkage with business cycle fluctuations (Ariccia, Igan, & Laeven, 2009). The results of this study

may help policymakers to take decisions about financial and real sector development to keep the economy on a certain trend growth path. Moreover, an understanding of the relationship between internal sources – financial development, interest rate, saving behaviors – and business cycle fluctuation helps a policymaker to design appropriate policies to strengthen financial development, so that the severity of risk associated with different stages of credit and business cycle fluctuation can be taken into account. Moreover, the study helps policymakers to utilize the tool of interest rates and household saving in such a way that can offset their negative impacts on economic activities. Similarly, a better understanding of the significance and relevance of credit, supply of money, interest rates and household saving help monetary authorities to take informed decisions in a challenging economic environment. Moreover, a causal relationship between internal and external sources and economic fluctuations helps policymakers to design country-specific policies. The results of this study also help policymakers to design policies regarding foreign aid, remittance and TO, so that they can play their role in the process of development.

2. *Academics and Researchers:* The recent crisis in developing economies has renewed the focus on the relationship between internal and external sources and business cycle fluctuations. As a result, further studies are going to be conducted to identify sources of fluctuation in developing economies. This study will benefit and help future researchers by providing data and information regarding an active set of sources that are manageable by the policymaker and a set of external sources that are hard for policymakers to affect. It will also help researchers in the field of banking and economics in further understanding the nuances in making use of the VAR framework to find causality dimensions, so as to point the direction of movement to policymakers with the support of concrete evidence. The study also contributes to the literature by

establishing causal relationships between internal and external shocks and business cycle fluctuations.

1.10 Organization of the Study

The remaining study is organized as follows. Chapter 2 is a review of the literature and it is divided into seven sections. Section 2.1 presents literature sources while Sections 2.2 and 2.3 of Chapter 2 present a review of theories related to business cycles, Section 2.4 presents a methodological review and Sections 2.5 and 2.6 examine the sources of macroeconomic fluctuations in developing economies with the help of empirical literature. Chapter 3 presents background of the methodology and the significance of VECM and discusses an important preliminary test for VECM. In Chapter 4, the empirical results are presented and discussed; the effectiveness of internal and external sources to mitigate macroeconomic fluctuations in developing nations is evaluated. Finally, chapter 5 concludes the study with policy implications and recommendations.

1.11 Summary

Chapter 1 presents a brief introduction to the thesis. It establishes that business cycle fluctuations or macroeconomic instability is the practical depiction of an issue that has received substantial attention in the theoretical and empirical literature in recent years, especially since the 1990s.

Chapter 1 identifies three internal and four external factors which cause fluctuations in GDP growth. These fluctuations further affect other social indicators like poverty, inequality and the welfare level of society in the long run. However, consecutive data on social indicators are not available because household and living standard surveys are not conducted regularly in developing countries. Therefore, the present study investigates internal and external causes

(determinants) of macroeconomic fluctuations in 25 LICs and 17 UMICs. In Chapter 1 it is established that the role of internal and external sources of fluctuation has been on the theoretical and applied research agenda for economists and policymakers since the evolution of macroeconomics. Although macroeconomic instability strongly affects the economy, the size of impact differs across economies depending on the structural characteristics of the economies. In the context of LICs, sharp and persistent economic fluctuations are observed; thereby, determining the driving forces of business cycle fluctuation is crucial.

Chapter 1 presents a general introduction to the internal and external sources of business cycle fluctuation; it then provides the definition of business cycle for this study, the objectives of this study, the research questions and the significance of the study. The theoretical and empirical contributions of this thesis to the literature are explained. Finally, it presents a brief outline of the organization of this thesis.

Chapter 2

Literature Review

2.1 Literature Sources

This study utilized three types of sources in the literature review: primary, secondary and tertiary sources.

2.1.1 Primary Literature Sources

In social and natural sciences, primary literature is empirical research based on experiment or on direct observation and it is usually found in scholarly articles and research papers. According to Donald and Pamela (2006), the first occurrence of a piece of work is called primary literature, such as conference reports, market research approaches and unpublished dissertations and theses. This study used Bank for International Settlements (BIS) papers, International Monetary Fund (IMF) working papers, World Bank (WB) working papers and OECD papers as primary sources in the literature review.

2.1.2 Secondary Literature Sources

In empirical research activities, secondary source means information gathered by other researchers, and information recorded in books, articles and other publications. According to Sproull (2002), secondary sources are as equally valuable as primary sources and can provide valuable statistics or data about additional features of the phenomenon provided in a primary source. As a secondary source of information, this study used researchers' empirical work and summaries that are relevant to the area of investigation (Saunders, 2011). The study reviewed the research published in renowned journals such as: *International Business Review*, *Journal of Applied Finance*, *The Review of Economic Studies*, *American Bankers Association Banking Journal*, *Applied Financial Economics*, *Journal of Applied*

Econometrics and *The Quarterly Journal of Economics*. Other journal sources included: *Journal of Financial Services Research*, *Journal of Money, Credit and Banking*, *Journal of Credit Risk*, *South African Journal of Business Management* and *South African Journal of Economics*.

2.1.3 Tertiary Literature Sources

Tertiary literature sources are planned instruments to assist researchers. These devices aid researchers' access to primary and secondary sources. These sources include indexes, encyclopedias and databases (Cooper, Schindler, & Sun, 2003).

2.2 Business Cycles Framework

Generally, a business cycle is defined as a sequence of macroeconomic activities following specific patterns – recession, recovery, growth and decline – around a long-term growth rate (Akinboade & Makina, 2009; Bernanke & Blinder, 1992; Khomo & Aziakpono, 2007). According to Del Negro (2001), business cycle means continuous ups and downs, expansion and contraction, in economic activities that occur at about the same time and follow each other.

Keynesian economists measure a business cycle from peak to peak while Austrian business cycle theory (ABCT) measures it from trough to trough. Keynesian economists believe that a business cycle starts from a period of contraction followed by a period of expansion, while Austrian business cycle theorists believe that it starts from expansion and is followed by contraction. At a time of expansion all economic activities are growing and society experiences prosperity and higher living standards, whereas at a time of recession economic activities start to decline and society starts to experience unemployment, low aggregate demand and other disasters linked with depression. A complete business cycle, from trough to peak, can be divided into four phases. (1) Recovery phase, in this early part of a peak all

economic activities start to grow from a low point and reach their peak level, just before a decline. (2) The recession phase is the later part of the trough phase where all economic activities start to decline (Claessens, Kose, & Terrones, 2010, 2012). (3) The peak is a phase where economic activities reach their maximum level and the economy enjoys a full employment level and reaps potential level of output. (4) In the trough phase of a business cycle all economic activities reach their minimum level.

Most of the literature used GDP variable to measure the four phases of economic activities (Du Plessis, 2006). However, from a broader perspective, the unemployment rate and short-term interest rate that depicts financial market fluctuation are also used to measure disturbance in economic activities (Geske & Roll, 1983). Furthermore, the length, timing and magnitude of business cycles are also important because different industries react to business cycle phases differently. Some industries earn excessive profit in recession while some industries experience severe financial stress. Therefore, the literature identifies four types of business cycle on the basis of time duration (Korotayev & Tsirel, 2010).

1. Kitchin cycle: it is generated by market information asymmetries. It usually indicates rise and fall in inventories and asymmetric flow of information between investors. This cycle complete its duration on average in 3 to 4 years (Kitchin, 1923).
2. Juglar cycle: it is also known as investment cycle, it observes investment fluctuations into fixed capital over 7 to 11 years (Korotayev & Tsirel, 2010).
3. Kuznets swing: it is generated due to a wave of demographic and infrastructural investment and continues over 15 to 25 years (Kuznets, 1930).
4. Kondratieff cycle: it captures fluctuation in wages, interest rates and raw material prices and lasts 50 to 60 years (Kondratieff, 1925).

Extensive research has been carried out to investigate how the difference in timing, length and magnitudes of business cycles affect the degree of uncertainty about the impacts that the

economy experiences at a time of expansion and depression, but few empirical studies investigated the indicative variables that cause these business cycle fluctuations. However, the theoretical literature identified various indicative variables to forecast and predict business cycles to help researchers and the interventions of policymakers. Usually, indicative variables have two important characteristics in their behavior: the direction of movement and timing of variable – turning point relative to aggregate economic activities (Abel, Dixit, Eberly, & Pindyck, 1995).

The direction of movement in an economic variable determines whether the variable is: procyclical – economic variable and aggregate economic activities move in same direction; countercyclical – economic variable and aggregate economic activities move in opposite direction; or cyclical – economic variable moves independently from economic activities. Similarly the second characteristics of an indicative variable distinguishes between leading, in which these variables give a signal for change before change occurs in economic activities, and lagging, in which these variable follow the change in economic activities. Moreover, these leading and lagging variables help economists to forecast the behavior of economic activities. A leading variable's turning point is 2 to 8 months before the turning point of business activities while a lagging variable's turning point is 2 to 13 months after the turning point of a business cycle.

The literature on business cycle differentiates between development and growth business cycle and classical economic business cycle. Classical business cycle indicates that ups and downs in economic activities are recurrent and non-periodic while growth business cycle reflects the upward and downward movement of growth rate of GDP about its long-term possible growth rate (Laubscher, 2004). This study used the classical and growth cycle definition of a business cycle to investigate cyclical movements in the economic activities of upper middle income and low income economies.

Although the literature is in general agreement on the definition of business cycle, consensus on the causes of macroeconomic fluctuation is absent. According to Khomo and Aziakpono (2007), cyclical fluctuations in economic activities are initiated by the inherent factors of the economic system. According to Chatterjee (2000), each cyclical phase of the economy carries with it the seed that generate the next phase – a boom generates the next recession that recession generates the next boom; and the economy is forever caught in a self-sustaining cycle. The empirical literature concluded that without intervention policies it is hard for economies to restore stable and sustainable economic development (Khomo & Aziakpono, 2007). The theories of business cycles are based on sudden shocks: large shock disrupt the economy occasionally and force it to move temporarily away from the point of equilibrium (Fuhrer & Schuh, 2001). During the last few decades various structural disruptions have been identified that have the potential to affect the behavior and size of economic instability (Bordo, 2008; Fourie, Botha, & Mears, 2011). The investigation of past factors of disruption helps researchers to develop more effective business cycle theories (Schularick & Taylor, 2012).

The starting and end point of business cycles usually coincide with historical events like 1930s Great Depression, the inflation instability grounded in Organization of the Petroleum Exporting Countries' oil prices in the 1970s, and the world wars. Similarly, during 2000-2005, world economies experienced incessant and smooth economic development while in 2006-2010 the worldwide transmittable credit crisis of 2008 event disturbed monetary and economic think tanks and motivated them to investigate the position of financial or monetary market development in business cycle fluctuations (Fourie et al., 2011; Schularick & Taylor, 2012).

2.3 Theories Underpinning Conceptual Framework

Although several approaches are available in the literature to review business cycle theories, all approaches share a consensus that economic disturbance is caused by some internal and external forces. These disturbing forces may be some kind of shocks generated within the economy or disturbances imparted beyond the economy and they constitute the original cause of ups and downs in business activities. The theoretical literature highlights the “propagation mechanism” which emphasizes that large and persistent economic fluctuations are often caused by small and short-lived shocks. Although there is extensive theoretical literature related to business cycles that documents different competitive and, at times, opposite causes of business cycle fluctuations, only a few selected theories that serve the purpose of the study are reviewed in detail in Section 2.3.

2.3.1 The Classical School of Thought

The foundation of the typical classical business cycle model is found in the research of Kydland and Prescott (1982) and McGrattan (1994b). The traditional classical business cycle model describes variations in collective data or statistics by enumerating the reactions of development and growth, employment, labor productivity, real wages and prices following technology and government spending shocks. Thus, the theoretical foundations of classical business cycle model suggest that for changing the financial atmosphere, the behavior of coherent or rational mediator – household or firm - is significant and important. Classical business cycle model is based on some assumptions. First, there are infinitely large numbers of identical households and firms which maximize their objectives in the presence of budget constraint. Second, there is perfect competition in the market and prices are given. Third, wages and price move quickly to clear labor and product market.

In this standard classical business cycle model the only source of fluctuations is real shocks: shocks to production function, size of labor, government spending and individual consumers' spending and investment decisions. The model states that at equilibrium, firm and household decision functions are maximized subject to budget constraints. Moreover, labor, goods and capital market are clear, and rational expectations are maintained. The classical school of thought believes that there is no business cycle in the economy, although temporarily the economy deviates from its natural RGDP growth rate but inbuilt stabilizers will remove that transitory phenomenon automatically. The classical model emphasizes that it is the inflexibility of wages that causes unemployment and business cycle fluctuation rather than the absence of fiscal and monetary policies. Real business cycle (RBC) theory is the latest version of the classical business cycle stance. Real business cycle theory states that technology shocks have the ability to generate business cycle fluctuation.

The traditional classical business cycle model imposes some unrealistic assumptions such as no nominal friction, no government intervention, perfect competition, autarky situation and a world with only technology shocks. Different empirical studies focused on different shortcomings of the classical business cycle model. The empirical literature identified four weakness of the business cycle model: first, the working parameters of this model do not coincide with growth and microeconomic observations; second, there is no empirical support for the main pillar of the theory that technological shocks are the central driving force behind cyclical fluctuations; third, the Prescott model assumes that prices are fixed but in the real world, price mechanisms play a central role in economic analysis; and lastly, the exchange failure that caused the 1929 and 1933 depression was ignored in this model (Danthine & Donaldson, 1993). According to Danthine and Donaldson (1993), the inclusion of exchange failure is a minimum criterion for the development of a serious theory of economic recession. If the empirical literature addresses all the issues raised by Danthine and Donaldson

(1993) and the concerns of Prescott related to RBC, then a generalized and acceptable business cycle theory could be developed.

2.3.2 Pre-Keynesian Approach

Pre-Keynesian economists were convinced that money and credit played a central role in economic activities. Marshall's plan and Austrian Business Cycle Theory (ABCT) are typical examples of pre-Keynesian approaches. In this time period, monetary business cycle theory was popular in the literature

- **Marshall's Model**

This model emphasized that psychological factors are responsible for business cycle fluctuations as well as for changes in bank lending behavior (V. Semerák, 2001). Optimism regarding business opportunities, discovery of new minerals, resources and job opportunities restore the confidence level of investors and households and lead to an increase in demand for more credit facilities to invest into new, even risky, projects, which is ultimately the foundation for the initial stage of the business cycle. As a result, new business opportunities will increase; new orders and contracts will be established, which stimulate economic activities. Moreover, when aggregate demand increases it causes an increase in the profit of manufacturing industries, which motivates them to hire more labor and increase their wages and, in this way, the whole of society will enjoy the fruit of expansion. This process of prosperity will continue and a substantial part of society experiences this prosperity until investors and financial institutions recognize new emerging risks that are associated with their investments. To reduce this risk, financial institutions restrict their lending by increasing the interest rate significantly at a time of excessive demand for credit. At the same time, doubt and wariness regarding the expected rate of return evolves in the mind of private investment and their confidence level falls. At the same time, banks respond to this situation by demanding back their credit; debtors will have only one option to raise money, they sell

their properties to repay debts. This situation will put deflationary pressure on property prices and produces undesirable results for society. The behavior of the economy makes the situation for creditors and lenders more critical and they become more pessimistic about the future and avoid taking further risks. In this economic scenario, some financially weak institutions will go bankrupt, strong lenders may go out of business and borrowers fall into a debt trap. Therefore, all economic activities will shrink and the economy moves toward recession. This continuous and gradual decline in economic activities will end in a depression. The severity of the depression will give birth to a new business cycle (Semerák, 2001).

- **Austrian Business Cycle Theory**

The roots of ABCT are embodied in Mises (1912) work but it was later elaborated on by Hayek and White (2007). Austrian school economists argued that banks approved excessive loans at low interest rates that were artificially set by central authorities. According to Hayek (1999), the growth of money in general and bank credit in particular, generate disequilibrium in economic activities and causes GDP to deviate from its natural growth trend. In addition, sustainable economic expansion is supported by savings while a boom is derived from excessive bank credit well beyond owned assets, encouraged by the setting of low interest rates, which is considered a short-term phenomenon. Moreover, it causes malinvestment and an increase in demand for production materials and labor that leads to an increase in their prices that, in turn, leads to an increase in prices of consumption goods (Hayek, 1999; Tempelman, 2010). If banks approve credit to private investors below equilibrium rate of interest – where demand for loanable funds equals supply for loanable funds – then society's structural savings become inadequate to finance this excessive demand for credit (Hayek, 1999). This development in economic activities is not sustainable because excessive demand for credit is not financed by household savings but by low interest rates; false moderation

amplifies the credit creation process (Tempelman, 2010). Therefore, economic prosperity or growth is sustainable if it is financed with increased household savings, whereas a boom that is only the result of easing interest rates and the expansion of bank credit is a short-lived phenomenon.

In this situation, investors will try to earn profit from lower interest rates and make excessive investment in capital goods, but the demand for goods will not increase up to the level. Moreover, a sharp increase in consumption goods and gradual rise in wages intensifies the economic scenario by reducing the saving power of society. This situation ends with demand for more money and shortage of additional capital and labor resources. When the public realizes the reality of boom and rising inflation, they start to convert money into real assets. Ultimately the lower demand for capital goods restricts productive capacities and the artificial expansion and prosperity that was fed by low interest rates will come to an end (Tempelman, 2010).

Similarly, Hayek (1999) stated that excessive credit creation that is not managed by society's savings will put inflationary pressure on prices of consumption goods and increase unsold inventories. The situation becomes more critical when creditors call back their credit and investors start to shut down in order to curtail losses and to repay credit. This process will continue or merely be postponed because sustainable economic growth needs systematic modifications or adjustments like business and economic closure or other eradications of infertile utilization of wealth and capital (Hayek, 1999; Tempelman, 2010). However, theoretically and empirically, ABCT is rejected by mainstream economists – Neoclassical and Keynesian economists (P. R. Krugman, Dominquez, & Rogoff, 1998).

2.3.3 Keynesian School of Thought

Keynes, a renowned modern English economist, strongly criticized the classical business cycle dichotomy in his book *The General Theory of Interest, Employment and*

Money(Keynes, 1936) by criticizing the assumption of price and wage rigidity and argued that wages and prices adjust instantly to clear the labor and goods market. The Keynesian model argued that prolonged upturns and downturns in economic activities are generated because nominal wages and prices are rigid for a longer period of time due to longer term labor contracts. Therefore, if the macroeconomic model admitted the rigidity of wages and prices in the short-run period, the classical dichotomy and irrelevance of money disappear.

Keynes (1936) argued that fluctuations in economic activities do not depend on aggregate supply rather they depend on three factors: first, the consumption behavior of society; second, the change in total productivity when one additional unit of capital is invested; and third, the lending rate of interest. Keynesian theory believes that any change in private spending, investment or government expenditure causes output fluctuations when prices are rigid. Only one component of aggregate demand (AD), investment, and its multiplier effect increases output multiple of original investment spending. However, in Keynesian economy, the multiplier must be greater than zero and its power depends on the marginal propensity of the population to consume. According to Keynes (1936), the marginal propensity of a population to consume is always less than one, which implies that an increase in income is greater than an increase in expenditure. Therefore, a surplus will exist in the economy as savings and all produced items are not consumed. Therefore, savings become greater than the investment and slow down economic activities. In addition, Keynes believed that business executives would be motivated to invest in new productive inventiveness if the expected rate of return was greater than the existing interest rate. Therefore the second foundation of Keynesian theory contradicts economists who believe that an increase in interest rate will promote savings and investment. By contrast, Keynesian theory believes that if the interest rate increases, it reduces productive investment, curtails employment opportunities and pushes the economy

into recession. Thus, overall economic activities will shrink if marginal productivity decreases due to a high interest rate at a time of prosperity.

Furthermore, traditional theorists believed that the interest rate is determined by tradition rather than by an increase and decrease in demand for money, but Keynes opposed their viewpoint and suggested that the interest rate should be used by public authorities according to the need of the time to intervene in business activities. Keynes argued that although high interest rates prevent overinvestment, they encourage hoarding and a decline in investment may bring more disastrous impacts on the economy. Therefore, it is obvious that Keynes introduced monetary policy (manipulated interest rate and M2) and fiscal policy (public development projects) as intervention policies that encourage investment and consumption simultaneously to get rid of depressions.

The USA and England practiced Keynesian ideas by introducing public development projects in their economies. However, due to the complexity of economic life, a clear verdict about the success of these public programs cannot be made. Although these economies have controlled depression to some extent, the literature cannot conclude whether it is due to fiscal policy (war expenditure, public works), monetary policy (managed currency) or other strategies. Keynes recommended government intervention policies as remedial measures to stabilize economic fluctuation.

McGrattan (1994a) model is used to demonstrate the Keynesian approach because the model tried to remove the inadequacies of the classical business or economic cycle model. With the theoretical base of growth theory, this model introduced economic upsets and shocks in the model. Moreover, the classical model and the McGrattan (1994b) “Keynesian model” impose different assumptions. The first assumption in the Keynesian model is that government spending and revenue decisions affect representative household preferences. Second, the Keynesian (McGrattan) approach criticized the classical model by arguing that technology

shock is not the only cause of business cycle fluctuation, additional shocks exist in the economy like government spending, government revenue from capital and labor, while all other assumptions of classical business cycle remained unchanged.

McGrattan (1994a) model with fiscal shocks was applied to examine the causes of fluctuations by using US aggregate data and it found that output and employment are less responsive to technology shocks, as predicted by Kydland and Prescott (1982), while fiscal shocks explain variation in economic activities better than the traditional classical model (McGrattan, 1994a). However, the model does not explain how individuals make preferences regarding hours of work and leisure and why there is imperfect competition in the market. Keynesian business cycle theory is based on speculative expectations that effect the expected rate of return on investment and subsequently on a multiplier and its impact on output and government intervention policies (Keynes, 1936).

However, the theoretical literature is unable to produce a single theory or explanation of business cycles that satisfies economists (i.e. a correct explanation of the business cycle). That is why different economists construct their own theory and infer various conclusions regarding macroeconomic dynamics; thus, the theoretical literature presents different ideas presented by different economists and provides a platform to new researchers to produce their own theory. No doubt, careful analysis of the economic process that is involved in the operation of business cycles helps researcher to draw conclusions.

2.3.4 The New Classical School

Barro (1989), Sargent and Sims (1977) and Lucas (1972), the founders of the New Classical school of thought, attacked the Keynesian basic tenet of policy effectiveness and argued that systematic stabilization policy, either fiscal or monetary, can affect nominal variables only while real variables of the economy remain unchanged. Therefore, only unanticipated policies can have a real effect on an economy as per New Classical economists' view. The

standard classical model was developed into two stages. The first is associated with Lucas (1972) and has often been labeled the “New Classical revolution”. The second is associated with Kydland and Prescott (1982) RBC model.

The New Classical model used micro-foundations, rational expectation and utility maximization, for macroeconomic analysis. The rational expectation hypothesis is that people make their best forecasts about the future on the basis of all information that is currently available to them rather than relying on the current situation. The rational expectation hypothesis implies that fiscal and monetary policy are not effective at stabilizing fluctuations in the economy if agents are sharing the same information as the government, thus individuals will act optimally because they are not surprised by any intervention policy. Lucas (1972) innovative work contributed to the business cycle literature by identifying that only an unanticipated shock in monetary policy influences fluctuation in macroeconomic variables. However, empirical literature confirmed above average growth rate in monetary aggregates causes expansions while below average causes recessions in the economy (Kaldor, 1976). Lucas (1988) introduced a precise mechanism in which financial fluctuations magnifies variations in business economic activities. To explain this specific mechanism, Lucas drew on an ideal situation where individuals are well informed about the price of goods they consumed and prices of goods they produced, this situation is generally called “Lucas Island”. On Lucas Island, in the situation of unexpected inflation, the people deduce that the comparative prices of commodities they manufactured are also temporarily augmented, thus, they make a decision to boost the yield and generate a business cycle. The situation is opposite in classical business cycle where individuals have limited information and monetary worries and shifts in relative prices increases the possibility of individuals making incorrect suppositions that may cause the economy to diverge from normal growth path of GDP and produce a business cycle (Alege, 2008). RBC theory, an example of New

Classical business cycle model, highlights the microeconomic base of macroeconomy and explains the business cycle in a self-correcting economy.

2.3.5 Real Business Cycle Theory

RBC theory utilized economic growth theory to explain new theoretical dimensions of business cycle research. It exhibits characteristics like representative agent framework, typical firms and households maximize their utility subject to budget and technology constraints, and exogenous productivity shocks cause a business cycle that is augmented through a proliferation mechanism such as substitution and income effect, consumption smoothing, investment lag or inventory building. The RBC theory utilized rational expectation, perfect competition on both demand and supply side, and perfect information as the basic doctrine to test the empirical validation of the theory. RBC theorists assert that ups and downs of the state of “technology” in the economy simply generate periodic expansions and recessions in economic activities. Moreover RBC theorists did not consider the phase of recessions as a dreadful sign for the economy, but considered them to be natural slowdowns in economic activities which are preceded by an expansion and which will again be followed by future expansions.

An important implication of RBC theory is that fiscal and monetary policy cannot be used to affect macroeconomic conditions. Contrary to Keynesian model and ABCT, RBC states unexpected changes in total factor productivity (TFP) induced by technology shocks generate a business cycle rather than a change in money supply or changes in AD. It imposes a restriction on money; money is neutral and considered a medium of exchange and does not possess the ability to affect real variables. Therefore, technological shocks cause a shift in aggregate supply in the short-run period as well as in the long-run period because a positive productivity shock raises productivity and real wages and individuals decide to work more in response to temporarily higher wages due to income effect and substitution effect.

Furthermore, Nelson and Plosser (1982), RBC economists, criticized Keynesian, monetarist and New Classical economists and argued that GDP growth certainly follows random walk hypothesis. RBC models provide an explanation for persistence and co-movement in economic fluctuations but fail to provide substantial explanations for fluctuations in employment.

2.3.6 The New Keynesians

At the end of the 1970s, New Classical economists, LUCAS AND SARGENT (1981) and Barro (1989), criticized the Keynesian revolution by objecting to its many precepts. At the start of the 1980s, the “new Keynesians” addressed the New Classical critique and introduced original Keynesian doctrine with some amendments. Classical models assume that wages and prices are flexible and any disequilibrium in the economy will be settled by a quick adjustment in prices. However, new Keynesian economists argued that market-clearing models are unable to provide an adequate explanation of short-run macroeconomic variations. New Keynesian theories explain the cyclical behavior of economic variables such as GDP and unemployment with the help of sticky wages and prices that have a strong influence on business activities. Therefore, a point of diversity among Neo-Keynesian and classical economists is how rapidly prices and wages regulate to clear market disequilibrium.

Neo-Keynesians contributed significantly to business cycle research by introducing the sticky wages and the menu cost concept to illustrate a possible explanation of the business cycle and introduced the role of monetary policy to stabilize economic disturbances. Although its philosophical foundation is deep-rooted in traditional Keynesian theory, it uses a different methodological approach to analyzing business cycle phenomenon. The New Keynesian business cycle model is based on three assumptions: first, involuntary unemployment in the labor market; second, money is not neutral; and third, wages and prices are inflexible in the short run.

Gordon (1984) provided a comprehensive hypothetical description for the lethargic behavior of prices in the presence of menu costs – the cost of price adjustment – and aggregate demand externalities – benefits that are beyond the reach of a firm and its customers. He argued that prices and wages adjust slowly and do not clear the market disequilibrium instantaneously because of high cost of information, communication and coordination failure.

The theoretical model of the new Keynesian school of thought is based on two main assumptions: rational expectations and imperfect competition in goods, labor and money market which causes a variety of market failures. In the late 1970s, Stanley Fischer introduced the model of sticky information by adopting a "staggered" or "overlapping" contract model (Fischer, 1977). He supposed that there are unions in the economy, who take turns to choose wages and set the wages for the next two periods. In contrast, J. B. Taylor (1999) model assumed sticky nominal wages, in addition to sticky information, because nominal wages had to be constant over the contract life. He subsequently developed this idea in two famous articles titled "Staggered wage setting in a macro model" and "Aggregate dynamics and staggered contracts" (J. B. Taylor, 1979, 1980). The common feature of Taylor and Fischer's contract model is that only the unions are supposed to set the wage in the current period by using the latest information of the economy. These early new Keynesian theories believed that a monetary authority (central bank) can control real wages by changing the M2 and affect economic activities when nominal wages are fixed (Mankiw, Romer, & Weil, 1990).

However, Neo-Keynesian and RBC models have a common characteristic in that both argued that the dynamic behavior of key macroeconomic variables depends on technology shocks (Ireland, 2004). Moreover, the Real Business Cycle (RBC) theory also proposes that shocks other than nominal wage and price rigidities might be important and helps us to understand how different shocks can affect and spread throughout the economy. The proponents of the

Neo-Keynesian model used econometric methods and dynamic general equilibrium model to enumerate the size of economic variation in a country (Clarida, Gali, & Gertler, 1999; Del Negro & Schorfheide, 2003; Mankiw, 1995). The Neo-Keynesian model reinforced the conclusion that nominal shocks also cause business cycle fluctuations as technology shocks and encouraged researchers to develop their own business cycle model by identifying existing shocks that are relevant to the economy.

2.3.7 The Monetarist School of Thought

The earliest Monetarist, Hawtrey (1919), argued that business cycles are a purely financial phenomenon because the only source of fluctuations in economic activities, expansion and depression period, is changes in the quantity of money. Thus, deflation, the decrease in price originating from a reduction in the quantity of money, depresses economic activities while inflation, an increase in prices because of an increased quantity of money, stimulates aggregate economic activities (Ifrim, 2011). However, the American boom between 1926 and 1929 implies that it is not necessarily true that a constant increasing trend in price always causes booms and a decreasing trend in prices will cause depression in the economy. In this boom period, although the quantity of money increased slightly, the loans volume increased significantly. This credit expansion causes innovation and technical progress that reduces production costs; entrepreneurs lower their product price and the economy experiences boom without inflation.

Monetarists argued that any fluctuations in monetary cash flows will destabilize economic activities and if the economy controls these fluctuations, then business cycles will disappear (Haberler, 1946). Another important source of fluctuation in economic activities is interest rates, thus an increase or decrease in interest rates by central banks causes credit contraction or expansion by affecting household preferences between consumption and saving and entrepreneurs' expectations for profits. Consequently, excessive credit expansion boosts

economic activities and the situation will prevail as long as expansion in credit is maintained and vice versa.

The Friedman monetary theory of business cycles, based on the assumption that a free market is inherently stable, implies that an exogenous shock to money supply affects aggregate demand which causes further cyclical variations in the macroeconomic variables of GDP and employment. Friedman and Schwartz (1975) used US historical data to show a high correlation between cyclical movements in economic activity and stock of money. Moreover, monetarist school provided credit expansion as a possible explanation of business cycles rather than nominal wage and price rigidity. The Friedman model is based on the assumption that the supply curve of labor depends on predicted wage instead of actual wage, so the misperception of workers related to prices in the presence of imperfect information provides the ground for economic deviation from long-run natural level of growth and this phenomenon becomes a strong cause to produce a business cycle.

2.3.8 Summary of Theories of Business Cycle Fluctuations

While modeling economic fluctuation, it is not absolutely necessary to think of market failure because a Walrasian model is one with competitive markets and no market imperfections. The theoretical framework of modeling economic fluctuation in this study begins with a Neoclassical model whose roots are embedded in the Classical business cycle model. The Classical and Neoclassical models incorporate technology shocks and government purchases as a possible source of shock that deviate output from its balanced growth path. In addition, the Neoclassical model applied microeconomic foundations, households' utility maximization subject to budget constraints, to explain the variation in the supply of labor. Neoclassical business cycle model opt Walrasian economy - which is based on the assumptions; rational behavior of economic agents, perfect competition and all economic agents have same information - while modeling economic fluctuation.

However, the traditional Keynesian model assumed a non-Walrasian economy approach to explain economic variation. The main features of traditional Keynesian business cycle model are: government intervention, government borrowing and government spending at a time of recession to stimulate aggregate demand to offset a sharp decline in private spending.

The Keynesian paradox of thrift implies that at a time of recession people increase their savings and reduce their spending, which contributes to an even bigger decline in aggregate demand and GDP, and unions resist nominal wage cuts even at a time of recession which causes a sharp decline in private spending. Moreover, Keynesian theory strongly rejects RBC theory that suggests no role for government in modeling business cycle fluctuation. However, new Keynesian models tried to provide justification of business cycle fluctuation by incorporating micro-foundation of households and firms' behavior into the model.

Moreover, the Keynesian business cycle model explains that imperfect competition and menu cost- some costs associated with changing prices – are the main causes of wage and price stickiness. By contrast, the New Classical model obeys the assumption of Classical model except for perfect information. This model emphasized that asymmetric information of firm causes incomplete price adjustment. According to New Classical RBC model, supply side shocks are a primary source of fluctuations in macroeconomic activities. Moreover, the theory utilized micro-foundations of household and firms' behavior while modeling macroeconomic behavior.

Although many economists disagree that technology shocks generate economic fluctuations, many other economists believe that the models that neglect supply side shocks while developing business cycle fluctuation have a problem because they are unable to explain changes in households and firms' behavior. Among modern economists, Lucas (1972) criticized earlier economic fluctuation modeling and claimed that monetary policies become ineffective because households and firms develop rational expectations and change their

production and consumption decisions accordingly. For example, expansionary monetary policy will become ineffective when individuals anticipate that their income has been increased due to increased M2, so they will increase their consumption as well as their savings. Only unanticipated fluctuations in AD will cause the economy to deviate from its long-term natural growth path. Lucas (1972) empirical work suggests that an anticipated policy shock to the economy will bring no change in economic variables but unanticipated shocks to the economy can cause GDP to depart from its natural growth path.

Therefore, unanticipated shocks create fluctuations in economic activities because households are unable to adjust their behavior quickly and fail to respond to the policy appropriately. In the empirical literature, the vector autoregression (VAR) model is a common and popular econometric technique to distinguish between anticipated and unanticipated shocks. Before the emergence of these different schools of thought, business cycle theory was considered a holistic section of economic theory, that is, something that did not match with the unconventional nature of microeconomics. Moreover, Classical business cycle theory, long-term growth theory, and traditional Keynesian theory were relatively incompatible whereas New Classical, new Keynesian and monetarist collapse in macroeconomics during the oil crisis of 1973 that give a ray of hope to the researchers that this research area is still active and researcher can try to identify different factors that can affect real economic variables.

2.4 Review of Methodological Literature

In this section all the mechanisms used by researchers to analyze the causes of business or economic cycle variations are discussed.

2.4.1 Atheoretical Statistical Method

A sequence of expansion and contraction – turning points and phases of cycles – in business activities is called a business cycle. A large amount of empirical research utilized an

atheoretical approach to explain macroeconomic variation. In this class of research, decisions are based on statistical measures without adopting a preceding hypothetical belief. Kydland and Zarazaga (1997) used an atheoretical method to examine the hypothesis that “real” factors cause economic fluctuations in Argentina rather than nominal shocks. Kydland and Zarazaga (1997) used old and new estimates of RGDP – two types of data – and Kydland and Prescott (1990) method of detrending, which is called the Hodrick–Prescott filter, and the cyclical behavior of the RGDP and its major components. They found that nominal factors do not provide significant explanation of economic disturbance in Argentina and suggested that the role of real factors in explaining business cycle fluctuation in Argentina needs to be investigated. Therefore, this study opened the door to new empirical and theoretical research to identify the factors, other than nominal factor, that have the potential to affect economic activities.

Agénor et al. (2000) conducted a study in which they reported stylized facts related to economic fluctuation in developing economies. They applied an atheoretical approach without adopting any a priori belief developed by any specific business cycle model. In their study they used cross-correlation among a huge set of macroeconomic variables and domestic manufacturing growth to investigate the relationship between economic or financial conditions and business cycle fluctuation. Agénor et al. (2000) used Hodrick–Prescott and band pass (BP) filters to isolate the cyclical component of RGDP.

A study of business cycle fluctuations in Brazil conducted by Bugarin, Ellery, Gomes, and Teixeira (2002) applied an atheoretical and theoretical approach simultaneously by following standard growth model. They used postwar-Brazil data for economic growth and other macroeconomic variables to investigate the causes of fluctuation in Brazilian economic activities. Moreover, the study used Hodrick–Prescott and BP filters to extract the cyclical trend from original data for the period 1970 to 1998. Results indicated that personal

consumption and real gross national product (GNP) have contemporaneous cross-correlation, total personal consumption is less volatile than consumption of durable goods and investment is less volatile than changes in inventories. Moreover the study utilized the fluctuation in total and average working hours due to deviation in number of employed persons to estimate the collective behavior of the labor market and found low correlation between productivity and real GNP. However, the study failed to explain the high fluctuations in total consumption, hours and productivity as compared to the fluctuations of the GNP.

Singh (2006) conducted research into the macroeconomic fluctuations of Latin America; He used an atheoretical approach to investigate the impact of macroeconomic policies and financial crises on growth and other developmental indicators. The study linked the long history of macroeconomic fluctuations in Latin America with instability in policies and weakness in institutions and affirmed this long-term economic instability constrained growth. However, Singh (2006) also found that with the passage of time, Latin America took steps toward a strong democracy and democratic elections that strengthened policy frameworks that supported the market-based institutions that are needed for a stable macroeconomic environment. In addition, this study described business cycle behavior with the help of negligible statistical measurement.

Arias, Hansen, and Ohanian (2007) used quarterly collective time series data from USA to investigate factors that cause a reduction in macroeconomic fluctuations. This study defined business cycles as a deviation from Hodrick and Prescott's trend and employed both atheoretical and theoretical approaches to find the causes of fluctuations in US aggregate economic activities. The study found that productivity shocks reduced 50% of the fluctuations of GDP and fiscal shocks were unable to affect fluctuations in TFP and output, whereas they could affect the household's first order condition of labor and saving.

2.4.2 A Priori-Based Method

An a priori-based method suggests an empirical study based on beliefs of the Classical or Keynesian business cycle model to analyze business cycle fluctuation. Although Classical and Keynesian are two different theories of the business cycle, both have some common properties, such as an assumption that economic fluctuations are caused by shocks, frictions or some kind of disruption. Most of the theories are based on a propagation mechanism – a system that intensifies small and short-lived shocks – for significant explanation of business cycle fluctuation.

The literature is divided into two major classes of business cycle models. One class of business cycle theories advocates that perceived friction and market imperfection drive the economy toward depression and deviate it from an efficient level of output and employment. Thus, they considered technology and monetary shocks as a possible source of economic fluctuations. Moreover, this group of models – New Keynesian School – suggests that financial friction, monetary shocks and representative agents' failure to adjust their behavior propagate business cycle fluctuation in the economy. The other class of business cycle theories, the Classical and RBC models, suggests that the optimal response of the economy to unavoidable shock causes economic fluctuations. In addition, this group of models believes that within an efficient market mechanism, intertemporal substitution propagates the shocks that cause business cycle fluctuation. Different competing theories in the business cycle literature suggest different shocks, disturbances and propagation mechanisms are present in the economy.

The literature suggests that two shocks are common in the economy: technology and monetary. Technology shock, the basis of RBC theory, are subject to a random process and can be divided into two categories: positive technology shock, which is a better method of production; and negative technology shocks, including weather, political instability and

natural disaster. It has been established in the literature that some time shocks are sufficiently strong, such as random changes in money supply and interest rate, to explain a large fraction of business cycle fluctuation, whereas in some cases they fail to serve as a direct explanation of a business cycle. A propagation mechanism intensifies the small shocks, such as frictions by financial institutions, which exist in the economy.

The history of business cycles reveals two kinds of business cycles: the first is the usual business cycle and the second is the Great Depression of 1930. The New Classical model – RBC theorists – postulates that breakdowns like the Great Depression are distinct from the usual business cycle; the optimum response of a perfectly competitive market system to economic shocks creates the usual business cycle. Kydland and Prescott (1982) developed the first RBC model to investigate whether usual business cycles are generated by failure of economic system at a small scale or are simply the response of the economic system to shocks. On the basis of the RBC model, economists developed numerous types of models that comprise alternative propagation systems. In a standard RBC model, economists simply build a model economy and expose it to a productivity shock and consider that the outcome looks like real-world business cycles.

Hamilton (2005) believed that most modern business cycle models are not reality based and fail to provide a satisfactory explanation of the different stages an economy experiences during economic fluctuation. Hamilton (2005) argued that modern business cycle model reflect a desire to integrate the factor affecting economic growth in the long run and the cause of short-run economic downturns within a single unified theory of aggregate economic performance. Hamilton (2005) concluded that such types of model are suitable for the macroeconomic analysis of LDCs.

Most empirical literature argued that technological shocks are important to clarify the causes of variations in major economic variables (Clarida et al., 1999; Hamilton, 2005; Long Jr

&Plosser, 1983; Perli, 1998; Rebelo, 2005; Stadler, 1994). Most of the literature used total factor productivity to determine technology shocks that are considered as exterior sources of supply upsets (Prescott, 1986). Controversies arose when different empirical studies utilized different proxies to measure TFP, such as capital utilization, changes in labor productivity and changes in profit margin (Evans, 1992; Hall, 1980; Rebelo, 2005).

The literature is agreed on one point that higher TFP derived from technical progress causes expansion, but the literature is divergent regarding the role of TFP at a time of recession. Lastly, contrary to RBC model, some empirical studies (Gali, 1996; Uhlig, 2004) applied structural vector error correction model (SVECM) to discuss the importance of technology shocks and found that a positive shock to technology causes a fall in hours worked in short-run period. In recent years, the New Keynesian business cycle model used traditional IS-LM framework to incorporate nominal variables as an alternative to technology shocks and opened the door for researchers to incorporate other non-technology shocks that might have the ability to disrupt GDP from its trend growth path. So far, theoretical literature has identified different types of shock which causes economic disturbance but still consensus is absent (Rebelo, 2005).

2.4.3 Oil Shocks

Rotemberg and Woodford (1996), and Finn (2000), incorporated changes in oil and energy prices while modeling business cycle fluctuation. They concluded that the inclusion of these two shocks enhances the efficiency of RBC model although these shocks do not account for large macroeconomic fluctuation.

2.4.4 Fiscal Shocks

Christiano, Eichenbaum, and Evans (1999), Baxter and King (1993), Mertens and Ravn (2011), and McGrattan (1994a) utilized fiscal shocks – tax rate influence and upsets in government expenditure – with RBC model and developed a model economy. They

concluded that although the efficacy of RBC model to predict the causes of business cycle fluctuations improved, variations in government revenue and expenditure were not big enough to explain a significant fraction of economic disturbance. The literature considered temporary changes in configuration of government spending explained economic variation (Burnside, Eichenbaum, & Fisher, 2004; Dungey & Fry, 2009; Edelberg, Eichenbaum, & Fisher, 1999).

2.4.5 Investment-Specific Technical Shocks

Greenwood, Hercowitz, and Krusell (1997) and Greenwood, Hercowitz, and Krusell (2000) considered investment-specific shocks while modeling business cycle fluctuation as an alternative framework to the RBC model. They affirmed that due to investment-specific shock only the productivity of capital goods increases contrary to RBC model where a positive technological shock increases the efficiency of labor as well as of existing capital. Moreover, the Fisher (2006) model claimed that investment-specific shocks provide justification of 50% variation in working hours and 40% in GNP.

2.4.6 Monetary Shocks

The monetarist business cycle model gained popularity in the empirical literature because of its attempt to incorporate monetary shocks – nominal frictions – in RBC models along with the traditional elements of credit friction (Chami, Cosimano, & Fullenkamp, 1999; Gilchrist & Zakrajšek, 2011) and monopolist competition (Dixit & Stiglitz, 1977). Monetarist business cycle model examined the response of economy for both monetary or financial and technological shocks and concluded that the presence of nominal frictions – sticky prices and wages – in goods and labor market influence firms and labor pricing decisions. Firms and workers supply goods and services at predetermined prices and wages are settled by workers and organization at initial stages of production (Rebelo, 2005). Therefore, while making an agreement regarding prices and wages, firms and workers consider future economic

conditions because prices and wages cannot be changed erratically. The empirical studies (Bernanke & Gertler, 2001; Clarida, Gali, & Gertler, 1998; Wilk, Wallace, & Anthony, 2001) that utilize RBC with extension of monetary shock developed impulse response function to depict the importance of technology and monetary shocks to economic variation. Moreover, these studies concluded that although technology shocks do explain the response of economic variables but financial forces also acts significantly to shape up the optimum response of economy. However, the upsets due to technology can generate expansion in economic activities if monetary policy plays an accommodative role in the economy (Altig, Christiano, Eichenbaum, & Linde, 2011; Galí, López-Salido, & Vallés, 2003).

Some models incorporate externalities, increasing returns to scale and monopolistic competition to improve the ability of the RBC model to forecast the driving forces of business cycle fluctuation in the economy (Baxter & King, 1991). Similarly, multiple equilibrium models suggest that the beliefs of agents regarding the future (pessimistic or optimistic) can generate business cycles. Moreover, these models concluded that belief shocks have internal persistence and serially correlated shocks are not required to generate persistent macroeconomic time series (Cass & Shell, 1983; Galí et al., 2003). However, the drawback of modern equilibrium models is that they required belief fluctuations and for it to be coordinated across agents.

2.4.7 Endogenous Business Cycles Model

Endogenous business cycle models depict multiple equilibriums that truly describe real-world phenomena. In early 1980s, some empirical studies (Azariadis & Guesnerie, 1986; Cass & Shell, 1983; Farmer & Woodford, 1997) introduced endogenous business cycle model and claimed that cyclical behavior in economic activities arises from internal sources. Most endogenous business cycle models are similar to RBC models because these models are based on Neoclassical growth model (Boldrin & Woodford, 1990). The empirical literature

identified some drawbacks of endogenous business cycle models. On the one hand, endogenous business cycle models are based on assumptions that are not trustworthy and develop a complex procedure to identify the shocks that disturb the economy, while on the other hand; deterministic cycle models frequently reveal various equilibriums.

2.4.8 News Shock

This type of model proposes that diffusion of a new technology that is expected to affect future productivity positively generates business cycles (Barsky & Sims, 2011; Cochrane, 1994). However, if positive news generates an expansion today, then, alternatively, will it generate recession if the impact of the new is smaller on economic activities than expected? According to Beaudry and Portier (2004), there is a dire need to make a clear distinction between durable and non-durable consumption as well as identification of capital as an input and capital as an investment because standard RBC models are unable to explain the behavior of consumption and investment if there is a news shocks related to future productivity.

2.4.9 Business Cycle Models and the Stylized Facts

Kaldor (1961) introduced the term stylized fact in the context of debate on economic growth. In economics the term is used for a summary of empirical findings that are consistent and accepted as a truth due to their generality; they are often qualitative in nature (Sewell, 2011). In business cycle research stylized facts help the researcher to develop a better understanding about the behavior and construction of the prototypical economy, to infer scientific results and to develop significant forecasting. The main stylized facts that business cycle models infer from the literature are the following.

1. RGDP is persistent and its three components – consumption, investment and government spending – are procyclical.
2. Although investment is more volatile than consumption, the most volatile component of investment is inventories.

3. Similarly, exports and imports are more volatile than spending or consumption but less volatile than speculation and investment.
4. Employment is less volatile than output.
5. Net exports and prices exhibit countercyclical behavior and are called leading variables while employment is procyclical and called a lagging variable.
6. Inflation and rate of interest before considering inflation are positively correlated.
7. There is no connection between output and working hours.
8. Nominal and real ERs are equally unstable.

Different empirical studies measure co-movements of aggregates across and within the economies and document facts that are similar to above-stated stylized facts. Following the works of (Ambler, Cardia, & Zimmermann, 2004), it is understood that investment is more unpredictable than productivity but employment and consumption are less unpredictable than productivity. Moreover, trade balance is weakly correlated with outputs while all other aggregates are strongly correlated with GNP. Similarly, as the same time relationship among growth and index ratio of exports and imports prices is very wide, so terms of trade are more volatile than GNP.

Harvey and Jaeger (1993) presented some stylized facts about detrending methodologies. He reported that the Hodrick–Prescott filter – a popular and widely used detrending technique promoted by Hodrick and Prescott (1997) – is a poor mechanical detrending technique that leads researchers to report fake cyclical behavior of time series. Similarly, structural time-series models often extract seasonal and irregular movement from original data that also calculate false estimated cyclical components. Therefore, Harvey and Jaeger (1993) study provided space to researchers to utilize autoregressive integrated moving average or first difference approach to detrend a time series.

Fiorito and Kollintzas (1994) reported a stylized fact for G7 countries by using quarterly data over the period from 1960 to 1989. The evidence suggested that RBC model explains several major stylized factors for G7 countries. Although consumption and investments are procyclical, variation in spending is less than in earning and productivity, but investment is more inconsistent than productivity. Moreover, prices and net exports are countercyclical and government expenditure and revenue do not exhibit any clear cyclical pattern. However, RBC did not account for the labor market, so RBC is unable to report any stylized facts for labor dynamics.

Agénor et al. (2000) stated a stylized fact for twelve developing economies. Agénor et al. (2000) also compared macroeconomic fluctuation between a sample of developed and developing economies and concluded that real wages and government expenditure are procyclical while monetary aggregates are countercyclical in both samples of countries. They used different detrending methods to increase the robustness of results.

2.4.10 Estimation Techniques for Business Cycle Models

In early 1970s, a variety of econometric techniques were applied to perform four important tasks for simple univariate time series models involving only a single variable: describing and summarizing the data, forecasting, operational implications and policy analysis. These techniques involved a large number of equations and sometimes a few equations to describe the relationship of variables. The economic disturbance of 1970 raised a question about the trustworthiness of these approaches and Sims (1980) introduced a new econometric technique known as VAR models to understand the macroeconomic behavior of an economy. In a linear autoregressive model, a dependent variable depends on its own lagged values while in VAR with n equations and n variables, all variables enter into the model simultaneously. Each variable depends on its own current and lagged values and on remaining $n-1$ variable's current and past values. VAR models provide rich information for multiple time series in a

more systematic way. In his early influential series of papers, Sims (1980) claimed that VAR is a more powerful and reliable tool for multiple time series analysis (Quenouille, 1957) and can be conveniently used for both theory and practice.

VAR models are appropriate for analyses of the dynamic structure of variables when large and continuous practical time series data are available. Moreover, the widespread use of computers facilitates complicated applied work in VAR model, which becomes easy and effective. Sims (1980) introduced VAR as an alternative to simultaneous equation models, which further enhanced the popularity and credibility of VAR. SEM was popular in 1950s empirical research work. Sims criticized SEM by arguing that the model employed a priori assumption of endogeneity for some variables without theoretical support. By contrast, in VAR models the researcher treated all independent variables as a priori endogenous and imposed some restrictions by following some statistical procedure. Vector autoregression model urges the variance decomposition method and response or retort function for forecasting and economic analysis. When the objective of the research is to investigate structural hypotheses that are based on economic theory, it demands a priori assumptions which may not be testable with statistical method, thus SVAR models are appropriate to incorporate such assumptions. Moreover, stochastic trends in economic variables and co-integration among variables, introduced new dimensions of development to analyze relations between economic variables (Engle & Granger, 1987).

VECMs document long-run relations and short-run dynamics separately in a more effective and convenient way. In VECMs, long-run relationships indicate particular economic relations in which a study is interested while short-run dynamics help to define the adjustment when a model is deviated from its equilibrium path by a shock. In business cycle models, the empirical literature used two famous estimation techniques: dynamic stochastic general equilibrium model and SVAR models.

In 1980, SVAR models were introduced as an alternative to traditional large-scale econometric models that have no theoretical and empirical support. At initial application, the SVAR model is based on an atheoretical approach because its users do not pay sufficient attention to the conditions that are necessary to identify causal effects in the data. Usually, the empirical literature employs SVAR for four reasons. First, researchers can study the behavior of other classical variables when a one-time structural shock is given to one variable. Second, researchers can construct error variance decomposition and measure the contribution of each variable to variability of data for short-run and long-run period. Third, the SVAR model measures the growing influence of each structural shock on the evolution of each variable over time (Edelstein & Kilian, 2009). Finally, SVAR models help researchers to develop conditional forecasting on the basis of future structural shocks (Baumeister & Kilian, 2011; Waggoner & Zha, 1999).

2.5 Empirical Literature Review: Internal Shocks and Business Cycle Fluctuations

Section 2.5 will review the stock of literature related to the role of internal sources in business cycle fluctuations while Section 2.6 will review the role of external sources in business cycle fluctuations. This study considered financial development, interest rate and investment to be internal sources of fluctuation in economic activities.

2.5.1 Financial Development and Business Cycle Fluctuation

A vast amount of literature discussed the role of financial institutions in fostering economic activities (King & Levine, 1993a; Levine, Loayza, & Beck, 1999, 2000; Neusser & Kugler, 1998; Pelgrin, Schich, & Serres, 2002). However, recent works tried to establish that financial development contributes to business cycles fluctuations (Silva, 2002; Tiriyaki, 2003).

A well-organized financial system fosters economic growth activities by channeling funds to those entrepreneurs who are able to implement successful projects (Schumpeter, 1911) and

minimizes economic fluctuations. Moreover, if financial institutions develop a system that successfully channels the resources of potential savers to borrowers, then economies can enjoy the benefits of specialization for a longer period of time. Developed financial systems help investors to have access to better trading facilities by minimizing risk element in a more efficient manner (Barth, Caprio & Levine, 2001). It has been established from a theoretical perspective that factors which allow financial development to promote economic growth should also play a role in disturbing macroeconomic aggregates. It is a common characteristic of a developed financial system that it becomes more capable to distinguish and finance potential borrowers and reduces finance to the projects which have a greater probability of failure while, on the other hand, credit market imperfection magnifies the impact of nominal and real shocks to economic activity and generates business cycle fluctuations (Bernanke & Gertler, 1995; Bernanke et al., 1999; Hubbard, 1997). Moreover, the theoretical standpoint argued that financial institutions minimize credit market imperfection by improving institutions' ability of gathering and processing information about debtors reduces agency and verification costs, and smooth economic instability. The empirical literature reported three different measures of financial development named as the M2, domestic credit by banks (DCB) and domestic credit by private sector (DCP).

2.5.2 Credit Channels and Business Cycles

Although empirical research has reached general agreement on the active function of commercial banks in spread of monetary policy, there is extensive dispute over their exact role in the real economy. An increase in the supply of loans by central bank enhances the ability of commercial banks to issue more credit, so boom in economy can be caused by excessive credit issued by banks. In recent years, the study of bank lending behavior and its relationship with macroeconomic and financial variables gained popularity in empirical research. Although Classical theory of economics neglects the role of financial market to

affect economic fluctuation, recent periodic financial disorders positioned banks and their lending decisions at the center of educational conversation and policy. Bank credits amplify aggregate macroeconomic fluctuations due to asymmetric information and imperfect competition in capital market.

Some studies focused on the stabilizing role of banks and stated that in cases of tight monetary policy, banks are forced to contract supply of loans by increasing lending interest rate unless bank-reliant borrowers are reduced and real activities are contracted up to a desired level (Bernanke & Gertler, 1995). Similarly, at time of economic expansion, overoptimistic investors will demand more loans and underestimate risk exposure that reduces bank loan quality. Thus any shock – fall in asset and stock prices – that disturbs profit level in the balance sheet of financial institutions leads banks to curtail credit supply, which boosts the procedure of depression and magnifies cyclical variation (Marcucci & Quagliariello, 2008). Similarly, some studies noted that excessive credit growth can be taken as a warning signal of financial instability and crises (Borio & Lowe, 2002, 2004; Kaminsky & Reinhart, 1996). Therefore, bank loans have a significant role in broadcasting the economic upsets to the real sector (Baum, Checherita-Westphal, & Rother, 2013; Beaudry & Pages, 2001; Quagliariello, 2009).

In Asian countries, during the time of explosion of a crisis, their credit growth rate was far higher than the growth rates of GDP (Corsetti, Pesenti, & Roubini, 1998; Goldstein, 1998; Kamin, 1999). Moreover, in risk management, the absence of managerial skills and the insufficiency of regularity in the framework caused great losses in loans that worsened the balance sheets of banks and non-performing loans. Therefore, inefficient financial markets played a significant role in Asian crises (Mishkin, 1999). According to Kwack (2000) and Athukoralge (2001), banks played a significant role in ER and stock market collapses during Asian crises and transmitted the disturbance to the real sector. Moreover, the slums in

Thailand were also attributed to a shortage of capital and financial uncertainties (Jongwanich & Kohpaiboon, 2008; Kinkyo, 2007).

Recent literature gave a lot of attention to financial market in economic business cycle and suggested that policymakers should carefully supervise them and execute policies according to economic need. When business cycle fluctuations are of medium magnitude then active countercyclical policy can be ineffective and policy may augment cyclical variations rather than smooth economic instability, whereas if business cycle fluctuations are above average then an innovative counter-policy may become more fruitful. Therefore, the success of policy depends on careful and consistent implementation of policies by central bank to achieve its primary objective of maintaining economic stability (Angeloni, Kashyap, Mojon, & Terlizzese, 2003).

No doubt money channels play a role in economic business cycle but the literature has two standpoints in this respect. On one side, studies suggested that money channels stabilize economic fluctuation by implementing central bank policies with commitment (Walsh, 2009), while on the other hand some studies emphasized that the money market amplifies economic disturbance by implanting central policies inappropriately (Ramirez & Fernández-Anaya, 2009).

Similarly, the economic literature also suggested that allocation of credit by the financial sector can generate and can also stabilize output fluctuation (Boivin & Giannoni, 2006). During 1990s, numerous studies (Masih & Masih, 1996) used Granger Causality test to examine the relationship between M2 and output as well as bank loan and output and found the results to be in favor of money channels. However, in short and medium run, the M2 played a significant role in soothing growth when it deviated from potential growth path.

Recent developments in the empirical literature regard the role of credit in business cycle based on the theoretical assumption that financial friction does matter for real economic

activities. In the last decade of the twentieth century, the theoretical literature debated a lot about the macroeconomic implications of financial market imperfections (Bernanke et al., 1999; Carlstrom & Fuerst, 1997; Iacoviello, 2005b; Kiyotaki & Moore, 1997); money market frictions – asymmetry in informative material, agency or organization costs or security restraints – in dynamic general equilibrium models were introduced. Research into credit channel concluded that financial frictions act as a financial accelerator for macroeconomic fluctuations and highlight effective mechanisms through which the credit channels are likely to impact the real economy. Therefore, monetary frictions play an important role in circulating economic upsets or shocks in the actual economy. Modigliani and Miller (1958) theorem stated that the economic structure is unable to affect real economic outcomes in the absence of financial frictions.

The concept of credit constraint was introduced by Townsend (1979) and further progressed by the work of Bernanke et al. (1999), Burris and Pendyala (2002) and Gertler and Kiyotaki (2010). They argued that credit restraints are defined by some type of collateral which provides security to the lender against non-payment of loan and restricts the borrower's credit limit. In addition, banks also have some friction that restricts their ability to raise loanable funds (Chen, Donoho, & Saunders, 2001; Meh & Moran, 2004). Therefore, the size of credit issued by banks and private sector significantly contributes to shock propagation and affects output dynamics in the economy.

Although a considerable amount of literature has indisputably proved and validated the connection between the credit granted by financial market and economic cycle but the direction of causality – whether unidirectional or bidirectional – between the bank credit and economic cycle is still a passionately debated issue (Georgellis & Oluitan, 2009). The literature suggested three types of hypothesized relationship between business cycle and bank credit. First, the supply-leading hypothesis is that monetary progress causes fiscal expansion;

second, the demand-following hypothesis is that fiscal expansion causes financial growth (Georgellis & Oluitan, 2009; Patrick, 1966); and third, is the bidirectional causality hypothesis.

Manikandan and Soman (2012) suggested that monetary progress is a reason for fiscal development and fiscal development provides the reason for monetary progress. Therefore, various economists have argued that the depth, breadth and duration of business cycles depends on financial markets and specifically on credit market and M2 (Calderón & Liu, 2003; Keynes, 1930; King & Levine, 1993b; Ma & Aperghis, 2007; Joseph A Schumpeter, 1911; Velde, Weber, & Wright, 1999).

The relationship between M2 and fluctuation in economic activities was introduced by Hawtrey in the beginning of the twentieth century. Later, many economists, including I. Fisher (1933), Joseph Alois Schumpeter (1934), Minsky (1978), Bernanke (1983), Gertler (1988), Schularick and Taylor (2009), and Singh, Murty, Gupta, and Dikshit (2012), highlighted the weight and value of credit generated by financial institutions in financial activities. Moreover, monetary business cycle theory based on Hawtrey's model also stated that the credit or finance arranged by banks or any financial institution affects business cycle fluctuation (Bieseke, Weinberg, & Cloete, 1990). Financial institutions exacerbate business cycle fluctuations by issuing a higher amount of credit in booms and by lowering credit at times of recession (Bieseke et al., 1990). Therefore, bank behavior, for example lower credit during recessions, contributes to financial fluctuations (Kaufman, 2003). As a financial expert at the BIS described:

“...financial developments have reinforced the momentum of underlying economic cycles and in some cases have led to extreme swings in economic activity ... These experiences have led to concerns that financial system is excessively pro-cyclical,

unnecessarily amplifying swings in the real economy”(Borio, Furfine, & Lowe, 2001).

On the other hand, some studies (Gilchrist & Zakrajšek, 2012) highlighted the role of the banking sector to control business cycle fluctuation. As Arestis (2006) stated that credit is a roadway along which production travels and the banks, if they knew their duty, would provide the transport facilities to the productive powers of the community and help to utilized them efficiently. Therefore, the banking sector can play a role as a tool to manage fluctuations of output or fluctuations in macroeconomic activities (Schularick & Taylor, 2009).

There is a consensus in the literature on the definite relationship between macroeconomic activities and economic aggregates pertinent to monetary policy (Stals, 1997). Similarly, Fuhrer (1998) argued that monetary policy persuade by central bank has important contribution to generate many depressions because procyclical behavior of financial instruments and inconsistent monetary policies may causes to fluctuate financial activities (Bernanke & Blinder, 1992; Bernanke & Mihov, 1998; M. Braun & Larrain, 2005; Macfarlane, 1993). Moreover, when the economy experiences recession, it will induce banks or other financial institutions to behave like some traditional financial markets. The banks will draft and implement credit-curtailling policies which may strengthen macroeconomic fluctuations (Akinboade & Makina, 2009). By contrast, at a time of boom, the credit market behaves in an unrealistically optimistic way and sanctions loans even to more risky projects and, hence, sows the seed of its own disaster or recession (Akinboade & Makina, 2009; Mathews, 1998).

Moreover, in this way the lending behavior of credit institutes in itself provides a shock that disturbs the economic activities, because the spontaneous wave of optimism increases the total amount of lending to community and leads to fluctuations in aggregate economic

activities. Alternatively, the expansion could be an overreaction to the other shocks to the economy that “legitimately” shift the supply or demand of credit (Akinboade & Makina, 2009; Weinberg, 1995). A few theoretical studies discussed the connection between financial instability and economic growth and found that long-run investment is countercyclical, which reduces business cycle fluctuations and promotes long-run growth.

2.5.3 Monetary Policy and Business Cycle Fluctuations

In the advanced economies, monetary policies become more important and effective when fiscal policy locked in austerity and started to cutback development program. Monetary policy utilizes lending interest rate as a tool to stabilize the economy because economic activities are very sensitive to changes in interest rate. The results of anticipated monetary policy modifications are less effective than unanticipated monetary policy because exogenous upsets or shocks to monetary policy mechanism give detail explanation of economic variations.

The consequences of the Great Depression developed a consensus among economists and politicians about intervention policies to prevent economies having such disasters. In general, the literature agreed that economic welfare of economies is dependent on a stable and predictable economic environment while fluctuation in economic activities reduces growth and welfare of society. A highly volatile economic environment affects economic growth and welfare by disturbing investment, employment and education opportunities available to society (Romer & Romer, 2002). A vast amount of literature investigated possible internal and external sources of fluctuation to find out how instability could be removed (Blanchard & Simon, 2001). In early 1960s, Keynesian thinking gained popularity in economic literature and Minsky and Kaufman (2008) – leading authorities on monetary and financial institutions – claimed that the business cycle would become a thing of the past if policy prescriptions of

new economics were applied appropriately. However, in the late 1960s, monetarists challenged Keynesian model and Friedman introduced the famous “K-percent money growth rule” to achieve macroeconomic stability and eliminate the possibility that monetary policy actions may themselves be a source of economic instability.

Although it now seems difficult to support such a rigid monetary policy, the underlying idea of monetarism – M2 can stabilize economic fluctuation – is still relevant to investigations. Some studies provided empirical evidence in favour of monetary policy (Aastveit, Natvik, & Sola, 2013; Baker, Bloom, & Davis, 2015; Bekaert, Hoerova, & Duca, 2013; Bloom, Floetotto, Jaimovich, Saporta Eksten, & Terry, 2014; Jurado, Ludvigson, & Ng, 2015), while some studies provided theoretical models about the relevance of monetary policy to economic disturbance (Haag, Mueller, & Troitzsch, 2012; Pastor & Veronesi, 2012; Pástor & Veronesi, 2013).

Similarly, Friedman and Schwartz (2008) hypothesized a connection between real economic activity and M2 in their influential book named “*A Monetary History of the United States 1867–1960*” on one hand, while on the other hand numerous empirical studies investigated the effect of monetary policy on business cycles (Canova & De Nicro, 2002; Leeper, Sims, Zha, Hall, & Bernanke, 1996; Sims, Simard, & Joern, 1998; Temin, 1998). The empirical literature gave divergent opinions regarding the importance of monetary shocks in business cycle fluctuations. According to Sims and Zha (1998), supply of money did not generate the Great Depression and they did not considered monetary policy to be an effective tool against recessions. Canova and Nicro (2002) reported evidence that favored the effective role of monetary policy in G7 countries; moreover, Dornbusch (1979) also argued that during the last 40 years, the US Federal Reserve played a significant role in slowing down economic activities at times of expansion.

Moreover, there are some studies that examined how monetary policy shocks affect economic activities by estimating VAR, while other studies neglected monetary policy by arguing that the literature overemphasized the role of monetary policy because a small part of monetary policy can contribute to shocks that affect economic activities (Christiano et al., 1999; Galí, 2015). Korenok and Radchenko (2004) conducted a study to analyze the effect of a shift in the systematic component of monetary policy on business cycle fluctuations by utilizing the approach of Sims and Zha (1998). This study applied Sims' method to investigate the consequences of a change in a monetary policy response toward inflation from accommodating to aggressive during the late 1970s. First, the study used quarterly data and divided the time into two periods - 1959: II - 1979: II and 1979: III - 2002: III - to estimate VAR system and impulse response functions: Then, the study used the first period estimate of the monetary policy equation as counter-factual histories of macroeconomic variables in the second period. Finally, the study compared constructed histories with the actual series.

The study confirmed a relatively small effect of monetary policy shocks on business cycle fluctuations. At the same time, the variance decomposition results pointed to a more important role for monetary shock than previously reported. Secondly, the study concluded that monetary policy has a persistent (possibly permanent) effect on a business cycle, and the responses of RGDP, industrial production aggregates and employment to monetary shocks are mainly attributed to the response of the permanent component of the reference cycle. Finally, the evidence indicated that a systematic component of monetary policy has no effect on the shape of cyclical fluctuations after World War II and only a marginal effect on the size of fluctuations has been observed (Cogley & Sargent, 2005).

Romer and Romer (2004) argued that measures of monetary policy are a problem for empirical research because different measures produce different results of monetary policy on macroeconomic fluctuations. Interest rate is the most popular instrument of monetary policy

that has been used in VAR model because it was exceptionally volatile during the period of 1979 - 82 as a result of market-driven fluctuations.

Since Keynes (1936) suggested that stabilizing policies can remove fluctuations in macroeconomic activities, the role of monetary policy has been one of the most important and widely contested and discussed topics of economics and the debate on monetary policies as a stabilizing tool for output fluctuations continues (Lucas, 2003). However, the success of stabilizing strategies depends on dimension and nature of cyclical variation which further depends on technological processes, institutional features, agents' behavior and expectations. It is a matter of fact that the financial cycle is affected by numerous factors and procedures and can be activated by ambitious shocks in the strategies that are designed to affect supply and demand in product and financial markets. Moreover, monetary policy influences the business cycle directly by distressing the cumulative supply and demand and indirectly by formulating expectations and financial institutions (Papademos, 2003); therefore, stabilizing consequences of monetary policy rely significantly on the behavior of the financial sector of the economy. Although the literature and facts have established that monetary policy has weight in collective economic and financial activities in both medium and short run, these conclusions do not imply that monetary policy necessarily plays a stabilizing role (Arestis & Sawyer, 2002; Ghosh & Phillips, 1998; Khan & Ssnhadji, 2001; McCallum, 1999).

The empirical literature pointed out that although several industrialized economies, USA and G7, stabilized output fluctuations with the help of monetary policies in recent decades, some studies negate the role of monetary policy to stabilize economic activities and argued that a large part of cyclical output variability is attributable to supply shocks rather than demand shocks (Lucas, 2003). Romer and Romer (2004) used data from 1969 to 1996 and concluded that an increase in interest rate reduces economic fluctuations but the magnitude of impact of interest rate on economic fluctuations is different in different economies. Although the actual

effects of monetary policy shocks are considerably slighter than those initially was forecasted by Romer and Romer (2004) but the direct role of policy shocks in historical US business cycle fluctuations was too much greater than documented in the literature.

Several studies were conducted to assess the relationship between a bank's lending interest rate and asset prices and to inspect its relation to macroeconomic improbability. For example, Fase (1995) utilized the quarterly data for the Netherlands between 1970 and 1990; Fase (1995) studied a two equation structural model of short-term loans and found that credit demand is very sensitive to interest rate, and monetary policy used interest rate for credit targeting.

A study by Calza, Gartner, and Sousa (2003) used the quarterly data between 1980 and 2000 to examine the role of RGDP, short-term interest rates and long-term interest rates to determine the demand for loans to the household sector in euro area. The study examined a positive connection between the RGDP and real loans in the long run and inverse linkages among interest rates and real loans measures. In addition to analyzing the dynamics of real loans, the study used VECM and found slow adjustment toward long-run path. These results were repeated by Calza, Monacelli, and Stracca (2007) in their subsequent study for the euro area using RGDP, nominal lending rate and inflation rate as determinants of real bank loans. They found that credit overhangs/shortfalls can have a lasting impact on economic activities for an absolute time phase (Calza et al., 2007).

Ibrahim (2006) studied the responses of bank loans to interest rates in Japan and Malaysian context and estimated the first-differenced and established a significant relation of RGDP, asset prices, bank loans, and interest rate by using the VAR system. However, there is no sound evidence that asset prices and RGDP are influenced by bank loans. The empirical literature documented that interest rates affect bank loans and can affect economic activities

but there is still a gap in the literature because no study checked the direct impact of interest rates on macroeconomic activities.

2.5.4 Private Household Savings and Economic Fluctuations

The financial crises and resultant great recession of 2007 to 2009 experienced by developed countries was distinguished by an increase in the ratio of private savings to private disposable income. Several studies provided evidence that a rise in private savings played a significant role in the fluctuation of business activities in USA (Carroll et al., 2012), UK (Brealey, Myers, Allen, & Mohanty, 2012), and advanced economies (Mody & Sandri, 2012). Although a sound literature is existing to define the determinant of the private saving rates (Callen & Thimann, 1997; Mello, Kongsrud, & Price, 2004; Edwards, Ferner, & Sisson, 1996; Edwards, 1998; Loayza et al., 2000; Masson et al., 1998), but the relationship between private savings and economic fluctuation is a less researched area. Therefore, a strong knowledge about relationship of private saving and economic fluctuations is necessary to develop an understanding about factors that policy makers can utilize to control the situation of economic disturbance.

No doubt, household or private spending, which is the largest component of aggregate demand, and saving behaviors over the economic cycle can either amplify or reduce oscillations and variations in growth. Some studies investigated the ratio of cyclicity to private savings in OECD countries and found countercyclical behavior of private savings and concluded that private savings ratio dampens recession (Adema & Pozzi, 2012). Moreover, subsequent studies that were frequently conducted in developed economies like Canada, Spain, Sweden, UK and the USA found that private savings rises in 7 out of 10 reported economies and found a negative or countercyclical trend during the recent depression of 2007 and 2009 (Allen, Chan, Milne, & Thomas, 2012; Carroll et al., 2012; Mody & Sandri, 2012). The incentive to examine the role of household savings in economic fluctuations is based on

prior experimental facts or evidence that suggests divergent results regarding the cyclical behavior of private savings. Some earlier empirical studies suggested (Carroll & Samwick, 1997, 1998; Carroll et al., 2012; Carroll, 1994) that when there is a downfall in economic activities, households face greater income risk and accumulate more wealth that substantially amplifies consumption fluctuations (Parker, 2001; Parker & Preston, 2005) and such spending is occasionally considered an independent source of economic instability.

Changes in consumption have a large impact on economic activities because their contribution to GNP is more than 60%. Therefore, Keynesian “paradox of thrift” stated that a slight increase in savings decreases aggregate demand, which induces recession in economic activities. Similarly, the paradox of saving – people’s habit to save more during a recession and save less in good times – causes an increase in fluctuations in economic activities. Moreover, along with private spending or consumption and saving behaviors, federal spending fluctuations, on occasion, seriously interrupts the stability of the economy. For example, the upsurge in defense expenditure in Korean War during 1953 and 1954 and in Vietnam during 1965 to 1967 became as important and challenging for economic policymakers as changes taking place in aggregate private demand during the past 20 years.

Household consumption is an important variable factor of investigation in the empirical literature related to business cycle fluctuation. The propensity of spending probably can affect fluctuation in economic activities. Dennis (2008) argued that personal spending habits and the spending trend of society will effect economic cycle behavior. The empirical literature related to the relationship between an individual’s saving behavior and economic activities is scarce and divided into two standpoints. One stance declared that private savings are procyclical and the other proposed that it is countercyclical, which is unfortunate because both have different implications for business cycles.

When private savings move in a direction opposite to economic fluctuation it will help to diminish business cycle fluctuations because in a recession people will finance their spending from savings which was accumulated during a good time. This phenomenon will boost aggregate demand and the efficiency of fiscal policy is more able to resist depression. On the other hand, if private savings and economic fluctuations move in same direction then private saving causes to augment the variations in economic activities. Thus, a higher household saving ratio in depression and a lower spending ratio in boom worsen aggregate macroeconomic fluctuation.

There is conflict in the theoretical literature about the consequences of household saving on economic cycle (Carroll, 1996; Carroll, Hall, & Zeldes, 1992). According to the consumption smoothing hypothesis – life cycle/permanent income theories of consumption – the behavior of private savings lowers economic fluctuations because throughout a depression income becomes lower due to unemployment and people smooth spending patterns with their savings so that spending as a division of income increases while saving ratio reduces and lowers economic disturbance (Carroll, 1996).

The above discussion established that the cyclical behavior of saving affects the intensity of fluctuations. Moreover, according to “Buffer stock models”, private saving behavior can intensify situations because of defensive saving motives. Labor faces higher risk of unemployment – income uncertainty – at a time of recession, so a large portion of income is saved and depresses aggregate demand which boosts economic fluctuation and vice versa during upturns (Milbourne, 1988).

Although a few empirical studies investigated the cyclical relationship of private savings with economic fluctuation, literature is available in which the determinants of household saving are briefly discussed (Edwards, 1998; Loayza et al., 2000; Masson et al., 1998). The literature identified the growth rate per person, real or actual GDP, the inflation rate, the real interest

rate, the credit ratio, the government budget surplus, the size of the social welfare system and the dependency ratio as possible determinants of private saving. This study noticed this gap and investigated how private saving behavior affects fluctuation in macroeconomic activities.

2.6 Empirical Literature Review: External Shocks and Business Cycle Fluctuations

Calvo, Leiderman, and Reinhart (1993) conducted a study on emerging market economies. They used VAR methodology to investigate the role of external shocks in Latin American countries for the period of 1988 to 1991. They found that external shocks explain a large fraction of the variance in the real ER of these economies. Subsequently, (Canova, 2005) used VAR model with sign restriction on impulse response and found that US monetary policy shocks quickly transferred to eight Latin American countries. Similarly, (Genberg, McCauley, Persaud, & Park, 2005) used classical VAR model to investigate the role of external shocks in seven Asian economies and found that during the period of 1999 to 2000, a large fraction of variance in inflation was well explained by external shocks in six Asian countries – Taiwan, Hong Kong SAR, Singapore, Thailand, the Philippines, and Korea – but in China, external shocks did not play a significant role in their economy. Moreover, another study estimated the effect of US monetary policy shocks on G7 economies by using SVAR methodology and found that the spillover effect of US monetary policy on G7 economies was negligible. The study concluded that developed economies are less vulnerable to external shocks as compared to emerging economies (Mody, Taylor, & Kim, 2001). Moreover, a larger variation in interest rate and ER in emerging economies are explained by US monetary policy (Maćkowiak, 2007; Österholm & Zettelmeyer, 2008). Similarly, Sato and Zhang (2006) investigated the role of external shocks in east Asian economies by using SVAR and found that external shocks played a significant role in real output fluctuation in east Asian regions. The empirical literature showed that the behavior of low income economies toward external shocks is an under-researched area and most studies considered US monetary policy

as external shocks while the role of TO, remittances, foreign aid and climate in low income economies was badly neglected. Thus, this study contributes to the literature by introducing a unique set of external factors that can significantly affect low income economies.

2.6.1 Trade Openness and Business Cycle Fluctuation

In recent years, the world economy has become more integrated due to an increase in trend of openness and fund inflows and outflows between economies. Almost every country is trying to increase trade with other countries in order to increase mutual benefits. Therefore, any sudden shock has a greater influence on business cycle fluctuation. In developing economies, macroeconomic fluctuations are a commonly observed phenomenon that reduces growth rate and welfare (Borjas & Ramey, 1995; Hnatkovska & Loayza, 2004; Stephane Pallage & Robe, 2003) and has an impact on wealth allocation, scarcity and poverty (Calderón & Levy-Yeyati, 2007). Therefore, it is necessary to investigate the causes of macroeconomic instability.

In LICs, macroeconomic fluctuations reflects that country has greater exposure to larger external shocks - which is calculated by the sensitivity of financial development to TO and external shocks – and weak to absorb the effect of external shocks. Moreover, it has been observed that an increase in level of worldwide trade and economic incorporation weakened business cycle fluctuation considerably in the world over the last 20 years. On average, the fluctuations in RGDP per capita in 2015 are just about 60% of total fluctuations that industrial and developing economies experienced in 1985 because of having tendency to increase large scale business through removing the trade barriers. However, due to high world's integration into goods and money markets, the causes of economic instability are unclear both theoretically as well as empirically. Therefore, high integration will enhance development and social wellbeing on one hand while on the other hand this incorporation and integration also provide the reason of waste disclosure to foreign shocks and upsets.

Free trade introduces specialization in production among tradable industries and causes an increase in growth fluctuations. It implies that the economies that are more trade friendly are more vulnerable to industry-specific shocks, which can spread across an economy. In addition, there is a lack of consensus that whether free trade causes economic and financial instability. Calderón and Schmidt-Hebbel (2008) argued that countries that have a higher degree of trade incorporation have a great resistance to the upsets and shocks to economic development.

Moreover, Calderón and Hebbel (2008), investigated the impact of free trade and economic incorporation on economic instability by examining the data of 82 different economies in the period 1975 to 2005; the study also examined the way in which an economy's individuality – such as the level of heterogeneity of exports and financial activity – affected aggregate fluctuations at disaster time interval or recession (this is checked by sudden decline in growth of economy). The study found that although TO alleviate shocks to economic instability, the economies with a tendency of high free trade had low susceptibility to experiencing a decline in development, but the economies that had greater levels of specialization of production and exports had greater chances of instability.

Similarly, Cavallo and Frankel (2008) found that the economies that have great economic directness are more susceptible to practice growth decline if their foreign accountabilities are more influenced in the direction of loans. The findings are consistent with Levchenko and Mauro (2007) research in which a sound panel data set was used which contained higher, up-and-coming, and rising economies in the period from 1970 to 2003. Study investigated the different type of flow of FDI, portfolio equity investment, portfolio debt investment, flows to official sector, banks flows and nonbank private sector flows, and found that there is quick and constant decrease in bank lending and official flows during and after the recession. FDI and portfolio equity are flexible to sudden stops - drops in total net financial inflows of more

than percentage points of GDP compared with the previous year- while sharp and persistent fall in bank lending and official flows during and after sudden stops has been observed.

Similarly, Kose, Prasad, Rogoff, and Wei (2004) identified that the literature is divergent about the impact of TO on economic activities. Some studies found that TO significantly and positively affects economic activities (David, 1993); Dollar (1992); (Frankel & Romer, 1999; Sachs, Warner, Åslund, & Fischer, 1995) while other recent literature found that the effect of TO on economic growth is not robust (Rodriguez & Rodrik, 2000; Rodrik, Subramanian, & Trebbi, 2004), because of geographical latitude, exclusion of relevant control variable, inadequate data and inappropriate estimation technique. Rigobon and Rodrik (2005) used a technique of identification through heteroskedasticity and reported a negative association between TO and economic growth by including institution and geography. A subsequent study also used the same technique for estimation and found a positive but small impact of TO on economic activities (Lee, Ricci, & Rigobon, 2004). Therefore, overall, the relationship between TO and economic growth is ambiguous and provides space for further investigation.

There are a few studies (Calderon, Loayza, & Schmidt-Hebbel, 2004; Dollar & Kraay, 2003; Irwin & Terviö, 2002; Wacziarg, 2001) which discussed the role of trade liberalization in business cycle fluctuation. These studies observed that external shocks have a small effect on those economies that are experiencing a high degree of TO. Moreover, trade liberalization may induce growth fluctuations, if a country is introducing more specialized pattern of production in some main items then country will become weaker to absorb the term of trade shock and disturb the economic growth from its trend pattern (Easterly, Islam, & Stiglitz, 2000). Thus, trade integration may augment economic activities but also may heighten vulnerability to external shocks, raising growth fluctuations.

It is said that free trade may act as a cushion to (domestic and foreign) country-specific shocks if efforts are made to diversify export portfolio through more expanded pattern of growth and broadening of business allies. A study conducted by Cavallo (2006), which utilized the cross-sectional data of almost 77 economies, between the time period of 1960 and 2000 and assesses that although free trade is reason to mitigate the output instability. The empirical results of the study indicated that 25% boost or increase in the trade to GDP ratio is a reason to decrease more than 40% growth fluctuations. On the other hand, Giovanni and Levchenko (2009) documented that the empirical literature is not very clear about the connection between macroeconomic instability and free trade because of confusion about the mechanism through which TO affects economic activities. Moreover, study identified three different ways in which free trade affects output instability. First, it established that TO increases output fluctuations by increasing the degree of exposure of manufacturing industries to external and exterior upsets. Second, the study argued that diversification of production across sectors may cause fluctuation; and third, the changing pattern of co-movement of the trading sector with the rest of economy may reduce fluctuation. The first two channels create fluctuation in economic activities while the third channel smooth instability. Moreover, Giovanni and Levchenko (2009) used unbalanced panel data of 28 industrial sectors from 61 economies over the period of 1963 to 2003 to investigate the impact of TO on output fluctuations and confirmed that TO as a possible channel of growth fluctuations. Empirical results showed that a 60 percentage point increase in TO raises growth fluctuations by 17.3%.

Strotmann, Döpke, and Buch (2006) recognized the mechanism through which TO affects fluctuations by using firm-level data for Germany and found that exogenous shocks severely affect the productivity of firms producing export items and causes output fluctuations, while on the other hand, a defective relationship between local and external upsets may decrease

the impact on growth instability for industries that are producing tradable items. However, empirical results contradict the theoretical literature and authors found that export firms' sales show lower variability in their output as compared to purely domestic firms. Moreover, Cavallo and Frankel (2008) assessed the impact of free trade on countries ability to absorb external shocks. The authors argued that any sudden changes in trade agreement may restrict imports and generate loss in trade credit for the economies that are more integrated to global markets, while on the other hand Rose (2002), documented that free trade provide the resistance or support that minimize the external upsets; so open economies have less chances to defaulting their foreign liabilities or debt.

As Cavallo and Frankel (2008) used a sample of 162 countries for the period from 1970 to 2002 to assess the role of trade and financial openness in output fluctuations after controlling for reverse causality between TO and other shocks. They found that countries with greater trade linkages were less prone to sudden stops and currency crashes. Moreover, study showed that a 10 percentage point increase in trade output ratio reduced probability output fluctuations by 40%.

Moreover, Shin and Wang (2003) emphasized that trade integrity among industries as well as countries causes business cycle fluctuations. Eichengreen (1992) and P. Krugman and Lawrence (1993) explained that if trade within the industries integrate with each other in order to increase trade business then trade integration significantly causes business cycle fluctuation. Moreover, a strong incorporation of trade boosts trade within industries and is a reason to advance specialization in firms. So, any specific sector upset may convert into regional upset, which raises the chances of symmetric modifications in economic cycle.

Frankel and Rose (1998) stated that the economies that have strong and faster business relations with each other tend to face strong connected business cycle fluctuations (Baxter &

Kouparitsas, 2005). According to the theoretical literature, a positive demand-side shock and industry-specific shocks are driving forces of business cycle fluctuation. A positive supply shock increases demand for imports and the effect of this phenomenon on the economic cycle of business co-workers depends on the degree of trade integration among these countries. Moreover, industry-specific shocks have a negative association with output fluctuations in developing countries if rising growth specialization clutches the trade within the industries.

2.6.2 Worker Remittances and Business Cycle

During the past three decades, developing economies have constantly experienced an increasing trend in workers' remittances. Middle income countries received 68% of total remittances while LICs have 32% share of total remittances. However, in LICs, the average annual growth rate of remittances of 15.9% is greater than the 10.8% growth rate of remittances in middle income countries (Freund & Spatafora, 2005; Ratha, Connell, & Bolle, 2003). In addition, the remittances account for 1.9% increase in economic growth of countries which have low income, 1.4% for countries which are lower middle income, and the contribution of remittances to GDP growth declined to 0.8% in UMICs, which shows the value of fund inflows as a reason of foreign exchange earnings in home economies in under-developing countries. Moreover, in LICs the ratio of remittances to imports reached 6.2% and 2.7% for UMICs. All the facts indicate that LICs depend heavily on remittances for economic growth as compared to UMICs and remittances became a prominent source of external finance among other sources of exterior investment or finance – FDI, external debt and foreign aid – in LICs and UMICs (Freund & Spatafora, 2005). Therefore, any shock to remittances will obviously bring change to economic activities and the growth rate will be deviated above or below the trend growth level in less revenue economies.

Remittances in LICs have continuous increasing patterns and it is generally observed in developing economies that remittances are a more stable source of financing of economic activities than confidential funds stream. The private capital inflow boosts economic activities in good times and negatively affects them at bad times in recipient countries. The situation reinforces that remittances are procyclical (i.e. they move in the same direction in which economic activities move), which in turn increases the severity of financial disaster in the recipient economies. On the other hand, remittances are often considered a possible way of preventing fluctuation in economic activities in migrants' residence countries at a time of financial adversity. However, some empirical finding indicated a negative relationship between remittances and business cycle fluctuation and suggested that workers' remittances help economies to overcome a decline in GDP at a time of harsh financial disaster (De, Islamaj, Kose, & Yousefi, 2016). It has been documented that at a time of financial crisis, Indonesia (1997), Ecuador (1999) and Argentina (2001) experienced a very quick boost or increase in remittances (Freund & Spatafora, 2005), which enabled them to control the financial crisis smoothly. From a macroeconomic perspective, when there is down cycle of economic activities in a home country, migrant workers send more remittance to their family members for financial support and compensate families' lost income because of joblessness and other financial crises.

A lot of literature is available on the factors that significantly affect the flow of worker remittances (Ali, 2012). In addition to supporting families, remittance behavior is affected by many variables such as pure altruism, pure self-interest, coinsurance, loan repayment, exchange motives and strategic behavior (McCoy, Nziramasanga, & Yoder, 2007). Various factors like interest rate differential and ER affect remittance behavior differently, and stabilize or destabilize economic activities. Pro-cyclical behavior – positive relationship between remittances and output – of remittances increases fluctuation while countercyclical

behavior – negative relationship between remittances and output – helps to stabilize economic activities. Previous studies accepted that remittances play a significant role in the economic activities of LICs and UMICs; however, the pro-cyclical and countercyclical behavior of remittances has different implication for these economies. Moreover, evidence based on the group of countries related to behavior of remittances regarding business cycle may be different from country-specific dynamics of remittances.

Remittances are basically utilized to fulfill the expenditures' need in the recipient country; they have the possibility to set off unfavorable growth changes and effect economic activities during a financial crisis by increasing aggregate spending. However, the effect of remittances, whether to stabilize or destabilize economic activities, depends on the methods and abilities of the economies to utilize this source of external finance at a time of business cycle fluctuations. If movement in remittances and output are in an opposite direction then it will help to smooth macroeconomic fluctuation, but if remittances and output move in the same direction then they cease to amplify business cycle fluctuations.

The theoretical literature suggests that the size of remittance depends on the motives to remit. The empirical literature concludes that self-interest and self-benefits for personal egoism are two incentives for remittances or transfer of funds (Dorantes & Pozo, 2006; Lucas & Stark, 1985). In the case of altruism, remittances are sent to recipient countries without any future benefits or expecting any incentive for individuals. Remittances sent to families at a time of economic crisis stabilize aggregate spending. When migrants have a motive of self-interest motive, remittances are sent to the home country for the purpose of investment. It has been observed that at a time of boom more remittances are sent, while fewer remittances are sent during a recession which amplifies the crises.

Experimental studies related to remittances performance during the ups and downs in economic activities are ambiguous. A few recent studies argued that a transfer of funds from abroad is mainly an unselfish act and helps to smooth fluctuations in economic activities (Bettin, Presbitero, & Spatafora, 2015; Frankel, 2011). By contrast, other studies stated that the speculation induced by remittances upsets macroeconomic activities (Giuliano & Ruiz-Arranz, 2009; Lueth & Ruiz-Arranz, 2008). According to Durdu and Sayan (2010), a countercyclical flow of remittances can mitigate macroeconomic fluctuations while procyclical flows can deepen it. Moreover, the behavior of remittances regarding macroeconomic fluctuations may be different in host as well as in home country. Remittances are a more stable source of finance than private capital and have a smoothing role in the economic cycle in recipient countries (Ratha, 2007).

Sayan (2006) investigated the relationship between remittances and business cycle fluctuations by utilizing polynomial fitting model for 12 developing countries over the period of 1976 to 2003. Sayan (2006) got the cyclical component for each series by removing trend for different time series. With the help of cyclical component, the study computed concurrent cross-correlation and asynchronous correlation coefficients and found that the behavior of remittances were countercyclical with business cycle fluctuations in the collective sample economies for the period of 1976 to 2003. However, the results at individual country level are inconclusive because it has been observed that in some countries its behavior is countercyclical, for some other countries it is procyclical and in some economies its behavior is cyclical.

Similarly, Okello and Anguyo (2006) contributed to the debate of positive or negative association of remittances with macroeconomic fluctuation by investigating movement in worker remittances and macroeconomic fluctuations for Uganda by analyzing yearly data for

specific period of 1992 to 2005. They used the Hodrick and Prescott (1997) filter and Christiano and Fitzgerald (2003) filter to separate the time-varying tendency from each variable. The Christiano and Fitzgerald (2003) asymmetric band pass filter is superior to symmetric band pass filters like Baxter and King (1999) because the symmetric filter requires the same number of lead and lag terms for every weighted moving average. This results in omitting observations both at the beginning and at the end of the sample while asymmetric filters, like the Christiano-Fitzgerald filter, do not require this and therefore can be estimated to the extreme end points of the original sample by allocating different weights on the leads and the lags depending on data. Moreover, by utilizing correlation analysis this study found that transfer of funds proceeds to Uganda amplify business or commerce rotation or cyclical fluctuations of that specific economy.

Hindustan received \$28 billion remittances income in 2007 and ranked top remittance receiver in the world. Gupta (2005) established, by using simple correlation analysis, that the general factors that give details about remittances are the self-motivations that motivate the worker to transfer funds to an Indian country. This study used Hodrick–Prescott filter and first difference to show cyclical behavior of data and concluded that the funds inflow to India has a strong positive correlation with financial or economic situation in the host economy but it has a small negative correlation with economic conditions in India.

Sayan and Koru (2007) improved procyclical and countercyclical arguments by examining the behavior of remittances from Turkish workers who are living in Germany. The study examined whether the inflow of remittances from Turkish migrants helped to reduce poverty rate in Turkey or not. They used polynomial fitting model or Hodrick–Prescott filter to separate the cyclical component from permanent component of time series; then Sayan and Koru (2007) investigated cross-correlation between cyclical component of remittances and

GDP of German and Turkish economies. They documented that the cyclical factors or determinants of mutual circulation of the actual funds inflows from Germany and the real or actual GDP in Turkey are positively related, at the same time funds transformation flows from Germany to Turkey are positively related with German financial system. They found that transfer of funds in the shape of money from Germany to Turkey probably increased variations in Turkey and disagreed with financial hypothesis which predicts countercyclical behavior of remittances with the home country's business cycle.

A study conducted by Lueth and Arranz (2007b) in Sri Lanka examined to what degree laborers' funds give support to Sri Lanka at a time of economic upsets by estimating a VECM for the time period 1996 to 2004. The study also investigated the behavior of remittances when there is large disturbance in macroeconomic variables like RGDP, ER, and relative interest rate in the host economy. The study used world oil price as a proxy for RGDP because the data on GDP for the host economy was not continuous. Lueth and Ruiz-Arranz (2007b) concluded that inflow of the money is positively correlated with recipient economy's financial situation and it amplifies the economic crisis rather than lessen them.

A study conducted by Silva (2009) examined the ups and downs in transfer of money by migrants to Mexico. However, this study was unable to give a clear verdict about the behavior of remittances, that is, whether it was positively or negatively correlated with economic fluctuation, but the study identified several factors that affect the inflow of remittances to Mexico.

Agarwal and Horowitz (2002) concluded that remittances that are induced by altruist forces may smooth business cycle fluctuation in the recipient economy while fund inflows through personal interest or self-motivations enhance fluctuations that destabilize the receiver's economy (Briere, Sadoulet, Janvry, & Lambert, 2002); Woodruff and Zenteno (2001). The

above research indicates that the empirical literature is unable to provide a judgment on the relationship between remittances and macroeconomic fluctuation in recipient country.

Vargas-Silva (2008) studied the relationship of remittances and business cycle fluctuation by using a Baxter-King filter to decompose the cyclical portion of a major macroeconomic time series. Vargas-Silva (2008) assessed whether funds inflow stabilizes economic fluctuation or amplifies macroeconomic disturbances by computing cross-correlations among the cyclical factors for both contemporary and broken up the series downward and moving up to three sections or portions. Finally, the study applied a VAR model, an econometric estimation technique, to build the instinct or urge to response functions to present the predictable answer of every factor when upset is observed to another variable. This study used quarterly data for timespan 1981 to 2006. The experimental results exhibited that remittances are linked countercyclically and considerably with the receiving economy, while funds inflow has a feeble or weak but pro-cyclical association with host country's economic situation or activities. Similarly Vargas-Silva and Huang (2006) studied the factors affecting laborers' payments, in other words the remittances, for many Latin American countries – Brazil, Colombia, Dominican Republic, El Salvador and Mexico – by utilizing quarterly data from 1981 to 2003 and working through a VEC model to check the phenomenon that funds inflow are affected by economic situation of USA (donor economy) or the economic situation of recipient economies in Latin America. The empirical results indicated that remittances strongly and negatively affect macroeconomic conditions in recipient country, while the host country's business cycle is positively related with remittances sent to home country.

A later study by Durdu and Sayan (2008) documented more complex and divergent results about the implication of variations in funds inflow for various economic factors and “sudden stops”. This study presented evidence about inflow and outflow of remittances between

Mexican and Turkish economies by using small economy calibrated with financial frictions. The study found that in Mexico remittances are countercyclical and stabilize macroeconomic fluctuation while in Turkey remittances are procyclical and amplify business cycle fluctuation. Their empirical results showed that fund inflow reduces the business cycles in Mexico while they boost business cycle activities in Turkey.

In addition, Magnusson (2009) applied a more regional approach to examine the relationship between funds flows between Latin America and USA and economic cycles. Magnusson (2009) argued that the empirical evidence is not supportive of connecting aggregate economic variables in USA to remittances and payments transfer to Latin America. He stated that Hispanic immigrants are concentrated in specific areas rather than uniformly spread across the USA, thereby it causes difficulties, in general, to find connections among great economic factors – GDP and funds flow – and remittances to the Latin American economies. Therefore, Magnusson (2009) suggested the application of local economic and financial indicators like “state-level business cycles and state-level employment” in construction and leisure sector, as a method of standard measure of economic cycle values in that region where the majority of Spanish migrants are employed. This study used quarterly data for Mexico and El Salvador and by using the Hodrick–Prescott filter and first-difference study attained the cyclic segment of time series. The empirical findings revealed that the payments or funds sent to Mexico and El Salvador and country-level factors are strongly and positively correlated with each other. Magnusson (2009) also proposed a distributed lag model as a robustness check and assessed regional business cycles on the basis of remittances inflows, this study concluded that funds flow towards Mexico and El Salvador are considerably affected by economic or business situations in both constructive and leisure sector. Overall, Magnusson found that in the USA, regional business cycle indicators show a significant and positive relation with transfer of funds to Mexico and to El Salvador.

Giuliano and Arranz (2009) documented the relationship among funds inflow and output variations by focusing the capacity of local financial sector development to take advantage of remittances and utilize it to overcome domestic fluctuation in economic activities. Moreover, the study concluded that in two-thirds of countries in the test, funds inflow is positively correlated with home economic cycle, whereas for the rest of the data sample funds inflow and local growth of country are negatively correlated with each other.

Gradzka and Roache (2007) employed correlation and co-integration examination – a distributed lag estimation model and dynamic factor model (DFM) – to judge the potential relationship among fund inflows to USA and Latin American economic cycle. Their empirical results suggested that remittances are a permanent financial support for foreign finance in case of macroeconomic fluctuations in home economy. The recipient of remittances stabilized economic fluctuation by keeping their consumption patterns smooth. Similarly, in the host country, the business cycle moderately affects the flows of remittances. Further correlation and co-integration analysis of the study indicated that only a few states of USA experienced a long lasting and steady link among growth variations and fund inflows. However, the researchers commented very clearly that a small sample size may have produced biased results.

Gradzka and Roache (2007) were pioneers of using a DFM to examine fund inflows and economic cycle variations. Utilizing a standard DFM, the study assumed a linear relationship between a portfolio of pre-examined variable factors including US economic cycle and fund inflows and a group of unnoticed "state variables" or ordinary features. They claimed that there is a feeble or fictional connection between capital inflows and the macroeconomic factors of USA. As Beveridge and Nelson (1981) employed an autoregressive integrated

moving average methodology to extract cyclical component and found that major fluctuations in growth could be credited to the trend component.

Stojanov and Strielkowski (2013) reported some important reasons that motivate researchers to investigate the link between migration and development during the last two decades. Generally, people migrate because of environmental change or climate variability, policy, war conflict, loss of housing options (construction of dams, urbanization), education or work but the differences between income levels in particular countries particularly motivate labor to migrate from the country of birth. People from LICs migrate for work to developed countries and many of them send remittances back to their country of origin to support their families and relatives (Lucas, 2005). Several studies supported the view that remittances have a positive effect for developing countries and considered remittances a source of improvement in living standard and a way to lower the risk of poverty. Remittances affect health and education opportunities for migrant households and help sustain economic activity and improve balance of payments (Lucas, 2005). Therefore, any type of instability in remittances affects financial policies and causes fluctuation in economic activities (Ruiz & Silva, 2014).

The literature discussed the determinants of remittances and their effect on the economic growth of recipient countries. A few studies documented the relationship of remittances and fluctuation to macroeconomic activities; the studies conducted in this research field were concentrated in the USA and produced ambiguous results. Therefore, this study is conducted to clarify the role of remittances in macroeconomic disturbances.

2.6.3 Climate and Business Cycle Fluctuation

Some empirical studies (Dell, Jones, & Olken, 2008, 2009; Olken, 2009; Preston & Jones, 2006) have investigated the effect of temperature and rainfall on economic activities and

found a bad climate – higher temperature – adversely affects economic activities in poor countries and an increase of one degree Celsius causes 1.1 percentage point decrease in economic growth. Moreover, temperature can affect the economic activities of poor countries in two ways. First, it affects the level of output by affecting crop yield. Second, it influences growth rate by creating an effect on investment. The results suggested that persistent effects of warmth and hotness shock not simply reduces output, but an increase in heat leads to a decline in yield rates, not just the level of growth. Therefore, evidence suggested that temperature affects economic growth through the different channels of agricultural output, industrial output, investment, innovation and political stability, which are usually not considered while making an assessment of the potential impact of climate change on poor countries. For the past decade there has been extensive literature that discusses the function of environment or weather in economic growth but the results are still inconclusive.

Early growth theories identified savings, investment (Solow, 1956), human capital (Romer, 1990), and technology as possible determinants of economic activities. After industrialization, the productivity of factors of production and economic growth are determined by world market conditions rather than home market condition. Moreover, productivity in the agriculture sector tends to diverge across countries while productivity in manufacturing and services industry converges (Bernard & Jones, 1996a). LICs have scarcity of financial assets and are weak in human and capital formation which ultimately affects the scale of production in these economies. Similarly, the traditional agriculture sector does not have the capacity to support high tariffs, rates of reserves and speculation or investments on its own behalf. Thus in order to increase saving growth rate and investment motives, LICs depends on specialization and trade for economic growth. However, various biophysical reasons have an effect on the efficiency and yield of farms and unskilled workers which, in turn, affect the rate of factor addition and comparative significance of different development

mechanisms. Different regions have different climate conditions (rainfall, water level and availability, hotness and its variation, length of the day) which can affect economic activities directly (Bailey et al., 1989; Geiger & Pohl, 1954; Holdridge & Grenke, 1971; Thornthwaite, 1933; Walter & Breckle, 1985).

Bernard and Jones (1996b) investigated the impact of temperature on agricultural activities and found that growth in agricultural activities is very high in countries that have moderate temperature, while in hot areas the growth in agricultural productivity becomes slow and in some areas it even decreases (Fulginiti & Perrin, 1997; Mellinger, Sachs, & Gallup, 1999).

There is mounting empirical literature that changes in climate affect the activities that make a large contribution to economic growth (Dell et al., 2009; Dell, Jones, & Olken, 2014; Gualdi et al., 2013; Parry, Canziani, Palutikof, van der Linden, & Hanson, 2007) and researchers are proposing a greater role for climate in sustainable economic growth (Change, 2014). This study provides some initial findings that demonstrate the role of climate change in economic activities in the coming decades. The focus of this study is to assess how a sudden change in climate affects macroeconomic activities in LICs where climate is an exogenous variable and policymakers are unable to incorporate climatic changes in their policymaking to stabilize economic activities. Although the literature discussed the economic impacts of climate (Agrawal & Perrin, 2009; Nordhaus, 1994, 2007; Stern, 2007; Tol, 2005) and the cost of climate policy action (Adema & Pozzi, 2012), there is no consensus on the size of impact of climate on aggregate economic activities (Change, 2014; Pachauri et al., 2014; Stocker et al., 2013).

Some in-depth regional studies like Garnaut (2011) and that of Ciscar et al. (2014) reported the economic consequences of climate change. Most remarkably, Stern (2007) concluded that the change in the weather could decrease the per capita consumption by 5 to 20% and

permanently lower the welfare of society by an equivalent amount. Most empirical research work used an integrated assessment model for their projections of climate change impacts on economic activities, but comparing these models is difficult because each model included different impact categories which are ambiguous and vary broadly in their projections for worldwide macroeconomic consequences. A few studies employed computable general equilibrium models to examine the impact of climate change on a specific sector in a comparative static setting (Bosello, Roson, & Tol, 2007, Bosello, Eboli, & Pierfederici, 2012; Eboli, Parrado, & Roson, 2010; Roson & Mensbrugghe, 2012).

This study contributes to the literature by modeling climate change in VECM and by developing an impulse response function that forecasts that any shock to one variable will cause change to another variable; in particular, how the economy will behave in a predicted time period if a shock is given to climate. Moreover, most studies documented the effect of terms of trade on GDP based on an assumption that climate change affects agricultural activities that cause terms of trade to deteriorate, but the literature considered terms of trade a weak determinant of the entire financial and economic impact of climate change because it is unable to affect the wellbeing of society and it does not enable understanding of the macroeconomic cost and consequences of climate change impacts.

It is necessary to estimate the effect of weather changes on GDP fluctuation because it will inform financial and strategic planning. To avoid the impact of unexpected weather variation on the economic situation, it is necessary to have adequate knowledge about climate change impacts on aggregate economic activities. The historical debate on the connection between weather and countries' financial and economic presentation revealed that warm regions tend to be weak in financial situations (Nordhaus, 2006) as compared to countries with a moderate climate. It has been observed that per capita income decreases 8.5% on average per degree Celsius rise in temperature (Dell et al., 2009), and it has further been suggested that hot

weather also affects living standards. However, the magnitude of the correlation between national income (NI) per capita and one degree emission of Celsius is still uncertain. Factors other than the temperature–income relationship are more important in the drive for prosperity in the current era (Acemoglu, Johnson, & Robinson, 2005; Rodrik et al., 2004; Sachs, 2003).

Some studies advocated that the economic effect of climate at micro-level can be aggregated to forecast the net effect of climate change on NI (Mendelsohn, Morrison, Schlesinger, & Andronova, 2000; Nordhaus & Boyer, 2000; Tol, 2002). Although the empirical literature related to climate change favored this approach and used it as a basis for a number of recent strategic suggestions concerning greenhouse gas emissions, this approach faces a number of challenges, such as how individual or micro-ranked effects interrelate with aggregates to shape macroeconomic upshots. A study by Dell et al. (2008) explained that climate shock – fluctuations in temperature – affects the path of NI by affecting aggregate output directly. The research established that a high level of heat has a significantly negative impact on financial and economic development in financially deprived economies and 1°C increase in temperature in a certain year caused to financial development to decline by about 1.1% in that year, whereas in rich or developed countries, variations in temperature had no significant effect on development or growth. Moreover, the study suggested that temperature changes the level of production by changing farming output and by disturbing reserves or investments that have the power to change production and output. Furthermore, a low output level has major consequences over time and if the growth effect continues in the medium run they permanently influence economic activities.

A bad climate brings changes in poorer economies through different channels, for example, a high temperature lowers growth rate, contracts agricultural output, and lowers collective investment and manufacturing growth. Moreover, in poor countries high temperature badly affects technical and scientific research work which impedes innovation activities and creates

political instability that obstructs the overall development process not just at the level of production. Although “climatic theories of development” have a long history, they are still the subject of modern debate. Thus, this study updates older debates related to the role of climate in economic development by recognizing the considerable current outcome of temperature on growth at not only the micro-level but on the aggregate economic system. Recently the Intergovernmental Panel on Climate Change produced an ambiguous report on the topic of climate and weather change and economic growth. This unclear report invited researchers to investigate the role of climate change in economic activities. Evidence suggests that higher temperatures and intense climate events – natural disasters like floods – and the quantity of food which we can grow are affected by changes in the weather; accessibility of water reserves and other factors can increase the scarcity of food, water and energy resources, which leads to them becoming more expensive and this, in turn, creates disturbances to mechanism of supply and competition for limited resources. Furthermore, all these climate changes will act as a threat to increase poverty and illness, and through a multiplier effect these problems will transmit throughout the economy.

Climate change is a major challenge for the world’s economy, but estimating the financial impact of climate change is even more complex because the channels through which climate affects aggregate output are still ambiguous. Even if one has knowledge about each relevant mechanism, it is still difficult to know through which method a variety of instruments or mechanisms interrelate to shape a true picture of macroeconomic outcomes.

Here is a summary of the literature that reveals the complexity and ambiguity of the climate–economy relationship. Moreover extensive literature concluded that most empirical studies focused on the impacts of climate on cultivation and farming (Adams et al., 1995; Deschenes & Greenstone, 2007; Erdemgil et al., 2007; Mendelsohn, Dinar, & Williams, 2006), on ocean fisheries, availability and access of clean water, storm frequency, migration, and various

other potential problems (Parry et al., 2007). Regarding financial growth, a few studies discussed the traditional thought that there is a connection between efficiency and warmth (Huntington, 1915; Marshall, 1890; Montesquieu, 1750). The literature documented the considerable effect of hotness on mortality (Curriero et al., 2002; Deschenes & Greenstone, 2007; Deschenes & Moretti, 2007), crime rate (Field, 1995; Jacob et al., 2007), and drought (Miguel, Satyanath, & Sergenti, 2004), all of which are directly or indirectly related with aggregate economic activities. This study examines the impact of a hot climate on aggregate economic activities and totally ignores the mechanism through which climate affects aggregate output.

The economists Marshall Burke, Solomon Hsiang, and Edward Miguel from Stanford and the University of California Berkeley offered a fresh study of the impacts of climate change on macroeconomic growth with two surprising conclusions. First, contrary to past studies, they concluded that the warm climate of the twenty-first century will bring huge global-scale macroeconomic impacts and that the usual emission of gasses in this century will lower per capita GDP by 23%. Second, they argued that starting temperature determines the size and direction of temperature: the countries with 13°C (55°F) per year temperature will experience fall in GDP growth rate as temperature increases while for cool weather regions, temperature will be a monetary bonus (Burke, Hsiang, & Miguel, 2015a). Therefore, the gap between rich and poor will become greater in future and the non-linear response creates a massive redistribution of future growth, away from hot regions and toward cool regions. During the last two decades, economists have debated the relationship between climate change and economic activity but still the challenges of estimating the economic impacts of climate change are daunting. Leading economists, including Nicholas Stern at the London School of Economics and Political Science, Robert Pindyck at MIT, and Martin Weitzman at Harvard have great skepticism about the architecture of historic approaches and argued that they are

deeply defective, which indicates that it is not too surprising that empirical estimates are diverse.

Hsiang and Burke (2014) conducted a study to examine the historical response of annual economic fluctuations to annual temperature variations for 166 countries over the timespan of 1960 to 2010. The study used an observational approach that restricted the ability of the researchers to say much about responses to warming outside the range of historical variation while the strength of this study is that it simply described what happened. However, the study underestimated the actual damages of climate change on economic growth by neglecting the collapse of a major ice sheet which raised the sea-level by several meters. A difference between historic approach and Burke and colleagues estimate is that the new approach estimated the impact of warming on economic growth rather than on current output.

Several studies have been conducted to estimate the climate change impact on output but a few have been conducted to estimate the impacts of climate change – high temperature – on macroeconomic fluctuations. However, new empirical studies documented that the effects on growth are much more persistent than impacts on current output. According to (Moore & Diaz, 2015), when a study swaps growth impact for current output impacts, it leads to a several-fold increase in economic damages per additional ton of carbon dioxide released to the atmosphere. Similarly, Bussolo, de Hoyos, Medvedev, and van der Mensbrugghe (2008) have documented a correlation between macroeconomic movements and temperature and concluded that in poor countries where climate tends to be hot, economic growth rate is very low. On the other hand Hsiang, Burke, and Miguel (2013) identified a nonlinear relationship between growth and climate and established a threshold point where temperature has little or no effect until a point of rapid collapse. Below the threshold point, low temperature has positive effects on economic growth but after that point high temperature has negative effects

on macroeconomic activities and implies the possibility of strong growth sensitivity across a wide range of temperatures. Of course, all the results highlight unequal economic impacts of warming on hot region, such as Asia, Africa, and the Americas, and cold regions, such as Scandinavia.

2.6.4 Foreign Aid and Business Cycle

“Foreign aid” is a term which is commonly used publicly, mostly in the media and at government level. Foreign aid describes technical and financial help given by one country’s government to another economy to support economic and social progress or to correct the financial upset in recipient country. Foreign aid can be in the form of loans, donations or grants, technical recommendation, schooling, tools and commodities such as foodstuff, health care, transportations and infrastructure. Before 1950 ‘military assistance’ was also considered a variety of financial assistance or foreign aid. Although some economies still grant military assistance and equipment to other economies, nowadays it is commonly termed as “foreign military assistance” (Wells, 2015).

Numerous studies have examined the effectiveness of foreign financial assistance on economic growth in both developed and developing countries (Bacha, 1990; Dimanche, 2010; Durbarry, Gemmell, & Greenaway, 1998; Fatima, 2014). The empirical literature on effectiveness of aid flows is divided into two main positions. The pro-aid researchers documented that foreign aid is effective in stimulating long-term growth in recipient nations (Dabla-Norris, Minoiu, & Zanna, 2015; Dabla-Norris, Minoiu, & Zanna, 2010), while Boone (1996), Lensink and White (2001), Easterly (2003), Malik (2008), Malik (2008), and Hamid (2013) opposed these findings by establishing arguments against the effectiveness of foreign aid and they contributed to the anti-aid literature. However, the impact of foreign aid on business cycle fluctuations in recipient economies is not empirically well researched.

It is very important to examine how foreign financial assistance affects business and economic cycle fluctuations in recipient economies. In the previous decade it was observed that before worldwide financial crises, the flow of foreign aid from rich countries toward developing countries amplified noticeably. In the beginning of the financial crises, a widespread concern originated that the supply of foreign aid would decrease because it was assumed that to overcome the financial crises higher public expenditure would be introduced with the aim of supporting financial system and to stabilize the economic disturbance, which would reduce the donor budget allocated for foreign assistance. At the same time, these financial crises also affected LICs' economies badly and they needed to have more development aid. Moreover, these severe financial crises were transmitted to developing economies through transmission channels like lower export, FDI and remittances that further depicted a strained fiscal and external position of developed economies in recipient countries; this raises two important questions about the sensitivity of aid flows to the economic conditions of donor and recipient countries. First, whether the financial crises in donor as well as in recipient countries affected aid flow; and second, whether this foreign aid would help recipient countries to stabilize their macroeconomic disturbance. Some empirical studies answered these questions and argued that donor countries provide foreign assistance to developing economies as an insurance against large internal and external shocks and to stabilize economic downturns but, at the same time, a favorable economic situation in recipient countries also motivates the donor economies to donate more aid as a reward for sound macroeconomic policies (Das & Dutta, 2012; Khan & Ahmed, 2007). However, the situation may vary across different country groups. Fluctuations in the macroeconomic activities of recipient countries due to delay or cutting down of financial assistance by donor countries are clearly noticed.

There is no doubt that foreign aid is an important source of capital in developing countries to fulfill their short-term liquidity needs and to maintain public and social spending which, ultimately, cultivates social and economic benefits over the long term and minimizes macroeconomic fluctuations (Ramey & Ramey, 1994). Similarly, the empirical literature emphasized that foreign aid is countercyclical to business cycle fluctuation, so it reduces macroeconomic fluctuations by providing security and insurance against business cycle fluctuation (Stéphane Pallage, Robe, & Bérubé, 2006). However, there are some indications that indicate that development or financial aid is procyclical with respect to output and revenues in recipient economies. Evidence reported that in two-thirds of African countries and almost half of non-African developing economies there is a strong correlation between the cyclical elements of aid receipt and the cyclical component of domestic output (Arellano, Bulíř, Lane, & Lipschitz, 2009; Stéphane Pallage & Robe, 2001).

The empirical literature argued that the procyclicality of aid in recipient countries can be explained by standard moral hazard model, which states that the donor country binds foreign aid to the recipient country's macroeconomic performance because of its lack of ability in funds management. Moreover, in developing economies, recessions are caused by macroeconomic mismanagement because of donor's inability to efficiently examine the use of foreign aid (Aghion et al., 2010; Svensson, 2000). Stéphane Pallage and Robe (2001) used a sample of 33 countries for the period from 1969 to 1995 and found that there is no correlation between business cycle in donor countries and aid payments to Africa from 1969 to 1992, but there is strong correlation between foreign aid and macroeconomic fluctuations in African economies. The study concluded that foreign aid boosts fluctuation in economic activities.

Similarly, Bertoli, Cornia, and Manaresi (2008) documented a strong negative relationship between economic cycle and collective foreign aid inflow over the period of 1970 to 2004.

Foreign aid is the main source of income and revenue of recipient's economies, particularly in Africa, where on average 12.5% of their GDP is composed of external aid and funds or financial assistance (Rand & Tarp, 2002). In such a situation, foreign aid could have a main role in smoothing out business cycle fluctuations in developing economies. Bulíř and Hamann (2003) documented that in a majority of countries foreign aid is more volatile than domestic government revenue and amplifies economic fluctuation rather stabilizes it. By contrast, Chauvet and Guillaumont (2009) examined the cyclical behavior of foreign aid over the period from 1970 to 1999 and found that in the case of LICs, which are unable to absorb the negative impacts of exogenous shocks, foreign aid is countercyclical and effective at stabilizing economic activities because of its stabilizing nature. Subsequently, Neagu and Schiff (2009) examined the stabilizing role of remittances and ODA with other capital inflow like FDI and found that ODA performs countercyclically and reduces fluctuations in macroeconomic activities because of its stable flow rather than other external capital sources.

Moreover, international reports documented that in most developing economies, foreign aid affects the ability of finance ministries to balance the impact of macroeconomic shocks on balance of payment, monetary policies instruments and effectiveness of fiscal policies. This has happened in Nigeria; its government assumed that foreign aid had increased its GDP permanently and the government of Nigeria and private firms planned their expenditure on the basis of this wrong assumption and accumulated long-term unplanned spending obligations that are costly to exit from (Isard, 2006). Therefore, the evidence suggests that foreign aid can be procyclical, countercyclical or acyclical because it depends on the set of countries that are considered for investigation and the time period (J. Ahmed & Martinez-Zarzoso, 2013). Moreover, it has been noticed that fluctuations in the economic activities of developing and under-developing economies are much more vigorous than industrial mechanized countries (Kalemli-Ozcan, Sørensen, & Yosha, 2001). Even the GDP of an aid-

recipient economy is many times more volatile than that of donor or developed countries because of the negative effects of fragmented and unpredictable aid flow. Therefore, only improved and sound policies can utilize the foreign aid to reduce economic fluctuations otherwise it may augment fluctuations in macroeconomic activities (Azam, Devarajan, & O'Connell, 1999). Moreover, the macro-level of aid flow will be effective when it is sanctioned at micro-level of individual projects where donor and end users are accountable.

Similarly, many studies (Bulír & Hamann, 2003; S. Gupta, Clements, & Tiongson, 2004; Rand & Tarp, 2002), claimed that procyclicality is more powerful in some African economies especially where the volume of foreign aid is comparatively greater as compared to recipients' GDP. Moreover, it has been observed that LICs which are six times more volatile as compared to developed economies reduce their larger cost of macroeconomic fluctuations by simply making a reallocation of foreign aid flows across time which helps to stabilize the economic activities in these economies (Arellano et al., 2009; Stéphane Pallage et al., 2006; Thornton, 2008).

From 1950s to 1970s, developing economies used foreign aid to fill up the gap in domestic resources, encourage domestic investment and industrial development. There is a belief that foreign aid could assist developing countries to transform into a “takeoff” stage of self-sustained growth by producing new domestic venture of investment (Rostow, 1985; Waterson & Lopez, 1983).

For developing economies, traditional ways – to change aggregate demand or household spending – of smoothing out macroeconomic fluctuations are likely to be very difficult and tedious, so poor countries used foreign aid as a remedial measure for economic destabilization. It has been argued that, due to moral hazard and refutation risk, heavily indebted nations – poor nations – are frequently or many times left without new loans or are

unable to pay off old ones, specifically at the time when their countries experience shocks (Atkeson, 1991), which amplifies the economic fluctuations in recipient countries (Agénor, 2000; Agénor et al., 2000; Kouparitsas, 1998).

The financial crises of 2008 to 2009 in developing nations opened a new window to work on the relationship between financial crisis and aid flows. It is graphically documented that countries like Japan, Finland, Sweden, and Norway cut down their out flows significantly after their systemic banking crisis near the beginning of 1990s (Roodman, 2008), and this reduction in outflow of financial resources upset economic activities in LICs and enhanced financial anxiety and economic fluctuations (Durdu, Mendoza, & Terrones, 2009). Therefore, a poor economic condition in donor countries affects the disbursement pattern of foreign aid to LICs which ultimately causes fluctuation in macroeconomic activities. Paxton and Knack (2011) calculated that the bank crisis in donor countries reduced the level of aid flow by approximately 13% and trend effect in aid indicated a 5% yearly decline after the inception of this recent mishap. Moreover, Dang, Knack, and Rogers (2009) reported considerable diminution of aid expenses after banking disaster regardless of calculating their impact on growth.

Allen and Giovannetti (2009) documented that growth gap is not truly representative of gap in foreign aid flow in donor countries, but business cycle fluctuation in recipient countries significantly affects inflow of foreign funds and their distribution. Stéphane Pallage and Robe (2001) argued that a number of African countries experienced a strong positive correlation between the cyclical component of financial assistance and domestic growth.

Overall, the empirical evidence is unable to produce a clear verdict about countercyclicality of aid in LICs. Most studies discussed foreign aid disbursement patterns toward LICs. Desai and Kharas (2008) reported that worldwide ODA from 1960 to 2007 became five times more

unstable than NI, and in USA the instability in foreign aid outflow has been elevated eight times during the last decade. Stock and Watson (2008) found a confusing connection between economic and financial growth in recipient economies and their aid inflows. It has been observed that GDP and aid flows have a tendency to move mutually in the same direction over extensive phases. There are examples in which aid is “decoupled” from financial or economic output in OECD economies. Moreover, in crises of mild and short duration, foreign aid is not procyclical with respect to recipient economy’s output (Bertelli & Whitford, 2009).

An inspection of the uncertainty of the literature about the assessment of output fluctuation or variation due to foreign aid over a long time may allow some clear and valuable analysis. Moreover, it should be anticipated that diverse aid categories like project aid, budget support, debt relief, and technical assistance, effect donors in different ways as well as recipients’ business cycles. However, aggregate data for OECD economies do not give any apparent results about foreign aid inflow and macroeconomic fluctuations. Assessing the adjustment in net aid disbursements of Development Co-operation Directorate (DAC), donors’ economies, and annual average modification in RGDP in OECD provides a diverse representation (Hallet, 2009). So that is why this study focuses on the less researched area that examines how financial assistance or foreign aid effects recipient economy’s economic and business cycle fluctuations.

2.7 Summary

The chapter has been divided into seven sections. Section 2.1 identifies primary, secondary and territory literature sources which have been used during the completion of this study. Section 2.2 describes the framework of business cycles. Section 2.3 describes the important theories which directly or indirectly help the study to identify a significant set of internal and external driving forces of macroeconomic fluctuations. Section 2.4 discusses the different

methodologies which have been applied since the origin of macroeconomic to study the problem of business cycle fluctuation. This section enabled the student to adopt an appropriate methodology to attain the objectives described in Chapter 1. Sections 2.5 and 2.6 present a review of empirical studies, identify a gap in the existing empirical literature and explain the rationale for investigating the role of internal and external sources in macroeconomic fluctuations.

Chapter 3

Data and Methodology

3.1 Background

Structural Vector Auto Regression or Vector Error Correction Models are appropriate methodologies when the objective of a study is to estimate a system of equations. Structural Vector Auto Regression or Vector Error Correction Model incorporates contemporaneous and lagged interconnections that exist between variable of interest and produce more reliable estimates of multivariate time series analysis. Moreover, SVAR/VECM enables the researcher to perform impulse response function, which is the reaction of any dynamic system in response to some external changes, and to compute variance decomposition, which is a description of how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables (Campbell & Ammer, 1993). The decision criteria to make a choice between VAR and SVAR or VECM depend on the order of integration and the presence of long-run equilibrium among stationary time series.

If co-integration among variables – that are stationary at first difference – exists then the study can use VECM for estimation purposes, but if there is no co-integration among first difference stationary time series then VAR is appropriate for further analysis. VECM is a multiple time series model and a convenient way to specify vector process with variables that have unit root and long-run stochastic trend. When the purpose is forecasting, causality analysis and impulse response analysis, then VECM is appropriate to realize the objective (Lütkepohl, 2007). It is useful to estimate the short-term and long-term impact of one time series on another time series. The term error correction depicts the speed of adjustment

process toward equilibrium path if any shock creates disequilibrium in the VAR system (Mulligan, 2005), while short-term dynamics are explained by error term.

3.2 VECM

If the variables are stationary at first difference, then co-integration regression becomes an inappropriate methodology to estimate the long-run linkages between a series of variables, whereas the error correction model (ECM) becomes useful to measure any dynamic adjustments between these stationary variables. A simple error correction term (ECT) is defined as:

$$\Delta y_t = \alpha \varepsilon_{t-1} + \gamma \Delta x_t + \mu_t$$

Where α is the co-integrating coefficient and ε is the error term from the regression of y_t on x_t . Then the ECM is simply defined as:

$$\Delta y = \delta + \beta_0 \Delta X_t - \Pi \cup_{t-1} + \epsilon_t$$

β_0 shows the degree of change in dependent variable due to changes in the independent variable in short-run period.

Π is the ECT, which indicates the rate of adjustment from period to period if any external shock deviates the model from equilibrium path.

When we use above single equation of ECM in a multivariate system it will be extended into VECM. We can use VECM when variables of k -dimensional process y_t are called co-integrated, of order (d, b) if all components are $I(d)$ and there exists a linear combination $z_t = \beta' y_t$, where co-integrating vector β is a nonzero vector of coefficients (Lütkepohl, 2007). A generalization of autoregressive processes in vector form is called VAR model. The general form of VAR model with lag order p is written as:

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + e_t$$

Where c is a vector of constants, A_i reflects the coefficient matrices for the lagged terms and e_i is a vector of error terms. Moreover, vector of error terms assumes some certain characteristics like zero mean $(e_i) = 0$, contemporaneous covariance matrix $(e_i e_i') = \Omega$ and no serial correlation of error terms: $(e_i e_{i-k}') = 0$.

Applying VAR to series that are integrated at level produces nonsense relationship. Therefore, the series has to be differenced to have reliable estimates. However, the resulting VAR model describes only the short-run association among variables because differencing might hide valuable information about the co-integration, long-run relationship, of the variables.

The VAR model: $y_t = c + \sum_{i=1}^p A_i y_{t-i} + e_t$ can be written as a VECM model:

$$\Delta y_t = \gamma + \pi y_{t-1} + \sum_{i=1}^p \Gamma_i y_{t-i} + e_t$$

Where $\Pi = \sum_{j=1}^{j=1} A_i - I_k$ and $\Gamma_i = \sum_{j=1}^{j=1} A_j$

$r = \text{rank}(\Pi)$ reflects the number of co-integrating vectors that are linearly independent from each other. The value of r varies between 0 and 1. If $r = 0$, there is no co-integration among the variables and the VAR model in the differences is appropriate while if $r=1$, there is co-integration among variables and VECM is appropriate. If $0 < r < 1$, the coefficient matrix can be expressed as $\Pi = \alpha\beta'$, where α and β are $(K \times r)$ matrices. Now, if the study incorporates a trend in the co-integrating relationship, then the equation becomes:

$$\Delta y_t = \alpha(\beta' y_{t-1} + \mu + \rho t) + \sum_{i=1}^p \Gamma_i \Delta y_{t-i} + \gamma + \gamma t + e_t$$

This study applied two VECMs: one is to assess the role of internal shocks in business cycle fluctuation while the other is used to examine the role of external shocks in business cycle fluctuation. The study used four variables to capture the role of domestic shocks in business cycle fluctuation: financial development, savings, population and lending interest rate. The

study also used four variables to capture the role of external sources in business cycle fluctuations: foreign aid, remittances, trade liberalization and climate condition are used to capture the role of external sources in business cycle fluctuations. Moreover, study used three models for internal shocks on the basis of three indicators of financial development. Model (1) uses m2 (liquid and quasi liquid money) as a proxy variable for financial development while model (2) and (3) uses bank credit to private sector and domestic credit by bank to depict financial development. Therefore, specific model for internal source of business cycle fluctuation is: GDP fluctuation = f (m2, dcb, dcp, savings, population, interest rate)

3.3 Econometric Model for Internal Source of Fluctuation

Equation 1

$$gdpd1 = \alpha_1 + \beta_1 m2 + \beta_2 savings + \beta_3 population + \beta_4 interest\ rate + e1$$

Equation 2

$$gdpd1 = \alpha_2 + \beta_1 dcb + \beta_2 savings + \beta_3 population + \beta_4 interest\ rate + e2$$

Equation 3

$$gdpd1 = \alpha_3 + \beta_1 dcp + \beta_2 savings + \beta_3 population + \beta_4 interest\ rate + e3$$

Since study used VECM so it could be specified as following for internal and external sources of fluctuations.

3.4 Specific Econometric Model for Internal Sources of Fluctuations

Model 1

$$\begin{aligned} \Delta gdp_{it} = & \alpha_{1j} + \gamma_{1i} ECT_{it-1} + \sum_{k=1}^m \beta_{11ik} \Delta m2_{it-k} + \sum_{k=1}^m \beta_{12ik} \Delta sav_{it-k} \\ & + \sum_{k=1}^m \beta_{13ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{14ik} \Delta int_{it-k} + \varepsilon_{1it} \quad \text{---Eq. 3.1} \end{aligned}$$

$$\begin{aligned}\Delta M_{it} = & \alpha_{2j} + \gamma_{2i}ECT_{it-1} + \sum_{k=1}^m \beta_{21ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{22ik} \Delta sav_{it-k} \\ & + \sum_{k=1}^m \beta_{23ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{24ik} \Delta int_{it-k} + \varepsilon_{2it} \text{ --- --- Eq. 3.2}\end{aligned}$$

$$\begin{aligned}\Delta sav_{it} = & \alpha_{3j} + \gamma_{3i}ECT_{it-1} + \sum_{k=1}^m \beta_{31ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{32ik} \Delta M2_{it-k} \\ & + \sum_{k=1}^m \beta_{33ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{34ik} \Delta int_{it-k} + \varepsilon_{3it} \text{ --- --- Eq. 3.3}\end{aligned}$$

$$\begin{aligned}\Delta pop_{it} = & \alpha_{4j} + \gamma_{4i}ECT_{it-1} + \sum_{k=1}^m \beta_{41ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{42ik} \Delta M2_{it-k} \\ & + \sum_{k=1}^m \beta_{43ik} \Delta sav_{it-k} + \sum_{k=1}^m \beta_{44ik} \Delta int_{it-k} + \varepsilon_{4it} \text{ --- --- Eq. 3.4}\end{aligned}$$

$$\begin{aligned}\Delta int_{it} = & \alpha_{5j} + \gamma_{5i}ECT_{it-1} + \sum_{k=1}^m \beta_{51ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{52ik} \Delta M2_{it-k} \\ & + \sum_{k=1}^m \beta_{53ik} \Delta sav_{it-k} + \sum_{k=1}^m \beta_{54ik} \Delta pop_{it-k} + \varepsilon_{5it} \text{ --- --- Eq. 3.5}\end{aligned}$$

Model 2

$$\begin{aligned}\Delta gdp_{it} = & \alpha_{1j} + \gamma_{1i}ECT_{it-1} + \sum_{k=1}^m \beta_{11ik} \Delta DCB_{it-k} + \sum_{k=1}^m \beta_{12ik} \Delta sav_{it-k} \\ & + \sum_{k=1}^m \beta_{13ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{14ik} \Delta int_{it-k} + \varepsilon_{1it} \text{ --- --- Eq. 3.6}\end{aligned}$$

$$\begin{aligned}\Delta DCB_{it} = & \alpha_{2j} + \gamma_{2i}ECT_{it-1} + \sum_{k=1}^m \beta_{21ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{22ik} \Delta sav_{it-k} \\ & + \sum_{k=1}^m \beta_{23ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{24ik} \Delta int_{it-k} + \varepsilon_{2it} \text{ --- --- Eq. 3.7}\end{aligned}$$

$$\begin{aligned}\Delta sav_{it} = & \alpha_{3j} + \gamma_{3i}ECT_{it-1} + \sum_{k=1}^m \beta_{31ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{32ik} \Delta DCB_{it-k} \\ & + \sum_{k=1}^m \beta_{33ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{34ik} \Delta int_{it-k} + \varepsilon_{3it} \text{ --- --- Eq. 3.8}\end{aligned}$$

$$\begin{aligned}\Delta pop_{it} = & \alpha_{4j} + \gamma_{4i}ECT_{it-1} + \sum_{k=1}^m \beta_{41ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{42ik} \Delta DCB_{it-k} \\ & + \sum_{k=1}^m \beta_{43ik} \Delta sav_{it-k} + \sum_{k=1}^m \beta_{44ik} \Delta int_{it-k} + \varepsilon_{4it} \text{ --- --- Eq. 3.9}\end{aligned}$$

$$\begin{aligned}\Delta int_{it} = & \alpha_{5j} + \gamma_{5i}ECT_{it-1} + \sum_{k=1}^m \beta_{51ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{52ik} \Delta DCB_{it-k} \\ & + \sum_{k=1}^m \beta_{53ik} \Delta sav_{it-k} + \sum_{k=1}^m \beta_{54ik} \Delta pop_{it-k} + \varepsilon_{5it} \text{ --- --- Eq. 3.10}\end{aligned}$$

Model 3

$$\begin{aligned}\Delta gdp_{it} = & \alpha_{1j} + \gamma_{1i}ECT_{it-1} + \sum_{k=1}^m \beta_{11ik} \Delta DCP_{it-k} + \sum_{k=1}^m \beta_{12ik} \Delta sav_{it-k} \\ & + \sum_{k=1}^m \beta_{13ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{14ik} \Delta int_{it-k} + \varepsilon_{1it} \text{ --- --- Eq. 3.11}\end{aligned}$$

$$\begin{aligned}\Delta DCP_{it} = & \alpha_{2j} + \gamma_{2i}ECT_{it-1} + \sum_{k=1}^m \beta_{21ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{22ik} \Delta sav_{it-k} \\ & + \sum_{k=1}^m \beta_{23ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{24ik} \Delta int_{it-k} + \varepsilon_{2it} \text{ --- Eq. 3.12}\end{aligned}$$

$$\begin{aligned}\Delta sav_{it} = & \alpha_{3j} + \gamma_{3i}ECT_{it-1} + \sum_{k=1}^m \beta_{31ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{32ik} \Delta DCP_{it-k} \\ & + \sum_{k=1}^m \beta_{33ik} \Delta pop_{it-k} + \sum_{k=1}^m \beta_{34ik} \Delta int_{it-k} + \varepsilon_{3it} \text{ --- Eq. 3.13}\end{aligned}$$

$$\begin{aligned}\Delta pop_{it} = & \alpha_{4j} + \gamma_{4i}ECT_{it-1} + \sum_{k=1}^m \beta_{41ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{42ik} \Delta DCP_{it-k} \\ & + \sum_{k=1}^m \beta_{43ik} \Delta sav_{it-k} + \sum_{k=1}^m \beta_{44ik} \Delta int_{it-k} + \varepsilon_{4it} \text{ --- Eq. 3.14}\end{aligned}$$

$$\begin{aligned}\Delta int_{it} = & \alpha_{5j} + \gamma_{5i}ECT_{it-1} + \sum_{k=1}^m \beta_{51ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{52ik} \Delta DCP_{it-k} \\ & + \sum_{k=1}^m \beta_{53ik} \Delta sav_{it-k} + \sum_{k=1}^m \beta_{54ik} \Delta pop_{it-k} + \varepsilon_{5it} \text{ --- Eq. 3.15}\end{aligned}$$

Moreover, specific model for external source of business cycle fluctuation is: Business cycle fluctuation = f (ODA, PR, TO, CO₂, US monetary policy).

3.5 Specific Econometric Model for External Source of Fluctuations

Model 4

$$\begin{aligned}\Delta GDP_{it} = & \alpha_{1j} + \gamma_{1i}ECT_{it-1} + \sum_{k=1}^m \beta_{11ik} \Delta oda_{it-k} + \sum_{k=1}^m \beta_{12ik} \Delta pr_{it-k} \\ & + \sum_{k=1}^m \beta_{13ik} \Delta trade_{it-k} + \sum_{k=1}^m \beta_{14ik} \Delta CO2_{it-k} + \varepsilon_{1it}. \text{ Eq. 3.16}\end{aligned}$$

$$\begin{aligned}\Delta oda_{it} = & \alpha_{2j} + \gamma_{2i}ECT_{it-1} + \sum_{k=1}^m \beta_{21ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{22ik} \Delta pr_{it-k} \\ & + \sum_{k=1}^m \beta_{23ik} \Delta trade_{it-k} + \sum_{k=1}^m \beta_{24ik} \Delta CO2_{it-k} + \varepsilon_{2it}. \text{ Eq.3.17}\end{aligned}$$

$$\begin{aligned}\Delta pr_{it} = & \alpha_{3j} + \gamma_{3i}ECT_{it-1} + \sum_{k=1}^m \beta_{31ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{32ik} \Delta oda_{it-k} \\ & + \sum_{k=1}^m \beta_{33ik} \Delta trade_{it-k} + \sum_{k=1}^m \beta_{34ik} \Delta CO2_{it-k} + \varepsilon_{3it}. \text{ Eq.3.18}\end{aligned}$$

$$\begin{aligned}\Delta trad_{it} = & \alpha_{4j} + \gamma_{4i}ECT_{it-1} + \sum_{k=1}^m \beta_{41ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{42ik} \Delta oda_{it-k} \\ & + \sum_{k=1}^m \beta_{43ik} \Delta pr_{it-k} + \sum_{k=1}^m \beta_{44ik} \Delta CO2_{it-k} + \varepsilon_{4it}. \text{ Eq.3.19}\end{aligned}$$

$$\begin{aligned}\Delta CO2_{it} = & \alpha_{5j} + \gamma_{5i}ECT_{it-1} + \sum_{k=1}^m \beta_{51ik} \Delta gdp_{it-k} + \sum_{k=1}^m \beta_{52ik} \Delta oda_{it-k} \\ & + \sum_{k=1}^m \beta_{53ik} \Delta pr_{it-k} + \sum_{k=1}^m \beta_{54ik} \Delta trad_{it-k} + \varepsilon_{5it}. \text{ Eq.3.20}\end{aligned}$$

Where (α) denotes the intercept term, β_i , where i ranges from 1 to 36, are coefficients to be estimated, which are assumed to be nonzero ($\beta_i > 0$), and (ε_{it}) is the error term, and the subscripts (it) are for the dating of variables in time periods. The VECM is estimated to answer the following research questions:

- I. What type of relationship exists between internal sources – financial development, saving, population and interest rate – and business cycle fluctuation in LICs?

- II. What type of relationship exists between external sources – foreign aid, TO, PR and climate changes – and business cycle fluctuation in LICs?
- III. What type of relationship exists between internal sources – financial development, saving, population and interest rate – and business cycle fluctuation in UMICs?
- IV. What type of relationship exists between external sources – foreign aid, TO, PR and climate changes – and business cycle fluctuation in UMICs?

3.6 Pre-Estimation

This section discusses some important pre-estimation steps that are necessary before estimating model.

3.6.1 Lag Order Selection

Lag order selection helps the researcher to select an appropriate number of lags that provide satisfactory knowledge about model without losing any information. The selection of lag length plays a critical role in specification of VAR models because higher order lags length or under fitting the lags rather than applying true lag length causes an increase in the mean-square forecast errors of the VAR or generates a problem autocorrelation (Braun & Mittnik, 1993). Therefore, accuracy of forecasts from VAR models is substantially related with true lag length selection (Hafer & Sheehan, 1989; Ozcicek & Mcmillin, 1999). The economic literature employed many lag length selection criteria to determine the autoregressive lag length of time series variables. Briefly, autoregressive (p) refers to a time series in which its current value depends on its first p lagged values. Therefore, autoregressive lag length p has to be estimated with the help of famous lag adopted different lag selection criteria like SIC (Schwarz, 1978), Hannan–Quinn criterion (Hannan & Quinn, 1979), FPE (Akaike, 1969), and BIC (Akaike, 1979). Some empirical studies (Baharumshah, Masih, & Azali, 2002; Baum, Barkoulas, & Caglayan, 2001; Sarantis, 2001) employed the Akaike information

criterion for selection of appropriate lag length while some studies (Islam, Shahbaz, Ahmed, & Alam, 2013; Taylor & Sarno, 1998) employed different lag selection criteria like SIC and BIC. Yamada (2000) used AIC and Hannan–Quinn criterion (Baharumshah, Sarmidi, and Tan (2003) and M. Ibrahim (2003) deployed FPE and SIC in their empirical research. However, all these studies agreed that all lag length selection criteria are equally good except for a few empirical studies (Altavilla & Grauwe, 2010; Tabak & Guerra, 2007), which reported the inconsistency of these criteria and their tendency to underestimate the autoregressive lag length.

3.6.2 Unit Root Test

To understand and forecast the relationship of macroeconomic time series, one major problem that central group economists face is that these series are often non-stationary and non-stationary series produce misleading parameters of the relationship between variables (Mahadeva & Robinson, 2004). Therefore, it is common to employ a unit root test to check stationarity, to avoid the problem of spurious relationships among variables of interest. Moreover, stationary time series play an important role in forecasting and help the researcher to choose appropriate models in order to make accurate predictions (Diebold & Kilian, 2000). The empirical literature recommends that checking of unit root test is mandatory prior to accepting a model. This study examined the stationary properties of the series by using Levin, Lin, and Chu (2002) and Im, Pesaran, and Shin (2003) unit root tests. The study began the unit root test by assuming autoregressive (1) process for panel data:

$$y_{it} = p_i y_{it-1} + x_{it} \delta + e_{it}$$

x_{it} , Represent exogenous variables in the model that include individual trends, p_i are autoregressive coefficients and e_{it} are errors that are mutually independent idiosyncratic

disturbance. Similarly $i = 1, 2, \dots, N$ represent cross-section series observed over period of $t = 1, 2, \dots, T$.

Levin, Lin and Chu's (2002) unit root test follows the first natural assumption that $\rho_i = 1$, it implies that first order serial correlation coefficients are identical in all units while Im, Pesaran and Shin (2003) allow ρ_i to vary freely across cross-section. Im, Pesaran and Shin's (2003) unit root test is two group mean panel unit root test designed against heterogeneous alternatives. The study follows the general model based on augmented Dickey–Fuller test specified to check the presence of common unit root.

$$\Delta y_{it} = \alpha y_{t-1} + \sum_{j=1}^p \beta_{ij} \Delta y_{it-j} + X'_{it} \delta + e_t$$

If all variables are integrated at first difference and the coefficients in front of them constitute co-integrating vector that, in turn, determines long-run equilibrium relationship and if co-integrating vector is not unique and, in general, if there are n variables in the model, one may expect to get at most $n-1$ stationary combinations, which constitute co-integrating rank. If co-integration is noticed, it should be unified into the model because its omission necessitates misspecification error. As Enders (2004), stated that time paths of co-integrated variables are influenced by the extent of any deviation from long-run equilibrium. After all, if the system is to return to the equilibrium path in the long run, then movements of at least some of the variables must respond to the magnitude of the disequilibrium. In other words, system's short-run dynamics are determined by its steady state and hence the latter should be incorporated into the model exogenously.

3.6.3 Co-integration Test

In the second step to check panel co-integration, the study used Kao (1999) and Pedroni (1999) test – under null hypothesis of no co-integration. These two tests are the most commonly used tests for co-integration in panel empirical work. The Kao (1999) test is used

for homogeneous panel statistics while Pedroni (1999) is used for two sets of group panel statistics: the first set is for testing co-integration in homogeneous panels and the second set of statistics is for testing co-integration in heterogeneous panels. If the null hypothesis is rejected in the homogeneous panels it mean the variables are co-integrated for all the cross-section but if the null is rejected in the heterogeneous group panels, it mean co-integration among the relevant variables exists for at least one of the cross section. Moreover, Pedroni (1999) is recognized in the literature as an extension of the variance ratio test of Phillips and Ouliaris (1990) and the ρ -tests of Phillips and Perron (1988).

Pedroni (1999) panel co-integration regression is as follows:

$$S_{it} = \alpha + \delta t + \beta_1 it + \dots + \beta_m X_{mit} + u_{it} \quad \text{where } t = 1 \dots T, i = 1 \dots N$$

The study also applied Kao (1999), first residual-based co-integration test based on Engle and Granger (1987) two step co-integration tests under null hypothesis of no co-integration. Engle and Granger (1987) stated that if variables are co-integrated then residual should be integrated at level, $I(0)$, otherwise residuals will be co-integrated at first difference, $I(1)$. Kao (1999) extended Engle Granger framework to test co-integration in homogeneous panels. Kao (1999) test is based on the residual of the ordinary least square (OLS) panel estimation by applying two types of panel co-integration for example, Dickey–Fuller and ADF with general framework.

$$e_{it} = \rho e_{it-1} + v_{it}$$

$$e_{it} = \rho e_{it-1} + \sum_{j=1}^p \phi_j \Delta e_{it-j} + v_{it}$$

The null hypothesis is $H_0: \rho = 1$ while alternative hypothesis of stationary residuals is $H_1: \rho < 1$.

3.6.4 Fisher Combined Johansen Test

Hansen and Johansen (1999) proposed two different approaches, likelihood ratio (LR), trace statistics and maximum eigenvalue statistics, to determine the presence of co-integration vectors in non-stationary time series. The following equation is fitted to derive trace statistics and maximum eigenvalue statistics.

$$\lambda_{trace}(\tau) = -T \sum_{i=r+1}^n \ln(1 - \lambda_i)$$

$$\lambda_{max}(r, r + 1) = -T \ln(1 - \lambda_{r+1})$$

Here T represents the sample size and n is total number of variables. λ_i is the i th largest canonical correlation between residuals from the three-dimensional processes. For the trace test the null hypothesis of at the most r co-integration vector against the alternative hypothesis of full rank $r = n$ co-integration vector, the null and alternative hypothesis of maximum eigenvalue statistics is to check the r co-integrating vectors against the alternative hypothesis of $r + 1$ co-integrating vectors.

3.6.5 Generalized Impulse Response Function

VAR can be used for forecasting through impulse response function and variance decomposition of forecast error in case of co-integrating equation. The impulse response function based on Cholesky decomposition method is used to trace out the time path of structural shocks on the dependent variable of the VAR model (Sims, 1980). However, the basic assumption of orthogonality in Cholesky decomposition method indicates that the results are highly sensitive to the Cholesky ordering scheme of variables in the system (Sims, 1980) and any change in ordering of variables in the system may lead to a number of different conclusions. Therefore, this study used generalized impulse response function (GIRF), invariant to the ordering of the variables in the VAR system, developed by Pesaran and Shin (1998) to overcome the problem of orthogonality. The GIRF is based on three

important assumptions: first, the error term is normally distributed with a constant covariance matrix. Second, all variables of interest are stationary and third, regressors are not perfectly collinear. The study obtained GIRF by transforming VAR into infinite moving average representation.

$$X_t = \sum_{i=0}^{\infty} A_i u_{t-i}$$

Where A is the coefficient matrix of order (n × n) is obtained through a recursive process.

$$A_j = \phi_1 A_{j-1} + \phi_2 A_{j-2} + \dots + \phi_p A_{j-p}$$

$$A_0 = I_n \text{ and } A_j = 0 \text{ for } j < 0$$

On the basis of known history of the economy up to time t-1 by the non-decreasing information set Ω_{t-1} , the GIRF developed by Pesaran and Shin (1998) is specified as follows:

$$GI(h, \Omega_{t-1}, \delta) = E(x_{t+h} / \varepsilon_t = \Omega_{t-1}, \delta) - E(x_{t+h} / \Omega_{t-1})$$

In the VAR process with infinite moving average representation, δ is some known vector which indicates that $GI(h, \Omega_{t-1}, \delta) = A_h \delta$ depends on the composition of shocks defined by δ and independent of the history of economy Ω_{t-1} . Therefore, the choice of δ plays a significant role in determining the time profile of GIRF. Contrary to Cholesky decomposition of shocking all the elements of ε_t , the generalized impulse response shocks only one element such that $\varepsilon_{jt} = \delta_j$ based on the assumption of historically observed distribution

$$GI_x(h, \Omega_{t-1}, \delta) = E(x_{t+h} / \varepsilon_{jt} = \Omega_{t-1}, \delta_j) - E(x_{t+h} / \Omega_{t-1})$$

Moreover, ε_t is Gaussian and follows

$$E(\varepsilon_t / \varepsilon_{jt} = \delta_j) = (\omega_{1j}, \omega_{2j}, \omega_{3j}, \dots, \omega_{nj}) w_{jj}^{-1} \delta_j = \sum e_j w_{jj}^{-1} \delta_j$$

The un-scaled GIRF of the effect of a shock in the j th equation based on $n \times 1$ vector is

$$[A_h \sum e_j / \sqrt{\omega_{jj}}] [\frac{\delta_j}{\sqrt{\omega_{jj}}}], n=0, 1, 2, \dots$$

This measures the effect of one standard deviation error shock to j^{th} equation at time t , on expected values of x at time $t + h$. Pesaran and Shin (1998) also showed that GIRF that are computed for co-integrating VAR models, the effects of shocks are bound to die out and their time profile contains viable information about the speed of convergence of the model to its equilibrium state. The effect of a unit shock to the i -th variable on the j -th co-integrating relations can be given by GIRF as follows:

$$GI(B_{jxt}, N) = B'_j A N \sum e_i / \sqrt{\omega_{jj}} e$$

GIRFs are computed to answer the following research questions which were developed in Chapter 1:

- I. What is response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of internal sources at time t while no other shock hits the system in LICs?
- II. What is response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of internal sources at time t while no other shock hits the system in UMICs?
- III. What is response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of external sources at time t while no other shock hits the system in LICs?
- IV. what is response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of external sources at time t while no other shock hits the system in UMICs?

3.7 Data

The study estimated the model by using quarterly time series data on 25 LICs and 17 UMICs on nine macroeconomic variables for the period of 1960Q1 to 2014Q4. Data for the study were obtained from the International Financial Statistics, the WB, IMF and OECD national accounts data file for selected LICs and UMICs. Annual data were converted into quarterly data by using frequency conversion method in E.Views. The ten macroeconomic variables are: real GDP at first difference— deviation of GDP from its respective trend is used as a proxy for macroeconomic fluctuation (Kydland & Prescott, 1990; Lucas, 1977) – financial development represented by bank credit to the private sector (DCB), domestic credit to the private sector (DCP) and liquid liabilities (M2), investment or household saving, interest rate, TO, PR, ODA, and climate. The study used population as a controlled variable to judge the true impact of internal and external sources on economic fluctuations. This study used three proxies for financial development to capture the quality and quantity of investment, exchanges of goods and services, saving mobilization, and management of risk. Moreover, the literature is confused about which proxy is the best measure of financial development. Therefore, three indicators were used for financial development to enhance the credibility of the estimates.

The first measure of financial development is DCB, it based on the assumption that the private sector makes better utilization of funds than the public sector (Beck, Levine, & Loayza, 2000). The second proxy, DCP, includes credits of deposit, money banks and other financial institutions. The third proxy, M2, is a measurement of financial deepening. However, all these proxies are highly correlated and there is no broad consensus among economists as to which of the proxies is the best measure of financial development. Moreover, the study applies multiple breakpoint tests to investigate parameter instability and structural change in the regression model.

3.8 Summary

Chapter 3 discussed the importance of the VAR model and gave the rationale to utilize it for estimation purposes. The study established that the VAR model is an appropriate methodology when the purpose is to summarize time series facts and simplify complex relationships. Moreover, it provides more reliable forecasting than single variable time series. VAR models also increase the power of analysis by increasing degrees of freedom in the case of developing nations where limited data are available (Goodhart & Hofmann, 2008).

In Chapter 3 the study developed three econometric models for internal sources of fluctuation and one econometric model for external sources of fluctuations. The study developed 15 econometric equations for internal sources and five for external sources of fluctuation for estimation purposes. In this chapter the study discussed some pre-estimation tests, like unit root test, co-integration test, Lagrange multiplier (LM) test, correlation test, variance decomposition and impulse response functions, their importance and the terms and conditions under which to utilize them. Moreover, this chapter provided information regarding data, variables, their description and sources of data.

Chapter 4

Empirical Results and Discussion

4.1 Introduction

This study investigated and quantified the relationship of internal and external sources with macroeconomic fluctuation in LICs as well as in UMICs for the period of 1960Q1 to 2014 Q4. This study was conducted to answer the main question of: What is the role of internal and external shocks in macroeconomic fluctuation in LICs and UMICs? Empirical studies help a researcher to justify a belief in truth or falsity of an empirical claim (Evans & Over, 2013). The purpose of this chapter is produce an empirical justification of research questions which are stated in Chapter 1 with a priori expectations of the variables by defining the association between independent and dependent variables.

4.2 Descriptive Statistics

Descriptive statistics provide simple summaries about the sample and about the observations that have been made.

Table 1 Descriptive Statistics for Low Income Countries

Variables	Mean	Median	Max	Min	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Obs.
Model 1									
GDP	-0.32392	0.00000	2.679442	-4.44506	1.04244	-1.25873	5.379247	972.875	1946
LNLM2	3.02201	3.01609	5.020909	-0.18559	0.48681	-0.38579	7.015919	1355.95	1946
LNPOP	15.7475	15.8727	18.13136	12.7303	1.08125	-0.50559	3.125907	84.1926	1946
LNSAV	5.03497	5.06316	5.253421	-0.00026	0.24994	-11.0216	158.3223	19553.5	1946
LNINT	2.98224	2.88925	5.630913	1.91262	0.46088	1.07079	5.785948	1001.20	1946
Model 2									
GDP	-0.32673	0	2.679442	-4.44506	1.047626	-1.26459	5.31291	936.765	1914
LNSAV	5.03409	5.06262	5.253421	-0.00026	0.251897	-10.9376	155.890	1902367	1914
LNINT	2.97890	2.88106	5.630913	1.91262	0.462641	1.086137	5.80746	1004.90	1914
LNPOP	15.7625	15.8778	18.13136	12.7303	1.075778	-0.51593	3.18525	87.6501	1914
LNDCB	2.24961	2.32831	4.43144	0.43044	0.670478	-0.10864	2.55608	19.4806	1914
Model 3									

GDP	-0.31037	0	2.679442	-4.44506	1.027593	-1.24679	5.48905	988.411	1911
LNSAV	5.03404	5.06365	5.253421	-0.00026	0.252025	-10.9379	155.810	1897428	1911
LNINT	2.97568	2.88086	5.630913	1.912624	0.460702	1.10909	5.92861	1074.70	1911
LNPOP	15.7381	15.8608	18.13136	12.73037	1.087251	-0.48596	3.09178	75.8874	1911
LNDGP	3.06774	3.00463	5.438315	0.81911	0.651159	0.56543	4.27969	232.225	1911
Model 4									
GDP	3.96E+0	2.40E+0	4.76E+10	1.07E+08	5.33E+0	3.887018	23.1368	40069.7	2064
ODA	4.85E+0	3.42E+0	3.48E+09	2282000	5.05E+0	2.499673	10.6249	7149.49	2064
PR	1.27E+0	3841317	3.46E+09	11040.31	3.37E+0	6.155894	48.9991	195004.	2064
TRAD	1.32E+1	2.39E+11	3.39E+13	0	3.76E+1	5.305059	35.7279	101797.	2064
CO₂	1568.81	954.336	17645.6	47.671	2337.61	4.402247	25.5379	50350.9	2064

Table 2 Descriptive Statistics for Upper Middle Income Countries

Model 1	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Obs
GDP	-0.00926	-0.01221	7.497849	-12.0519	1.208504	0.15549	14.23215	9290.478	1766
M2	55.45999	42.46269	182.3829	10.15943	38.2508	1.152585	3.34248	399.6385	1766
POP	1.23E+08	26405675	1.35E+09	678786	3.12E+08	3.134597	11.16617	7799.03	1766
INT	33.95343	13.62031	4774.525	3.4225	217.5853	16.11263	285.9047	5965661	1766
SAV	7.58E+10	1.86E+10	2.17E+12	3.51E+08	2.20E+11	6.201239	47.0831	154314.7	1766
Model 2									
GDP	-0.01038	-0.01221	7.497849	-12.0519	1.216449	0.156779	14.14064	8958.81	1731
POP	1.10E+08	25796124	1.35E+09	678786	2.94E+08	3.52131	13.75223	11915.7	1731
INT	34.46042	13.75563	4774.525	3.4225	219.7451	15.95186	280.2455	5617306	1731
SAV	7.60E+10	1.79E+10	2.17E+12	3.51E+08	2.22E+11	6.14001	46.15975	145228.2	1731
DCB	44.20292	29.64513	166.5041	3.904611	35.42355	1.093066	3.317821	351.9832	1731
Model 3									
GDP	-0.0009	-0.00634	7.497849	-12.0519	1.210687	0.170437	14.4483	9390.29	1718
POP	1.25E+08	25549066	1.35E+09	678786	3.16E+08	3.081334	10.8217	7098.027	1718
INT	34.5313	13.72608	4774.525	3.4225	220.5776	15.8904	278.1092	5490091	1718
SAV	7.56E+10	1.75E+10	2.17E+12	3.51E+08	2.23E+11	6.122249	45.85805	142217.5	1718
DCP	59.00569	43.48633	192.6601	-79.0924	51.6693	0.334702	2.751481	36.49765	1718
Model 4									
GDP	-0.01749	-0.04391	7.497849	-4.08561	1.131442	0.667865	8.522274	2537.99	1887
ODA	4.14E+08	2.99E+08	3.90E+09	-9.66E+08	4.30E+08	3.105053	20.75959	27830.78	1887
PR	1.64E+09	6.49E+08	2.69E+10	47330.66	3.71E+09	5.05899	30.26804	66510.44	1887
TRADE	67.32548	61.68794	149.4534	14.39088	3.836399	0.442894	2.339284	96.01433	1887

CO ₂	0.368295	0.333375	1.379282	0.061644	0.202096	2.165025	9.579326	4877.649	1887
-----------------	----------	----------	----------	----------	----------	----------	----------	----------	------

Table 3 Descriptive Statistics for Full Sample

Model 1 (Full Sample)									
GDP	1.96	0.33	19.45	-24.05	3.82	0.51	5.59	1196.60	3712
M2	27.97	3.84	182.38	-0.19	37.18	1.75	5.45	2818.07	3712
POP	5873964	17.3894	1.35E+09	12.73	2.24E+08	4.84	25.18	90590.59	3712
SAV	3.61E+1	5.14812	2.17E+12	-0.00026	1.56E+11	8.92954	96.39793	1398515	3712
INT	17.7169	3.850158	4774.525	1.912624	150.8527	23.3120	598.341	5515487	3712
Model 2									
GDP	2.51	0.89	39.49	-24.05	4.28	0.96	8.16	7880.37	6238
DCB	21.08	9.21	166.50	-1.87	28.28	2.03	7.21	8902	6238
POP	3958030	1235159	1.36E+09	12.70185	1.69E+08	6.77213	48.70328	590592.1	6238
SAV	3.03E+1	9.57E+08	2.54E+12	-0.00026	1.49E+11	11.3295	151.7428	5883959	6238
INT	26.4726	15.19792	193.0986	-0.18559	33.14812	1.91675	6.761707	7497.597	6238
Model 3									
GDP	1.96835	0.366189	19.44997	-24.0492	3.824723	0.51632	5.660458	1231.502	3629
DCP	29.5492	3.772232	192.6601	-79.0924	45.21027	1.46977	4.559572	1674.355	3629
POP	5920268	17.366	1.35E+09	12.73037	2.26E+08	4.78535	24.61365	84487.41	3629
SAV	3.58E+1	5.144724	2.17E+12	-0.00026	1.58E+11	8.85940	94.66783	1318075	3629
INT	17.9143	3.844139	4774.525	1.912624	152.5608	23.0496	584.9613	5153241	3629
Model 4									
GDP	2.10E+09	2.44E+08	4.76E+10	-17.146	4.35E+09	4.786948	34.92555	180428.7	3898
ODA	2.57E+08	60600000	3.48E+09	13.27078	4.40E+08	3.064032	15.11502	29937.76	3898
PR	67011445	98380.14	3.46E+09	10.76491	2.53E+08	8.342407	88.92362	1244315.	3898
TRAD	6.99E+11	1.92E+08	3.39E+13	0.000000	2.82E+12	7.323526	66.47225	689176.6	3898
CO ₂	830.1624	146.2216	17645.60	-2.69776	1872.685	5.499804	40.76892	251337.0	3898

Tables 1, 2 and 3, show the summary of statistics for all variables in four models for LICS, UMICs and full sample (LICs plus UMICs). In the case of LICs, the results indicate a positive mean for all variables in all four models except GDP. Similarly, the value of standard deviation indicates low fluctuations for internal sources – M2, DCB, DCP, interest, population and saving – while high fluctuations in external sources like ODA, PR, and trade and high standard deviation value of CO₂ indicate that climate is highly volatile in LICs. Moreover, the results indicate that skewness value of all variables in LICs is negative except

interest rate. The value of skewness can be zero, positive or negative. It basically gives information about the shape of the data. Our variables ODA, PR, trade, CO₂ and interest rate have positive skewness values, which indicate that data are asymmetrically distributed with a long tail to the right while negative values for M2, DCB, DCP, saving, and population indicate that data are asymmetrical with long tail to the left. Moreover, kurtosis values are positive for all variables in the four models which indicate that the distribution of data is more peaked than a Gaussian distribution. To check the null hypothesis of normality, the study used Jarque and Bera (1980) test and found that all variables have positive value for Jarque and Bera and are significant at 0%, which indicate that we accept the alternative hypothesis that the statistical distribution of all these variables follows a normal process (Nisha, 2015). Furthermore, without satisfying normality assumption we can proceed with our model, it will not disturb the relationships (Ender, 2004).

In the case of UMICs, the results indicate a positive mean for all variables in all four models except GDP. Similarly, the values of standard deviation indicate high fluctuations for internal sources – M2, DCB, DCP, and interest – while there is low fluctuations for external sources except TO. Similarly, the skewness value is positive for all variables in four models which indicate that data are asymmetrically distributed with a long tail to the right. Similarly, the value of kurtosis is also positive which indicates that data are more peaked than a Gaussian distribution, while positive and significant values of Jarque and Bera indicate that the statistical distribution of all these variables follows a normal process.

4.3 Multicollinearity Test

Multicollinearity, a high correlation among independent variables, biases the estimated

Table 4 Correlation among Variables of Internal Sources of Fluctuation

Var.	Low Income Countries							Upper Middle Income Counties						
	gdp	M2	DC B	DCP	PO P	SAV	int	GDP	M2	DC B	DCP	POP	SAV	int
GDP	1							1						
M2	0.00	1						0.00	1					
DCB	0.03	0.78	1					-0.02	0.89	1				
DCP	0.03	0.73	0.74	1				-0.00	0.75	0.85	1			
POP	0.016	0.04	0.03	-0.15	1			-0.01	0.46	0.43	0.30	1		
SAV	0.08	0.03	0.02	-0.42	0.24	1		-0.01	0.46	0.38	0.3	0.78	1	
INT	0.04	0.04	0.03	0.03	0.11	0.06	1	-0.15	0.08	-0.09	-0.0	-0.0	-0.03	1
Full Sample														
	GDP	M2	DCP	DCB	POP	INT	SAV							
GDP	1													
M2	0.568	1												
DCP	0.422	0.858	1											
DCB	0.531	0.939	0.911	1										
POP	0.413	0.500	0.393	0.487	1									
INT	-0.062	0.011	0.011	-0.008	-0.005	1								
SAV	0.331	0.492	0.376	0.437	0.800	-0.005	1							

results and has damaging effects on multiple regressions. A multi-collinearity problem exists when the correlation coefficients in the correlation matrix are greater than 0.80 (Cooper et al., 2003). The results of correlation among internal sources of fluctuation for LICs, UMICs and full sample are reported in Table 4. Results indicate that correlation coefficient values for all variables are less than 0.7 except DCB, DCP and M2 in all three samples. Therefore, the results indicate no multi collinearity among the identified sets of variables in LICs as well as in UMICs except M2, DCB and DCP. The correlation coefficient values are close to or above

0.8 which indicate that M2, DCB and DCP are highly correlated with each other in both cases. Therefore, in order to remove multi-collinearity among M2, DCB and DCP, the study estimates three models with three proxies of financial development individually.

Table 5 shows correlation among variables of external sources of fluctuation in LICs, UMICs and as well as in full sample. Results indicate no strong correlation among defined set of variables because coefficient values of correlation lie between 0.049 and 0.347 in LICs while in UMICs the correlation values are between 0.002 and 0.351 and in full sample, the correlation values are varying between 0.107 to 0.435.

Table 5 Correlation among Variables of External Sources of Fluctuation

Var.	Low Income Counties					Upper Middle Income Countries				
	GDP	ODA	PR	TRAD	CO ₂	GDP	ODA	PR	TRA D	CO 2
GDP	1					1				
ODA	0.098	1				-0.015	1			
PR	0.058	0.198	1			0.002	0.017	1		
TRAD	0.073	0.288	0.049	1		-0.006	0.123	-0.075	1	
CO₂	0.012	0.266	0.116	0.192	1	-0.015	0.351	-0.039	0.075	1
Full Sample										
	GDP		ODA		PR	TRAD		CO2		
GDP	1									
ODA	0.387		1							
PR	0.240		0.301		1					
TRAD	0.187		0.366		0.107	1				
CO2	0.257		0.435		0.208	0.266		1		

The study also ran a LM test to check the serial autocorrelation; results are reported in Table 6. Results show that we accept the null hypothesis, no serial correlation, at 3rd lag order in both cases.

Table 6 LM Test for Autocorrelation (VECM with three lags)

Lags	Low Income Countries		Upper Middle Income Countries		Full Sample	
	LM-Stat	Prob	LM-Stat	Prob	LM-Stat	Prob
1	69.55453	0.0007	63.02122	0.0000	453.9077	0.0000
2	47.43320	0.0962	2148.012	0.0000	312.4415	0.0000
3	31.19074	0.6966	32.98279	0.1315	39.1988	0.1987
Probs from chi-square with 36 df.			Probs from chi-square with 25 df.		Probs from chi-square with 49 df	

4.4 Empirical Results

This section of the study presents the results of statistical analysis, which were obtained by using EViews software. In the first part of this chapter study presented pre-estimation procedure and in the second part study estimate theory based VECM.

4.4.1 Unit Root Test

According to the procedure delineated in Chapter 3, the study used unit root test in the first step of analysis to check stationary properties of the data because non-stationary time series analysis may produce deceptive results. To check the unit root of a panel data set, differencing and detrending a data series was developed in 2000 and afterward several models were developed for testing the unit root in panel data. The standard dynamic model for panel unit root test is:

$$y_{it} = p y_{it-1} + \delta_0 + n_i + v_t + \epsilon_{it}$$

Where the coefficient of p is equal to 1 while subscript i denote, 1, 2, ..., n and it distinguishes that n individuals are included in the panel. The study used the two most popular unit root test models for panel data advocated by Levin et al. (2002) and Im et al. (2003). The model of Levin et al. (2002) is based on ADF and Phillips Perron, with null hypothesis of non-stationarity, these test statistics are asymptotically distributed as standard normal with a left-hand rejection area. The selection of lag is based on modified AIC. Results are presented in Table 7.

Table 7 Panel Unit Root Results

Ind. Var.	Method	Low Income Countries				Upper Middle Income Countries			
		Individual Intercept		Individual Intercept With Trend		Individual Intercept		Individual Intercept With Trend	
		At Level	At 1 st Difference	At Level	At 1 st Difference	At Level	At 1 st Difference	At Level	At 1 st Difference
GDP	LLC	18.6055	-13.6933*	6.66806	-18.0719*	3.17436	-5.03381*	5.40030	-7.81756*
	IPS	20.1725	-13.0583*	11.6026	-18.3646*	9.60912	-15.3445*	9.64959	-13.7314*
M2	LLC	2.61251	-21.0681*	0.16755	-17.8994*	0.30736	-5.22621*	1.69913	-5.43675*
	IPS	2.12350	-21.5603*	0.26507	-20.5360*	0.45061	-9.75271*	2.93341	-7.85718*
DCB	LLC	2.36712	-11.0628*	0.08666	-9.76242*	-0.89166	-6.07345*	-2.748*	-6.55595*
	IPS	2.50035	-13.3725*	3.17603	-6.28639*	0.07684	-10.4670*	2.25820	-8.63854*
DCP	LLC	2.78609	-14.9767*	1.72488	-14.4960*	-0.77599	-4.55999*	2.75146	-3.52156*
	IPS	1.70627	-16.1160*	3.27766	-17.9964*	-0.83674	-10.6931*	-2.57**	-8.50444*
POP	LLC	5.06037	-4.759***	4.65570	-6.8417***	-1.43100	-2.06522*	-1.49**	-5.09898*
	IPS	13.5184	3.70250**	8.24377	-4.57853*	4.93324	-1.35580*	0.78329	-7.31584*
INT	LLC	1.63877	-13.4785*	-3.553**	-9.73510*	-0.87463	-5.653*	-0.209**	-9.0402*
	IPS	0.63841	-11.2252*	0.44831	-8.28565*	-1.66871	-7.7918*	-2.897*	-5.91009*
SAV	LLC	10.2814	-17.3184*	4.61454	-15.1594*	7.10435	-5.7815*	2.84675	-8.23644*
	IPS	7.55509	-19.3184*	4.31954	-22.0316*	7.36693	-9.1211*	2.05765	-8.41618*
ODA	LLC	-0.82434	1.82205*	-2.59210	-1.34753*	0.09250	-3.9446*	1.18629	-6.08927*
	IPS	0.95062	-7.35601*	-1.94694	-4.40363*	3.51432	-9.12602	-1.89261	-7.68780*
PR	LLC	-0.03125	-12.2724*	-0.15270	-17.5932*	0.40512	-2.71450*	2.93720	-2.21371*
	IPS	2.72005	-5.06540*	-0.35995	-1.76662*	2.27001	-6.62034*	-1.41792	-4.71346*
TRAD	LLC	8.65719	-2.19404	4.42530	-2.52583*	1.96877	-8.8544*	-2.026**	-10.0002*
	IPS	6.49771	-5.58297	4.19882	-5.54148*	2.16642	-11.141*	-3.880**	-9.44483*
CO₂	LLC	1.18798	-7.76096	1.49620	-8.37552*	1.14571	-5.82815*	-0.96***	-6.27016*
	IPS	2.45065	-9.05367	02.88999	-6.52688*	1.04914	-8.41825*	-1.561**	-6.60823*

* Shows significance at 0%, ** shows significance at 5%, *** shows significance at 10%.

Both unit root tests, Levin–Lin–Chu (LLC) test and Im–Pesaran–Shin test(IPS) results accept null hypothesis, the series are non-stationary at level while alternative hypothesis, series are

stationary, is accepted at first difference and series are called integrated I (1) in LICs as well as in UMICs.

4.4.2 Lag Length Criteria

In lag length criteria, the study used automatic band width parameter methods recommended by Newey and West (1994) for appropriate lag length. The results were obtained by using different criteria like LR, sequential modified LR statistics, FPE, AIC, Hannan and Quinn information criterion and SIC to select appropriate lag length because if the lag length is not optimum, the error term may not be Gaussian and the implication of the estimation may be invalid. The results of the lag order selection for models 1, 2, 3 and 4, internal and external shocks to business cycle fluctuation are presented in Tables 8 and 9. The selection of lag order by each method is shown with an asterisk (*). First of all the study estimated unrestricted VAR with lag 0 to lag 4. Subsequently, the study used lag structure to have lag selection criteria for selection of appropriate lags. Therefore, all used information criteria suggest that for models 1, 2, 3 and 4 appropriate lags are 3, although SIC criteria suggest two lags for models 3 and 4 but study accepted three lag for all models on the basis of majority criteria. However, in the case of UMICs all used information criteria suggest that lag 4 is appropriate for models 1 and 3 while for models 2 and 4, appropriate lags are 5 and 2.

Table 8 VAR Lag Order Selection Criteria for Low Income Countries

	Lag	LogL	LR	FPE	AIC	SC	HQ
Model 1	0	-77077.98	NA	1.46e+20	57.78260	57.79143	57.78579
	1	-46390.81	61259.33	1.51e+10	34.79071	34.83486	34.80669
	2	-39996.52	12745.45	1.27e+08	30.00938	30.08885	30.03814
	3	-39929.56	133.2724*	1.22e+08*	29.97118*	30.08596*	30.01271*
Model 2	0	-76272.84	NA	8.67e+18	54.95738	54.97447	54.96355
	1	-47077.25	58264.98	6.42e+09	33.93462	33.98588	33.95313
	2	-39862.44	14377.64	35914320	28.74815	28.83358	28.77900
	3	-39676.63	369.7345*	31778784*	28.62582*	28.74542*	28.66901*
Model 3	0	-74557.04	NA	2.45e+19	55.99778	56.00662	56.00098
	1	-44298.97	60402.52	3.35e+09	33.28500	33.32921	33.30100
	2	-37492.79	13566.37	20457022	28.18534	28.26493*	28.21415
	3	-37433.08	118.8371*	19796373*	28.15252*	28.26748	28.19412*
Model 4	0	-187859.7	NA	3.88e+84	211.7990	211.8176	211.8059
	1	-160208.8	55083.70	1.17e+71	180.6660	180.7958	180.7140

	2	-155991.8	8372.207	1.05e+69	175.9524	176.1934*	176.0414
	3	-155913.3	155.3084*	9.99e+68*	175.9045*	176.2567	176.0346*

Table 9 VAR Lag Order Selection Criteria for Upper Middle Income Countries

	Lag	LogL	LR	FPE	AIC	SC	HQ
Model 1	0	-106049.6	NA	1.65e+48	125.2120	125.2280	125.2179
	1	-77052.84	57788.01	2.30e+33	91.00690	91.10315	91.04254
	2	-70949.97	12126.49	1.76e+30	83.83113	84.00759*	83.89647
	3	-70910.94	77.33215	1.73e+30	83.81456	84.07123	83.90960
	4	-70828.05	163.7251*	1.61e+30*	83.74622*	84.08309	83.87095*
Model 2	0	-102107.2	NA	1.13e+48	124.8315	124.8481	124.8377
	1	-74135.68	55737.88	1.64e+33	90.66709	90.76611	90.70382
	2	-67507.05	13168.11	5.10e+29	82.59420	82.77574	82.66154
	3	-67470.06	73.27538	5.03e+29	82.57953	82.84359	82.67747
	4	-67392.96	152.2113	4.72e+29	82.51584	82.86242	82.64440
	5	-67214.26	351.7208*	3.91e+29*	82.32795*	82.75704*	82.48711*
Model 3	0	-103763.3	NA	3.94e+48	126.0854	126.1019	126.0915
	1	-75474.20	56372.01	4.80e+33	91.74265	91.84118	91.77918
	2	-69405.91	12055.47	3.10e+30	84.39965	84.58029*	84.46663
	3	-69374.04	63.11260	3.08e+30	84.39130	84.65406	84.48873
	4	-69303.26	139.7680*	2.91e+30*	84.33567*	84.68053	84.46355*
Model 4	0	-95230.64	NA	4.86e+39	108.4082	108.4269	108.4151
	1	-70838.17	48590.56	4.42e+27	80.68318	80.81397	80.73152
	2	-66827.70	7961.591*	4.79e+25*	76.15903*	76.40192*	76.24880*

4.4.3 Co-integration

The results of Kao (1999) homogeneous panel co-integration with null of no co-integration are presented in Table 10. The results show that the null hypothesis of no co-integration based on Kao (1999) test has been rejected for internal and external shocks. Therefore, panel co-integration tests point out the existence of a long-run relationship between internal and external shocks and business cycle fluctuation for LICs and UMICs.

Table 10 Kao Residual Co-integration Test

	Low Income Countries			Upper Middle Income Countries		
Series	T statistics	Residual variance	HAC variance	T statistics	Residual variance	HAC variance
Model 1	-9.769738 (0.000)	0.440920	0.291270	-14.04111 (0.0000)	0.970244	0.436399
Model 2	-9.694339 (0.027)	0.453284	0.309942	-13.93420 (0.0000)	0.966222	0.438016

Model 3	-9.125169 (0.000)	0.413406	0.272267	-13.60292 (0.0000)	0.992504	0.430824
Model 4	-6.261410 (0.000)	1.62E+16	1.47E+16	-19.97679 (0.0000)	1.162986	0.689272

Note: Probability vales are given in brackets.

The study also tested co-integration among variables by using Pedroni (1999) panel co-integration test for the robustness of results. The results of the panel co-integration test for internal shocks are reported in Table 11 while the results of co-integration test for external shocks are reported in Table 12. The results confirm that co-integration between a defined set of variables exists at 0%, 5% and 10% significance level in both cases for LICs and UMICs. The results suggest a long-term relationship among variables for a cross-section of countries after allowing for country-specific effects in both cases.

Table 11 Pedroni (1999) Panel Co-Integration Tests For Internal Shocks

	Within-Dimension (Panel Statistics)		Weighted Statistics	
	Low Income Countries	Upper Middle Income Countries	Low Income Countries	Upper Middle Income Countries
	Statistic	Statistic	Statistic	Statistic
Panel v-Statistic	2.792026 (0.0026)	3.227338 (0.0006)	-1.282239 (0.9001)	-1.383386 (0.9167)
Panel rho-Statistic	-5.075552 (0.0000)	-1.846271 (0.0324)	-3.945154 (0.0000)	-0.137313 (0.4454)
Panel PP-Statistic	-5.166108 (0.0000)	-5.998223 (0.0000)	-4.801701 (0.0000)	-3.464710 (0.0003)
Panel ADF-Statistic	-6.343841 (0.0000)	-9.48304 (0.0000)	-8.964139 (0.0000)	-10.37333 (0.0000)
	Between-Dimension (Group Statistics)			
	Low Income Countries		Upper Middle Income Countries	
	Statistic		statistics	
Group rho-Statistic	-3.100148 (0.0010)		-0.326695 (0.3719)	
Group PP-Statistic	-7.122938 (0.0000)		-5.733037 (0.0000)	
Group ADF-Statistic	-5.805116 (0.0000)		-9.689282 (0.0000)	

Table 12 Pedroni (1999) Panel Co-Integration Tests For External Shocks

	Panel Statistics (Within-Dimension)		Weighted	
	Low Income Countries		Upper Middle Income Countries	
	Statistic	Statistic	Statistic	Statistic
Panel v-Statistic	4.000842 (0.0000)	2.552121 (0.0054)	-1.305662 (0.9042)	0.160138 (0.4364)

Panel rho-Statistic	-5.139305 (0.0000)	-5.764752 (0.0000)	-4.342073 (0.0000)	-4.657906 (0.0000)
Panel PP-Statistic	-4.914615 (0.0000)	-7.722411 (0.0000)	-5.319378 (0.0000)	-7.890260 (0.0000)
Panel ADF-Statistic	-6.178601 (0.0000)	-16.88295 (0.0000)	-8.970781 (0.0000)	-16.67470 (0.0000)
	Group Statistics (Between-Dimension)			
	Low Income Countries		Upper Middle Income Countries	
	Statistic		Statistic	
Group rho-Statistic	-3.086289 (0.0010)		-4.759909 (0.0000)	
Group PP-Statistic	-7.148823 (0.0000)		-11.84118 (0.0000)	
Group ADF-Statistic	-5.797489 (0.0000)		-17.39776 (0.0000)	

Notes: probability values are given in brackets. The null hypothesis, no co-integration, is rejected. * indicates the rejection of the null hypothesis at 0%, ** indicates rejection of null hypothesis at 5% and *** represents rejection of null hypothesis at 10% level of significance.

The study also used Johansen-Fisher-type panel co-integration test, developed by Maddala and Wu (1999), to test long-term co-integration among variables. The results of co-integration among internal shocks and business cycle fluctuation are reported in Table 13 while the results of co-integration among external shocks and business cycle are summarized in Table 15. The study used Fisher's result, a panel version of individual Johnson co-integration test, to recommend an alternative approach for co-integration in panel data by combining tests from individual cross-sections to obtain a test statistic for the full panel. This test is based on the aggregate of the p values of the individual Johansen maximum eigenvalues and trace statistic.

$$-2 \sum_{i=1}^n \log p_i \sim \chi^2_{2n}$$

Where p_i represents the p-value from an individual co-integration test for cross-section i, under the null hypothesis, no co-integration, for the panel and χ^2_{2n} is a chi-square distribution with N degrees of freedom based on MacKinnon, Haug, and Michelis (1999) values for Johansen's co-integration trace test and maximum eigenvalue test. In the Johansen-type panel co-integration tests results heavily depend on the number of lags of the VAR

system. The results of Johansen-Fisher-based panel co-integration test strongly indicate evidence of co-integration relationships between sets of variables in all cases.

Table 13 Johansen Fisher Panel Co-integration Test (Internal Shock)

Unrestricted Co-integration Rank Test (Trace) & Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
	Low Income Countries		Upper Middle Income Countries	
Hypothesized No. of CE(s)	Trace Test Statistics	Max-Eigen Test Statistics	Trace Test Statistics	Max-Eigen Test Statistics
None	183.0* (0.0000)	101.7* (0.0000)	336.1 (0.0000)	126.5 (0.0000)
At most 1	55.0 (0.09524)	48.25 (0.1739)	97.00 (0.0000)	54.18 (0.0044)
At most 2	67.53 (0.0042)	36.89 (0.6112)	69.15 (0.0001)	43.49 (0.0530)
At most 3	48.84 (0.1593)	29.83 (0.8798)	58.11 (0.0016)	58.11 (0.0016)

* Probabilities are computed using asymptotic Chi-square distribution and given in brackets.

Table 14 Johansson co-integration Test for Full Sample (internal Sources of fluctuations)

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.075539	712.4265	95.75366	0.0001
At most 1 *	0.062147	451.1105	69.81889	0.0001
At most 2 *	0.045481	237.6429	47.85613	0.0001
At most 3	0.000860	2.940719	15.49471	0.9695
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.075539	261.3160	40.07757	0.0001
At most 1 *	0.062147	213.4676	33.87687	0.0001
At most 2 *	0.045481	154.8639	27.58434	0.0001
At most 3	0.000860	2.863146	14.26460	0.9554

Table 15 Johansen Fisher Panel Co-integration Test (External Shocks)

Unrestricted Co-integration Rank Test				
	Low Income Countries		Upper Middle Income Countries	
Hypothesized No. of CE(s)	Trace Test Statistics	Max-Eigen Test Statistics	Trace Test Statistics	Max-Eigen Test Statistics
None	151.6* (0.0000)	95.80* (0.0000)	266.2* (0.0000)	143.0* (0.0000)
At most 1	62.11 (0.0954)	51.57 (0.2019)	147.1 (0.0000)	88.93 (0.0000)
At most 2	53.44 (0.1557)	39.14 (0.6796)	79.96 (0.0000)	55.70 (0.0030)
At most 3	40.07 (0.6407)	34.46 (0.8483)	42.46 (0.0654)	35.12 (0.2382)
At most 4	49.78 (0.2541)	49.78 (0.2541)	25.47 (0.7020)	25.56 (0.6975)
At most 5			21.85	21.85

			(0.8593)	(0.8593)
* Probabilities are computed using asymptotic Chi-square distribution and prob. Values are given in brackets.				

Table 16 Johansen Co-integration Trace Test for Full Sample (External Shocks)

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.185831	1600.420	69.81889	1.0000
At most 1 *	0.138261	875.7257	47.85613	0.0001
At most 2 *	0.048364	351.1965	29.79707	0.0001
At most 3	10.37631	12.4538	15.49471	0.2547
At most 4	25.11633	1.24511	3.841466	0.39813
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.185831	724.6946	33.87687	0.0001
At most 1 *	0.138261	524.5292	27.58434	0.0001
At most 2 *	0.048364	174.7427	21.13162	0.0001
At most 3	34.037631	13.2086	14.26460	0.42783
At most 4	62.11633	1.24511	3.841466	0.25367

* denotes rejection of the hypothesis at the 0.05 level

4.5 VECMs for Dynamic Adjustments

After finding a long-run relationship among internal and external shocks and business cycle fluctuation, this study employed the VECM to know the nature of relationships among variables of interest. The study ran three models to estimate the short-run relationships, if any, between internal shocks and business cycle fluctuation with three different proxies of financial development (M2, DCB, DCP) and one model for relationship between external shocks and business cycle fluctuations. This test used the set of first difference variables to measure the multivariate co-integration framework with N individuals with time trend dimension T. The heterogeneous vector co-integration model takes the following form:

$$\Delta y_{it} = \pi_i y_{j-1} + \sum r_i y_{i,j-k} + e_{it}$$

This equation is estimated for each individual N with null hypothesis that all N individuals have the same number of co-integrating vectors (r) among the p variables, using likelihood method, and the trace statistic is calculated. The study applied VECM to answer the following questions.

1. What type of relationship exists between internal sources – financial development, saving, population and interest rate – and business cycle fluctuation in LICs?
2. What type of relationship exists between external sources – foreign aid, TO, PR and climate changes – and business cycle fluctuation in LICs?
3. What type of relationship exists between internal sources – financial development, saving, population and interest rate – and business cycle fluctuation in UMICs?
4. What type of relationship exists between external sources – foreign aid, TO, PR and climate changes – and business cycle fluctuation in UMICs?

The result of VECM for internal shocks and business cycle fluctuation in the long run are reported in Table 17; it depicts a long-run relationship between internal shocks and business cycle fluctuation while table 16 shows short-run association between internal shocks and business cycle fluctuation.

Table 17 Long-run Co-integration Equation Based on Vector Error Correction Model (internal Sources and Business cycle Fluctuation)

Independent variable	Dependent Variable is Gdp								
	Low Income Countries			Upper Middle Income Countries			Full Sample		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model1	Model 2	Model 3
LNLM2	-0.624958* [- 6.13754]			-0.006781 [-1.13580]			0.055911 [11.4693]		
LNDCB		-0.245222* [- 3.22664]			0.002505 [0.43833]			0.057345 [8.67503]	
LNDCP			0.264780** [1.92727]			-0.001012 [-0.11914]			0.039155 [1.49953]
LNPOP	-0.090* [- 2.07821]	-0.092** [-1.99152]	-0.128** [-1.99419]	3.84 [1.00276]	6.92 [1.76077]	-7.01 [-8.66318]	-3.27E-08 [-7.89197]	-4.71E-08 [- 9.43226]	-0.003248 [- 0.40949]
LNSAV	0.142041 [0.73834]	0.234845 [1.18010]	2.427257* [6.78566]	-1.41345* [4.66908]	-1.18445* [-3.76555]	-4.756771* [-7.02964]	-1.70E-11 [- 5.26125]	-1.48E-11 [-3.80956]	-2.18E-10 [-8.88324]
LNINT	0.297303* [2.79150]	0.321754* [2.80195]	0.280552** [1.91660]	-0.010067* [9.74432]	-0.012199* [12.0550]	-0.007819* [-3.50097]	-0.003471 [- 3.18437]	0.006320 [4.92383]	- 4.36E-07 [-14.8200]
C	3.180112	1.462492	-10.46900	19.11352	5.233296	19.89045	3.051754	3.588568	35.64752
ECM Term	-0.292360* [-17.3764]	-0.295477* [-17.0622]	-0.137795* [-9.43273]	-0.084709* [-13.5422]	-0.075528* [-12.8942]	-0.011651* [-3.77919]	-0.069789 [-16.7426]	-0.045824 [-12.5195]	-0.0264 [- 2.23149]

BREAK	-0.105684* (-3.66753)	-0.136653* [-4.55648]	-0.065029* [-2.37719]	- 4.716794 [8.07702]	-5.102730* [-8.96867]	-2.783591* [-2.25935]	- 3.45631* [7.13242]	-4.2730* [-5.22345]	-3.75671* [-2.34675]
R-squared	0.144521	0.535231	0.395442	0.556866	0.692627	0.572533	0.319572	0.297674	0.409649
Adj. R-squared	0.136938	0.454021	0.299062	0.551836	0.686623	0.565862	0.317466	0.295456	0.405965
F-statistic	19.05804	18.90487	24.85634	110.7178	115.3586	85.82618	151.7015	134.2034	111.1905

The study used three models to show the effect of financial development on business cycle fluctuation because the study used three proxies – DCB, DCP and M2 – to indicate financial development. These three proxies of financial development are highly correlated with each other, thus the study is unable to run these proxies in one model.

In this study we used M2, DCB, and DCP to indicate financial development, interest rate is used as monetary policy tool and private savings to assess the role of internal sources in macroeconomic fluctuations. Moreover, the study used population as controlled variable. The incident of Great Depression in 1930 provided space for policy intervention to regulate economic activities. Initially, fiscal policy gained popularity to control economic disturbances but during the last two decades it has been observed in many developed economies that fiscal policy has been locked into austerity and governments cutback their projects and the role of monetary policy to affect economic activities becomes more important than ever. (Canova & Nicolo, 2002). The empirical literature discussed one question continuously: how can monetary policy become more effective. The theoretical literature suggested three different tools for effective monetary policy. First, discount rate: the rate of interest at which federal bank provides loan to commercial bank. Second, reserve requirement: the amount of assets that are kept as reserves rather than loans. Third, open market operation: action of federal bank related to buying and selling bonds and securities. However, the empirical literature identified different monetary frictions like M2 (Haider, & Ghani, 2012), DCB and DCP (Haider et al., 2012) and interest rate (Baxter, 1994; Coibion). The study used interest rate as a tool of monetary policy with this belief that monetary policy has the power to affect the economic and financial decisions of the people, whether they should get a loan from a bank

to invest or to put their savings in a bank. Moreover, monetary policy can create resistance to business cycle fluctuation by increasing or decreasing private investment through incentives. The empirical results of this study indicated that M2 $[-0.624958*(-6.13754)]$, DCB $[-0.245222*(-3.22664)]$, and DCP $[0.64780**(1.92727)]$ has a statistically significant long-term relationship with business cycle fluctuation in LICs. Although M2 and DCB have negative association with business cycle fluctuations and dampen business cycle fluctuation in lower developing economies, DCP has a positive significant long-run relationship with economic fluctuation and amplifies business cycle fluctuation. On the other hand, in UMICs the scenario is different because M2, DCB and DCP $[-0.006781, (-1.13580)]$, $[0.002505(0.43833)]$ and $[-0.001012(-0.011914)]$ have statistically insignificant relationships with economic fluctuation.

Similarly, results indicate that interest rate has a significant and positive association with BC fluctuations in all three models in LICs $[0.297303*(2.79150)]$, $[0.321754*(2.80195)]$, $[0.280552**(1.51660)]$ while in UMICs interest rate has negative and significant association with economic fluctuation $[-0.010067*(-9.74432)]$, $[-0.012199*, (-12.0550)]$ and $[-0.007819*(-3.50097)]$. However, in the case of LICs, private savings is insignificant in first two models while in model three it has a positive and significant relationship with business cycle fluctuation $[2.427257*(6.78566)]$ in LICs and amplifies business cycle fluctuations while in UMICs household saving diminishes the business cycle fluctuation $[-1.411345*(-4.66908)]$, $-1.18445*(-3.76555)$, $-4.756771*(-7.02964)]$.

Most of the previous empirical research (King & Levine, 1993a; Levine et al., 2000; Pan & Wang, 2013) investigated the relationship between financial development and economic growth and found that financial development increases economic growth by stabilizing output fluctuations through improved flow of information and implementation of agreements while, on the other hand, any shock to financial market will positively contribute to business

cycle fluctuations. Our results are consistent with several empirical studies that have identified the stabilizing role of financial development in growth fluctuations (Aghion, Fally, & Scarpetta, 2007; Easterly et al., 2001). Results indicated that in LICs, as M2 and DCB - which are used as indicators of financial development - increases, economic fluctuation reduces. Moreover, the evidence suggests that the size of financial development and economic growth fluctuations has an inverse relationship at initial stages of growth and when financial market development reaches a certain point the relationship becomes positive and sometime insignificant (Beck et al., 2001). Banks provide finance to companies and households at a time of need and help the economy to move on a well-balanced growth path. The economic literature documented that banks alleviate the impact of sudden shocks on their clients by providing them funds even in bad times (Chew, 2001).

Moreover, financial crises in developing and even in some industrialized countries gave a new dimension to the thinking of the policymakers of LICs about economic and financial stability and policymakers introduced financial institution risk amelioration policies and efficiently allocated their resources to save their banking system. It is noteworthy that over the past decades, in LICs the number of banking crises is low which indicates the resilience of the bank credit system in developing nations (Dafe, 2016). Furthermore, in LICs the primary role of the financial market is to mobilize savings into investment, thus the financial sector positively contributes to economic development by augmenting the quantity and efficiency of investments and lowering macroeconomic fluctuation (Estrada, Park, & Ramayandi, 2010).

In addition, in LICs although the financial market is small in size but financial institutions are healthy, smooth and well-functioning and provide strength and flexibility in case of instability (Estrada et al., 2010; Mallick, 2009). Similarly, some empirical studies documented that as financial depth increases it reduces output fluctuations and enhances

long-run growth of the economy (Easterly, 2002). In LICs, although financial markets are not well developed but they play a significant role in stabilizing economic fluctuation by diverting resources from low lucrative projects toward high money-making ventures effectively. Perhaps this is because at lower stages of development, economies can do too much of a good thing with finance, thereby at lower level of economic growth, financial system and higher productivity growth move in same direction by regulating macroeconomic disturbances (Cecchetti & Kharroubi, 2012).

Furthermore, the result of this study indicates that when DCP is used as a proxy for financial development, it has a positive long-run association with output fluctuations and increases economic fluctuation and destabilizes economies. Our results are consistent with King and Plosser (1984) that provides empirical explanations for positive association of private financial sector and economic fluctuations by arguing that financial development may have positive effects on economic fluctuation because of two reasons. First, the private sector may utilize resources to maximize its own interest and misallocation of resources by private sector may cause output fluctuations. Second, the association between financial development and economic growth largely depends on the behavior of borrower and lenders; if credit is utilized to finance investment in productive assets then it causes to reduce economic instability, but if credit is being utilized to feed speculative bubbles then it may increase instability in economies (Hasan & Marton, 2003). Similarly, if credit is utilized for productive investment it is fruitful and if it is utilized for consumption purposes then it causes fluctuation in aggregate demand and destabilizes the economic growth pattern (Greenwood, Sanchez, & Wang, 2013). However, more bank enterprise credit reduces instability and increases economic growth, when lending is utilized to boost entrepreneurial activities. By contrast, rapidly growing credit by private sector to households, if not regulated prudently causes financial and economic instability.

Moreover, financial development mitigates macroeconomic fluctuations by nurturing risk diversification and by reducing information asymmetries within an economy. However, if credit market imperfection prevails in the economy, it may put restrictions on a country's ability to reallocate the resources that amplify macroeconomic fluctuations and contribute to their persistence (Greenwald & Stiglitz, 1991; Kiyotaki & Moore, 1997). Moreover, financial developments increase the credit generation ability of institutions and promote risk sharing that enhances the abilities of economies to absorb shocks. Financial development dampens output fluctuations by relaxing cash constraint for firms and households in LICs that are facing international financial constraint (Acemoglu & Zilibotti, 1997; Caballero & Krishnamurthy, 2001). Financial institutions help to reduce aggregate fluctuations by retreating resources away from the sectors that largely contribute to output fluctuations (Braun & Larrain, 2005; Braun & Raddatz, 2007). Some empirical studies suggested a U-shaped relationship between output fluctuations and financial development and documented that as financial depth increases it causes to reduce macroeconomic fluctuation by improving the speed of economy's actual industrial composition as it converges to its optimally diversified benchmark level (Kim & Lin, 2010; Manganelli, 2012). Moreover, in LICs, financial development reduces output, consumption and investment disturbance or fluctuations and smooth economic activities (Denizer, Iyigun, & Owen, 2002).

Furthermore, the results of VECM indicated that interest rate has a significant and positive association with economic fluctuation in LICs [$0.297303*(2.79150)$], [$0.321754*(2.80195)$], [$0.280552^{**} (1.91660)$] and negative and significant association in UMICs [$-0.010067*(-9.744332)$], [$-0.012199*(-12.0550)$], [$-0.007819* (-3.50097)$].

Therefore, results suggest that in LICs well as in UMICs interest rate can be used as a tool to stabilize economic fluctuation. As the results indicated a positive relationship between interest rate and economic fluctuation, so as interest rate increases it will increase instability

while decrease in interest rate causes to reduce economic fluctuations by increasing household and private spending which accelerates economic activities. The results of this study indicate that interest rate, used as a proxy for monetary policy, has a long-run positive association with macroeconomic fluctuation. Empirical studies suggests that interest rate is relatively less volatile than money market rate, thus monetary policy impacts through interest rate on real economy have strong implications for business cycle fluctuations (Cottarelli & Kourelis, 1994; De Bondt, Mojon, & Valla, 2005; Mojon, 2000; Sander & Kleimeier, 2004). In addition, in LICs, political instability and parliamentary conflicts may raise serious concerns about the sustainability of fiscal policy and its role in economic uncertainty but in extreme cases of fluctuation, fiscal policy can be actively used to stabilize fluctuation as in the case of the Great Depression (Boivin & Giannoni, 2006). Moreover, in LICs, most of the time fiscal policy generates macroeconomic shocks rather than stabilizing economic shocks, thereby fiscal policy is not recognized as an effective tool at a time of instability. Moreover, in LICs the freedom of central bank to exercise monetary policy is limited; in recent years the central banks of LICs are increasingly becoming independent because of economic reforms but still monetary policy fail to control the economic fluctuation (Mishra & Montiel, 2013; Mishra, Montiel, & Spilimbergo, 2012).

Similarly, in 1990s the ER – discretionary stabilization tool – lost its popularity because in a world with high capital mobility ER as a policy, discretion is unable to provide a fruitful result. Even in a managed ER regime, a managed ER is adopted as a tool of monetary policy rather than as an independent policy instrument. In LICs, ER is usually fixed by fiscal authorities so they are left with no choice to use ER as a monetary tool to correct economic fluctuation (Mishra, Montiel, & Spilimbergo, 2010). In short monetary policy has different instrument of choice including interest rate for stabilization of the economy when incidentally economic activities experience some swing. Moreover, effectiveness of monetary policy

largely depends on appropriate tool and its ability to affect aggregate demand (Arestis & Sawyer, 2004).

Most of the time economists discussed the role of monetary policy and its transmission mechanism with reference to highly developed, sophisticated and well-functioning financial market economies (Clarida et al., 1998; Maćkowiak, 2007), while the role of monetary policy with a rudimentary financial system is an under-researched area. That is why the link between monetary policy and aggregate economic activities in LICs remains something of a black box (Bernanke & Gertler, 1995).

The results of this study contribute to explain the black box by providing evidence about the effectiveness of monetary policy – the study used interest rate as an instrument of monetary policy – to smooth economic fluctuations in LICs. Therefore, in case of expansion and depression in the economy, a federal bank adopts contractionary or expansionary monetary policy to control fluctuation and uses interest rate as a tool to control variability in economic activities. In case of depression, easy monetary policy forces the banks to increase supply of loans by lowering interest rate unless real economic activities expand to a desired level and vice versa (Bernanke and Gertler, 1995). Moreover, demand for credit is very sensitive to lending interest rate and monetary policy used interest rate as an effective tool to control macroeconomic fluctuation (Fase, 1995). Practically, it has been observed that demand for real loans and interest rate are negatively correlated with each other while real loan and economic activities are positively related with each other in long-run period, so that an increase in interest rate increases macroeconomic fluctuations by lowering investment activities (Calza et al., 2003) especially in case of LICs while in UMICs increase in interest rate causes to increase saving that increases the availability of funds for investment and causes to reduce business cycle fluctuation. Moreover, if interest rate significantly affects aggregate demand by effecting household and investment spending than it can remove the

economic fluctuation. Therefore monetary policy utilizes interest rate to adjust the economy and lower the fluctuation to achieve output stability (Hodrick & Prescott, 1997).

The theoretical literature identifies a number of direct – sales and purchase of government securities – and indirect ways – interest rate – through which monetary policy successfully operates to stabilize economic disturbance. Moreover, interest rate affects real economic activities through multiple channels like balance sheet channel (Gilchrist & Zakrajšek, 2012; Kashyap & Stein, 1995) – net worth of business and individuals – bank lending channels (Kashyap & Stein, 1995) – high interest rate causes to lower bank profitability and bank is less willing to lend – value of currency (Gali & Monacelli, 2005) – high rate of interest appreciates domestic currency – and ER channels (Kollmann, 2001) – exports become less competitive with their volumes reduced as they become more expensive.

However, a miscalculated monetary policy induces fluctuation in economic activities while on the other hand a sensible and well-estimated monetary policy helps to control these fluctuations. It has been observed during the past two decades that LICs improved fiscal and monetary policy effectiveness through liberalization and extended financial market and stabilized their economic indicators at a moderate level. Furthermore, LICs are continuously facing different challenges, like exposure to global financial market; policymakers are assigned a primary role to central bank for conducting macroeconomic stabilization (Adam, Kessy, & Langford, 2016).

Central bank conducts monetary policy by buying and selling government securities and by bank lending channels – one component of broader credit channel – to attain its primary goal of economic stability. However, central bank may become successful in attaining its intermediate goals like interbank interest rate, the stock of un-borrowed reserves, the monetary base, or the money stock. In LICs, the empirical literature identified two types of monetary policies: first, accommodative, and second, stabilizing monetary policy.

Accommodative policy provides supply of credit on a regular basis to promote economic activities without considering economic fluctuations, while stabilizing policy is adopted to counterbalance undesired changes that interrupt economic activities. Conclusively, study found that in LICs monetary policy is stabilizing in nature while in UMICs use accommodative monetary policy to control the economic fluctuations.

The results also indicate that private saving is insignificant in first two models, while it is significant and has a positive long-run association with economic fluctuation in LICs (0.142041, [0.73834], 0.234845, [1.18010] and 2.427257* [6.78566]), while in UMICs, private saving has a negative and significant relationship with economic fluctuation in all three models [-1.411345*(4.66908), -1.18445* (-3.76555), -4.756771* (-7.02964)]. Therefore, results suggest that in LICs private saving exacerbates economic fluctuation while in UMICs it dampens macroeconomic fluctuation.

In LICs, our results are consistent with empirical studies that documented higher saving tendency during the Great Depression (Claessens et al., 2012; Devereux, Gregory, & Smith, 1992; Mody et al., 2012). In LICs, gross domestic saving is largely dependent on household sectors. Several factors like uncertainty about future income, borrowing and liquidity constraint, smoothing consumption throughout life, intergenerational altruism, and aversion to debt bequests are major determinants of household saving in LICs. In LICs, a majority of people are dependent on agriculture sector for their livelihood; thereby, the uncertainties that are prone to stochastic weather shock affect agriculture as well as household earning. No doubt, the ultimate goal of nations – higher living standard – is highly associative with domestic saving growth rate because saving enhances the national capacity for investment and production that further affect economic growth by reducing output fluctuation. Surprisingly in LICs, saving is unable to perform its stabilizing role because of the limited saving abilities of its people and their fears about the future. Therefore, the people of LICs

will invest their savings wherever it finds highest return, which weakens the relationship between saving and growth in LICs. Moreover, at a time of uncertainties, people transfer their savings abroad, which amplifies uncertainties rather than stabilizes them (Kaya, 2010). Evidence suggests that saving and investment correlation is weaker in LICs than in OECD countries and that the weak relationship disturbs economic activities positively (Isaksson, 2001; Tesar, 1991). In LICs, evidence is reported that higher capital outflow (Özmen, 2007) causes economic fluctuation (Payne & Kumazawa, 2006) because saving is a force that triggers domestic investment, which promotes economic growth and reduces fluctuation in economic activities, but if domestic financial sources have been shifted to developed economy to earn higher interest rate then obviously the force behind economic activities becomes absent and slows down economic activities and causes recession (Payne & Kumazawa, 2006).

Moreover, people keep their savings in domestic as well as in foreign assets and in the presence of economic shocks people prefer to keep a greater portion of their savings in foreign assets (Ventura, 2002). It has been observed that saving and investment correlation is stronger in larger economies and controls irregularities in economic activities, whereas this correlation is weak in small economies – increased saving does not cause an increase in investment – and slows down the pace of economic activities (Baxter & Crucini, 1993). In LICs the correlation between saving and investment is less than 0.45, which indicates that 1 point increase in saving causes 0.45 point increase in investment; thus, it means that domestic “saving retention” phenomenon does not hold which is problematic for small developing economies (E. Cavallo & Pedemonte, 2016). The results imply that in small open economies, domestic saving added to world saving pool causes impediments in domestic saving and investment relationship and generates fluctuations in economic activities by destabilizing investment activities (Feldstein & Bacchetta, 1991).

In LICs, people usually have less ability to save but when a few big savers save a lot but invest relatively little it induces high fluctuations in economic activities. However, temporary shocks in investment are insignificant while permanent shock to investment has a significant association with fluctuation (Aghion et al., 2010). Moreover, the results of this study are consistent with the empirical studies that reported the possibility of a negative impact of household saving on economic growth through contractionary effect of consumer spending (Lietaer, Ulanowicz, & Goerner, 2009; Özmen, Şahinöz, & Yalçın, 2012); indirectly these studies advocated that increased saving would reduce consumer spending and that would reduce the profitability of economic activities and lead the economy toward recession.

By contrast, the results in UMICs are totally different from LICs and indicate that domestic savings have a negative long-run association with economic fluctuation and increase economic growth by lowering economic fluctuation. Results of this study suggest that as domestic saving in higher income countries increases it reduces output fluctuations or, in other words, the behavior of domestic savings is countercyclical – movement in domestic saving and economic activities is in opposite direction. The results of this study are consistent with the empirical literature that suggested that saving performs a major role in economic growth of UMICs because higher saving causes higher investment and leads toward higher sustainable economic development by reducing output fluctuations (Aghion, Comin, Howitt, & Tecu, 2006; Mason, 1988; T. Singh, 2010). Moreover, empirical studies documented that an increase in economic growth increases per capita income. As documented by the Keynesian theory of marginal propensity to consume, as personal income increases it will increase saving and investment opportunities and lead economy toward prosperity by reducing instabilities in economic activities. Empirical evidence suggested a linear relationship between saving and investment (Granger & Terasvirta, 1993) in UMICs and a linear relationship between investment and output fluctuations (Blackburn & Pelloni, 2004).

Therefore, empirical studies proved an indirect or negative association between saving and economic fluctuations. Thailand – included in the group of middle income countries – controlled instability in economic activities with the help of internal and external sources of saving (Deaton, 1989). Modern macro-economists analyzed the model in which households make decisions about their consumption and saving for their entire life period depending on a given stream of expected income and household degree of frugality (Cynamon & Fazzari, 2008). Moreover, as for a given level of income, frugality and saving are positively related to each other, thereby as frugality increases, people will save more.

Similarly, people spread their projected income throughout their life to avoid sharp swings in their consumption pattern. Moreover, at a time of depression people use their savings to maintain certain living standards and in this way aggregate demand will increase and this will cause a reduction in fluctuation. Hence, domestic saving dampens economic fluctuation in two ways: first, by providing finance to firms, and second, by increasing aggregate demand in the economy. Household savings increase the net acquisition of financial resources of financial institutions and they provide funds to all type of firms – from fast food restaurants to high-tech services – so that they can acquire capital to support rapid economic growth on the one hand while, on the other hand, savings resist a sharp decline in aggregate demand at a time of recession and maintain aggregate activities at a certain influential level (Collins, 1991; Huff, 1999). The finding of this study coincides with that of modern economists who believe that an increase in saving means more necessary capital to fuel economic growth and more output and investment in the near future, in contrast to traditional economists who believe that higher saving means lower consumption, a fall in output, and instability in economic activities. However, the prediction of tradition economists was falsified during 1960 and the mid1980s when Singapore – one of four Asian tiger economies – experienced a large decline in consumption in late 1970s but at the same time the country experienced a

sharp rise in financial assets that facilitated the process of investment expansion and output boom (Huff, 1995). This example suggests that as household saving increases, economic activities will flourish and fluctuation will diminish.

Our results are also consistent with Harrod-Domar growth model that suggested the ratio of saving to capital output ratio will determine the growth path of the economy (Perkins, 2001).

However, it was the Solow's Neoclassical growth model which has shown how the saving rate could affect the growth rate of output for a temporary period of time (Solow, 1957). Solow's model also suggested that an increase in saving rate positively affects economic growth and raises living standards permanently by increasing the steady state amount of stock of capital per worker. However, Law and Singh (2014) tested the application of "endogenous growth models" and reported that a higher rate of saving improves quantity and quality of existing stock of capital and raises technology level and output growth level permanently in economies (Carroll & Weil, 1994; Lucas, 2002; Romer, 1994). However, this relationship between household saving and economic growth is stronger in larger economies as compared to smaller economies (Ciftcioglu & Begovic, 2010). Moreover, our results are consistent with Rodrik (2000) and Kuijs (2006). Furthermore, empirical studies concluded that the saving growth rate positively and significantly affects economic activities by lowering output fluctuations (Attanasio, Picci, & Scorcu, 2000; Carroll & Weil, 1994; Deaton & Paxson, 2000).

Conclusively, financial development in LICs dampens economic fluctuations while in UMICs, company financial development is insignificant and does not play any role in the case of economic variability in long-run period. Moreover, the interest rate is significant in both two samples – LICs and MICs – and operates as an effective policy intervention to smooth economic disturbance in the long run. Similarly, household saving has a positive association with economic disturbance in LICs and intensifies economic fluctuation; in

UMICs, household saving has predicted theoretical negative association with economic fluctuation and higher household savings indicates lower economic fluctuation and lower saving means higher economic instability or variation.

Moreover, the value of the ECT indicates that all models are statistically stable in LICs as well as in UMICs $[-0.292360^* (-17.3764), -0.295477^* (-17.0622), -0.137795^* (-9.43273) - 0.08284^* (-3.09635) - 0.080153^* (-13.5578) - 0.07052^* (-2.74432)]$. The ECT indicates the speed of convergence of the model toward equilibrium path if any shock causes to diverge the model from its equilibrium growth path. The results indicate that the speed of convergence in LICs is higher as compared to UMICs. Results indicate that in the case of LICs if any disturbance causes the system to deviate from its equilibrium path, the system will converge at a speed of 29% correction in the first quarter in model 1 while in models 2 and 3 the convergence speeds are 29% and 13% in each quarter respectively. However, in the case of UMICs, the speed of convergence is very slow as compared to LICs.

Table 18 Long-run Co-integration Equation Based on Vector Error Correction Model (External Sources and Business Cycle Fluctuation)

Inde. variable	Model 4		Model 4
	Low Income Countries	Upper Middle Income Countries	Full Sample
ODA	-0.0896* [-4.24235]	- 0.81710 [-1.59996]	3.036178 [0.59400]
PR	-0.525246* [-17.7654]	- 0.52811 [-0.92790]	-34.78655 [-3.07339]
TRAD	0.421143* [26.3301]	0.514793 [3.36526]	0.020700 [21.2567]
CO ₂	-0.706022* [-26.1443]	0.224491 [0.22823]	1269021. [1.24991]
C	1.21	0.259704	1.1110
ECM term	-0.144813* [-3.51141]	-0.08011* [-6.89263]	-0.07853 [-2.54378]
BRAEK	-0.380813 [-50.3387]	-0.439181 [-5.28913]	-0.567891 [-4.32456]
R-squared	0.912671	0.202409	0.807583
Adj. R-squared	0.791380	0.285544	0.806548
F-statistic	7.120920	19.01984	780.2094

Results about long-term and short-term association of external sources of fluctuations are reported in Tables 18. Results indicate that ODA has a negative and significant relationship with economic fluctuation $[-0.0896^* (-4.24235)]$ in LICs and diminishes economic fluctuation in long-run period while ODA has a negative but insignificant association with economic variability $[-.81710, (-1.59996)]$ in UMICs.

Our results are consistent with empirical studies which documented the importance of ODA in economic growth of LDCs (Ang, 2010; Burnside & Dollar, 2004; Easterly, 2003, 2005; Hansen & Tarp, 2001; Karras, 2006; Rajan & Subramanian, 2005). The results of this study suggest that in LICs ODA is a vital source to control economic fluctuation and set the economy on a path of economic development. Recently during 2007 and 2009, it has been observed that financial crises in developed economies lowers the flow of FDI, remittances and foreign aid toward LDCs, which generated economic instability by lowering the growth rate by about 7% in these economies (Dang et al., 2009). At a time of depression fiscal stimulus packages in LICs are instantly introduced to save the economies from subsequent fluctuation and ODA plays an important role in the successful operation of this stimulus (Norris et al., 2010). Moreover, a smooth disbursement of ODA effectively controls unpredictability through some important sectors like health, education and infrastructure and causes to smooth economic activities. Contrariwise, a sudden cut of ODA by developed economies aggravated the contraction in economic activities in LICs and disturbed the whole development process (Birdsall & Deese, 2004; Dabla et al., 2015). Moreover, in LICs, policymakers used ODA as a customary way to smooth output fluctuation; thus, if demand for new loans is denied or disbursement of ODA delayed by developed economies because of moral hazards – misuse of foreign aid –then fluctuations are intensified (Stéphane Pallage & Robe, 2001). Moreover, the importance of foreign aid to smooth economic fluctuation in

LICs increases because it earns foreign capital for them and it contributes 12.5% to their GDP growth – an indicator of economic development (Stéphane Pallage & Robe, 2001). The empirical literature agreed that output fluctuations negatively affect economic growth, and foreign aid help LICs to foster their economic growth by lowering fluctuation (Gupta & Islam, 1983; Mendoza, Jones, & Vergara, 2009; Ramey & Ramey, 1998).

However, the empirical literature argued that aid disbursement pattern may amplify output fluctuations (Dollar & Levin, 2006). Similarly, the impact of foreign aid on recipient countries depends on aid volume and recipients' economic policies (Burnside & Dollar, 2004) on the one hand while, on the other hand, some studies suggested that a stable economic growth also depends on stable aid flow from donor toward recipient countries (Lensink & Morrissey, 2000). Therefore, the impact of foreign aid is conditional on the economic policies adopted by LICs for utilization of resources. Poor countries with sound economic policies can accelerate aid-growth process by stabilizing fluctuation in output while inefficient policies – consumption of foreign aid in unproductive government expenditure – boost economic fluctuation. A modified Neoclassical model emphasized that due to imperfect international capital market, foreign aid has impacts on the performance of poor economies. The theoretical literature considered foreign aid to be income transfer that may or may not be fruitful for LICs. The effectiveness of foreign aid in LICs depends on the quality of monetary, fiscal and trade policies (Burnside & Dollar, 1997). However, Hansen and Tarp (2001) stated that good policies do not matter at all in LICs for aid–growth relationship. Empirical studies that indicated the effectiveness of foreign aid considered foreign aid to be insurance against macroeconomic fluctuation and argued that foreign aid has the potential to reduce economic disturbances (Stéphane Pallage et al., 2006) and promote long-run growth (Borjas & Ramey, 1995).

Similarly, evidence suggests that development aid is procyclical to output growth in recipient countries because economic activities and development aid moves in the same direction, which indirectly indicates that development aid and economic fluctuation move in opposite direction (Bulír & Hamann, 2007; Stéphane Pallage & Robe, 2001). Moreover, in two-thirds of poor economies the cyclical component of foreign aid and cyclical component of domestic output are highly correlated with each other which indicates a negative association between foreign aid and economic disturbances (Andrews, Das, Elder, Ovadiya, & Zampaglione, 2012). Similarly, the standard hazard model suggested that in the case of LICs, donor agencies monitor the utilization of aid by restricting aid disbursement with their economic performance and try to control macroeconomic mismanagement (Dabla-Norris et al., 2010; Svensson, 2000). Moreover, donor agencies also focus on quality of macroeconomic management institutions while making decisions regarding allocation of foreign aid to LICs. Interestingly, during the last few years, it has been observed that the flow of foreign aid has increased toward developing economies relative to other flows like FDI and private flow (Ekanayake & Chatrna, 2010). Several reports (Boone, 1994, 1996) support aid-growth model prediction and argued that in LICs aid is fully consumed to accelerate economic activities. Moreover, aid has a positive association with growth but the role of sound economic policies cannot be overlooked (Burnside & Dollar, 2000). Before 1990s, policies regarding utilization of foreign aid were largely ignored, but after mid1990s, bilateral and multilateral donor agencies considered and paid attention to governance, corruption and transparency issues in foreign aid and an international practical action oriented road map – Paris declaration – was introduced to improve economic development in LICs. Although during 2009 – financial crises – the flow of FDI and remittances toward LICs dropped significantly while the flow of foreign aid increased by US\$130 billion by the end of 2010 (Griffith-Jones & Ocampo, 2009).

Evidence suggested that although donors countries provided foreign aid for different purposes, such as alleviating poverty, disaster relief, to promote economic growth and to political alliances, all drivers lead toward economic stability (Alesina & Dollar, 2000). A study conducted by Addison, Mavrotas, and McGillivray (2005) demonstrated aid-growth relationship through reduction of poverty in LICs. Similarly, in sub-Sahara Africa, although bad governance, corruption and land reform are responsible for its poor economic performance, foreign aid still affects its growth by controlling fluctuation in macroeconomic activities and one percentage point increase in the aid/GNP ratio contributes one-quarter of one percentage point to the growth rate (Gomanee, Girma, & Morrissey, 2005). In addition, empirical literature suggested that LICs are facing a saving investment gap and a gap between exports earnings and import receipts and LICs usually finance these gaps with foreign aid. This finance to investment actually helps the economies to come out of depression (Chenery & Strout, 1966; Hansen & Tarp, 2001). At a time of contraction, LICs attempt to foster economic growth by mobilizing internal sources on the one hand while, on the other hand, they borrow from external sources to accelerate domestic investment, to finance health and educational development projects and to finance transitory balance of payment deficit which lead toward stability (Okonjo-Iweala, Soludo, & Muhtar, 2003). Therefore, there is no doubt over the past few years that foreign aid directly and significantly affects government expenditure in social sector like health, education and sanitation sector and excels human capital to contribute to economic development in long-run period (Gomanee, Morrissey, Mosley, & Verschoor, 2005; Herzer & Morrissey, 2009). However, during financial crises of 2007 and 2009, a sharp decline in foreign aid was observed because donors could not meet their aid disbursement toward developing economies (Cali & Velde, 2011; Naudé, 2009). Resultantly, economic activities in developing economies depressed a lot, for example, LICs exports declined by up to 25% (Cali & Velde, 2011), growth rate decreased by about 7%

(Dang et al., 2009) and flow of FDI lowered by 10%. All above-stated empirical results support the results of this study that has established that as foreign aid increases it reduces economic fluctuation in LICs while a decline in foreign aid increases economic fluctuation. However, foreign aid did not play a significant role in economic fluctuation of UMICs [$-8.17\text{E-}10$, (-1.59996)].

The results are consistent with empirical studies which provided evidence that foreign aid has an insignificant association with economic activities (Christensen, Doucouliagos, & Paldam, 2007; Gang & Khan, 1990; Paldam, 2003). It has been observed that, overall, the share of foreign aid going to UMICs has been declining since 1970s and allocation of aid resources to UMICs is 46% less on average as compared to LICs (Akramov, 2012). Moreover, following Paris agenda, many developed economies dropped some countries that have higher per capita gross NI and increased their partnership with countries of low per capita income (Anderson, 2008). Therefore, the total share of UMICs of total foreign aid has been reduced by one-third since 1990s because donor agencies started to close aid allocation to these countries by applying graduation criteria on the basis of per capita GDP (Glennie, 2011). Empirical evidence documented that by region, 34% of total aid was allocated to Sub-Saharan Africa, 18% to central Asia, and 15% to east Asia, and by income group, LICs received 55% share of total foreign aid while only 6% was allocated to UMICs (Alonso, Glennie, & Sumner, 2014). However, the large difference in allocation of foreign aid to recipient countries depends on recipient country's need and economic performance as well as on political and strategic factors (Beuran, Raballand, & Revilla, 2011). At the same time there was a prolonged period of robust economic growth in UMICs largely associated with their macroeconomic management and improved institutional performance. Moreover, in these economies the governments introduced effective fiscal policies to overcome development challenges by providing access to improved health, education and infrastructural facilities to more of the

population (Abdychiev et al., 2015; Jaumotte & Spatafora, 2007). Therefore, all above-stated facts support the results of this study that foreign aid did not play a significant role in economic activities of UMICs.

PR are negatively and significantly associated with macroeconomic fluctuation in LICs [-0.525246^* , (-17.7654)], while in UMICs PR have an insignificant relationship with economic fluctuation [-0.52811 , (-0.92790)]. The results of this study indicate that in LICs, remittances stabilize economic fluctuations, thereby as remittances increase economic fluctuation will diminish and if remittances decrease it will increase fluctuations in LICs. Our results are consistent with the statement of Sayan (2006) who argued that remittances move counter cyclically relative to the economic cycle of the recipient country. Remittances may rise when the recipient economy suffers a downturn in activity or macroeconomic shocks due to financial crisis, natural disaster, or political conflict, because migrants may send more funds during hard times to help their families and friends. Remittances may thus smooth consumption and contribute to the stability of recipient economies. Moreover, evidence suggests that remittances are generally more stable than foreign aid, FDI and any other private inflow; hence, remittances have a greater impact on economic activities (Buch & Kuckulenz, 2004; Ratha, 2005). Remittances are considered unilateral transfer of resources and do not have any future liability like interest rate and profit transfer; thereby, remittances have a tendency to behave countercyclically because migrants send more remittances to support their family when there is a downturn in economic activities of their home country and save their family from worries of unemployment and other crises of depression (Lindley, 2006).

Moreover, remittances help the economies to come out of economic disturbance by affecting structural characteristics, macroeconomic conditions and aggregate demand (Bettin et al., 2015). Empirical studies suggested a stabilizing role of remittances for macroeconomic

fluctuation for two reasons. First, it has been observed in LICs that people send more remittances when there is widespread unemployment in their home country just to finance the spending activities of relatives and family members in their home country (Sayan, 2006). Therefore, migrant family members are just like insurance for the economy against bad times. Second, at time of global financial crises it has been observed that remittances have proved to be a very strong instrument to overcome the downfall in economic activities in LICs (Ocampo, 2009; Sirkeci, Cohen, & Ratha, 2012). Moreover, empirical studies suggested that remittances move in opposite direction to economic activities because of altruistic behavior of migrants (Agarwal & Horowitz, 2002; Osili, 2007).

Accordingly, migration itself is a risk diversification strategy against economic shock (Yang & Choi, 2007). Similarly, some studies support our result by arguing that remittances significantly affect all development tools like saving (Foster, 1995; Osili, 2007), aggregate spending (Adams, 2006), and poverty and income inequality (Adams & Page, 2005). The empirical literature argued that remittances are automatic stabilizers that reduce macroeconomic fluctuation (Anyanwu & Erhijakpor, 2010; Bugamelli & Paternò, 2011; Chami, Hakura, & Montiel, 2009; Gupta et al., 2009) by insuring negative income and consumption shocks (Bugamelli & Paternò, 2011; Combes & Ebeke, 2011; Craigwell, Jackman, & Moore, 2010). Moreover, countercyclical behavior – opposite movement in remittances and economic fluctuation – of remittances certified remittances as automatic stabilizers and dampened fluctuations in macroeconomic aggregates (Durdu & Sayan, 2010; Gupta et al., 2009). Empirically it has been observed in African countries (LICs) that when there was a negative shock that affected macroeconomic activities, such as a natural disaster, financial crises and conflicts, the inflow of remittances increased sharply due to altruistic motives of migrants (Gupta et al., 2009; Mohapatra, Ratha, & Silwal, 2011). Similarly, remittances also have the ability to stabilize the economy by correcting the current account

deficit in LICs (Bugamelli & Paternò, 2011), and by smoothing the fluctuations in overall capital flows (Chami et al., 2009). Furthermore, remittances increase the total foreign exchange reserves in the economy and stabilize the economy by increasing sovereign credit worthiness of LICs (Ratha, Mohapatra, & Scheja, 2011; Ratha & Shaw, 2007). Moreover, some studies argued that inclusion of remittances in credit worthiness rating score may increase the credibility of LIC by one to three notches (Mohapatra & Ratha, 2011; Ratha et al., 2011) and LICs can get required funds at easy terms and conditions from international financial market to finance their developmental projects. Moreover, African countries utilized the stable inflow of future remittances as a security and got loans from international finance market at low interest rate and longer repayment duration.

Natural disasters and other climatic events generate a negative shock and affect a large number of people in LICs (Azam & Khan, 2011; Cuaresma, Fidrmuc, & Hake, 2011) and LICs are unable to absorb the shock (Naudé, 2009) because of having a lower degree of flexibility in their economic system. Moreover, natural disasters affect growth rate in LICs by lowering investment in education and health sector because instantaneously LICs divert their domestic resources to overcome these natural calamities (Cuaresma et al., 2011) and economy gets stuck in poverty traps (Irfan, 2011; Ratha et al., 2011). Empirical evidence documented that it has been observed in LICs – Haiti – that the inflow of remittances significantly increases at time of natural disaster and becomes more effective than foreign aid to overcome this disturbance and mitigate the macroeconomic fluctuation (David, 2010; Mohapatra & Ratha, 2011; Yang & Choi, 2007). Therefore, the immediate response of remittances – driven by altruistic response of migrants – plays a significant role to control instability. When remittances are considered ex-post risk management strategy, it reduces the intensity of negative economic shocks and when it is used as an ex-ante risk management strategy, it creates significant friction against instability (Mohapatra, Joseph, & Ratha, 2009).

However, in both cases remittances lower economic instability (Bugamelli & Paternò, 2005). Several studies suggested that migrants remit more to finance living standard of their families left behind generally but specifically at a time of depression (Abadan-Unat, Keleş, & Penninx, 1975; Koc & Onan, 2004; Martin, 1991; Puri & Ritzema, 1999; Taylor et al., 1996). Moreover, remittances automatically regulate economic activities when immigrant remits for consumption as well as for investment purposes.

Moreover, the results of this study identified an insignificant relationship of remittances with economic fluctuation in UMICs. During the last decade it has been observed that flow of remittances toward UMICs dropped considerably and became five times less as compared to LICs (Page & Plaza, 2006). Moreover, evidence suggested that in some UMICs, although the remittances are more than 10% of NI their impact on economic activities is still unclear (McKenzie, 2005). Moreover, before 1970s, the inflow of remittances to UMICs was near to one billion dollars per annum and reached 5.4 billion dollars in 1998, but during the last decades a substantial decline in remittances has been observed in UMICs and at the same time the economies of these countries are becoming more innovative and dynamic. Poverty has declined, per capita income has increased and millions of job opportunities have been originated in these rapidly growing economies. Therefore, remittances are not playing an important role in economic activities and are unable to create instability as well as to correct the instability in the economies of UMICs.

Moreover, TO has a significant and positive association with macroeconomic fluctuation in LICs as well as in UMICs [0.421143* (26.3301), 0.514793* (3.36526)]. Results indicate that as trade integration increases, it increases macroeconomic fluctuation in both sample countries. TO creates macroeconomic fluctuations in small open economies through trade in goods and services and financial assets (Kose & Riezman, 2001). The constituents of a significant proportion of exports of LICs are primary products, and prices of primary

products are extremely low and highly unstable. Moreover, LICs consumed a significant fraction of exports income to meet their debt obligation services; thereby, a small decline in primary products and a small increase in world interest rate fetch sharp economic fluctuation in LICs. Moreover, the imports of LICs are intermediate inputs or capital goods whose prices are increasing constantly in international market and deteriorate term of trade in LICs and cause a positive relationship between TO and macroeconomic fluctuations (Aghion, Bacchetta, Ranciere, & Rogoff, 2009; Imbs, 2004; Tswamuno, Pardee, & Wunnava, 2007). In addition, TO is a transmission mechanism which transmits the impacts of one country's shock to another and disturbs economic activities.

The results of this study are consistent with empirical studies (Andersen & Babula, 2008; Dollar & Kraay, 2003; Irwin & Terviö, 2002; Wacziarg, 2001) that argued that TO introduced a more specialized pattern of production, so any industry-specific external shock will cause output fluctuations in developing nations because trade integration raises a country's exposure to external shocks. LICs in particular become more vulnerable to terms of trade shocks because they specialize in agricultural and primary exports. Therefore, although TO increases economic growth, it also increases susceptibility to external shock and raises output fluctuation (Easterly et al., 2000). Similarly, in developing nations, trade liberalization induces financial liberalization and more financial liberalization means financial instability which causes more fluctuation in GDP growth. Empirical evidence suggested that LICs have a stronger positive correlation between openness and output fluctuations (Romaine Ranciere, Tornell, & Westermann, 2003). Specialization in specific industries and the vulnerable terms of trade in poor countries provide a good explanation of positive association between openness and fluctuations (Bejan, 2006). Although empirical literature has reached a consensus that TO stimulates domestic growth, it also increases vulnerability of economy to external shocks, which implies more output fluctuations (Easterly, 2003; Kose, Prasad,

&Terrones, 2006). Therefore, the country more exposed to trade will be naturally affected by the size and frequency of shocks coming from abroad because of inadequate knowledge and strategies to handle those shocks. Results are also consistent with Hnatkovska and Loayza (2004) and Cavallo and Frankel (2008) which shows that some external crises, such as sudden stop and currency crashes, badly affect the economic activities in LICs and increase fluctuation in these economies through the channel of TO (Braun & Raddatz, 2007). Concentration of trade and terms of trade increases aggregate fluctuations by 15 to 20% in small economies (Easterly & Kraay, 2000). Similarly, the sectors of the economy that are more open to international trade are more volatile. Any idiosyncratic shock to an individual sector will affect not only that sector but also generate aggregate fluctuation in the economy (Gabaix, 2011; Gatti et al., 2005).

Results suggest that higher CO₂ emissions increase temperature which ultimately causes higher fluctuation in economic activities by declining economic growth in developing nations, whereas as temperature decreases it slows down economic disturbance by positively affecting economic growth rate. It is generally observed that climate affects human temperament which further affects the productivity of human beings. A French philosopher, Montesquieu, stated that “The inhabitants of warm countries are, like old men, timorous; the people in cold countries are, like young men, brave”. Similarly, Tol (2009) identified a strong positive correlation between temperature and economic fluctuation by finding that one degree Celsius warmer causes 8.5% decline in per capita income in poor nations. Moreover, heat storms badly affect the agriculture sectors in poor countries and slow down their growth rate; thereby, hot weather significantly obstructs long-term development. Our results are consistent with Burke, Hsiang, and Miguel (2015b), they stated that warming weather widens the gap between rich and poor countries because hot weather causes a large reduction in growth of poor countries while rich countries have the instruments and knowledge to handle climatic

changes and save the economy from its bad impacts. Moreover, evidence suggested that in poor countries, per capita income will decrease on average by 75% by 2100 as compared to world without climate change, while the richest cool countries will experience a slight gain in per capita income (Burke et al., 2015b).

Moreover, high temperature affects economic production negatively through different channels like slowing down worker efficiency, commerce activities and even capital investment (Dell, Jones, & Olken, 2012). Higher temperature reduces worker productivity by increasing health concerns, and economic growth decreases as temperature increases in LICs because high temperature also reduces the industrial and agricultural production in these economies. Thus, fluctuation in temperature negatively affects the economic performance of poor nations and increases instability by affecting growth rate in each year and over time it adds to a really big impact (Dell et al., 2012). The results of the study also update the older “climatic theories of development” with prominent examples dating to Huntington (1915), Montesquieu (1750), and even to Khaldun (1982) and modern empirical debate over temperature’s aggregate effects (Acemoglu, Johnson, & Robinson, 2001; Sachs, 2008). The estimates of this study provide explicit evidence regarding substantial, contemporary long-run impact of temperature on the development process.

The results of this study conclusively indicate that PR and foreign aid reduce economic fluctuation because both have a negative and significant association with economic fluctuation in LICs, while in the case of UMICs PR and foreign aid have an insignificant relationship with economic fluctuation. However, TO has a significant and positive relationship with economic fluctuations in both LICs and middle income countries. Moreover, climate change has a positive and significant relationship with economic fluctuation in LICs, while in UMICs it has an insignificant association with economic fluctuation.

The model of external sources of fluctuation in both cases – LICs and UMICs – is stable and significant with expected negative sign (-0.144813^* , $[-3.5114]$, -0.08011^* $[-6.89263]$). Results indicate that if any shock disturbs the model from its equilibrium path, the model will converge toward its equilibrium path with a speed of 14% adjustment in Quarter one and so on in the LICs while in UMICs the speed of convergence is 8% per quarter. Moreover, results indicate that the speed of adjustment is higher in LICs as compared to UMICs. Complete estimated VECM for LICs as well as for UMICs are reported in appendix (Table, 1 to 8).

4.6 Impulse Response

The impulse response function increases credibility of VAR econometrics in applied research work. The impulse response function is a graphical presentation of an impulse response that simulates – over time – the effect of a one standard shock to one of the equation series on itself and on other equation series in the entire VAR system (Pesaran & Shin, 1998). The impulse response adapts the entire VAR system into its moving average representation (Hamilton, 1994). The results of generalized impulse responses for VECM with a 10,000 Monte Carlo simulation and one-standard error band are reported in Figure 1 for 10 quarters forecasted time horizon. The study used GIRF to answer the following questions.

1. What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of internal sources at time t while no other shock hits the system in LICs?
2. What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of internal sources at time t while no other shock hits the system in UMICs?

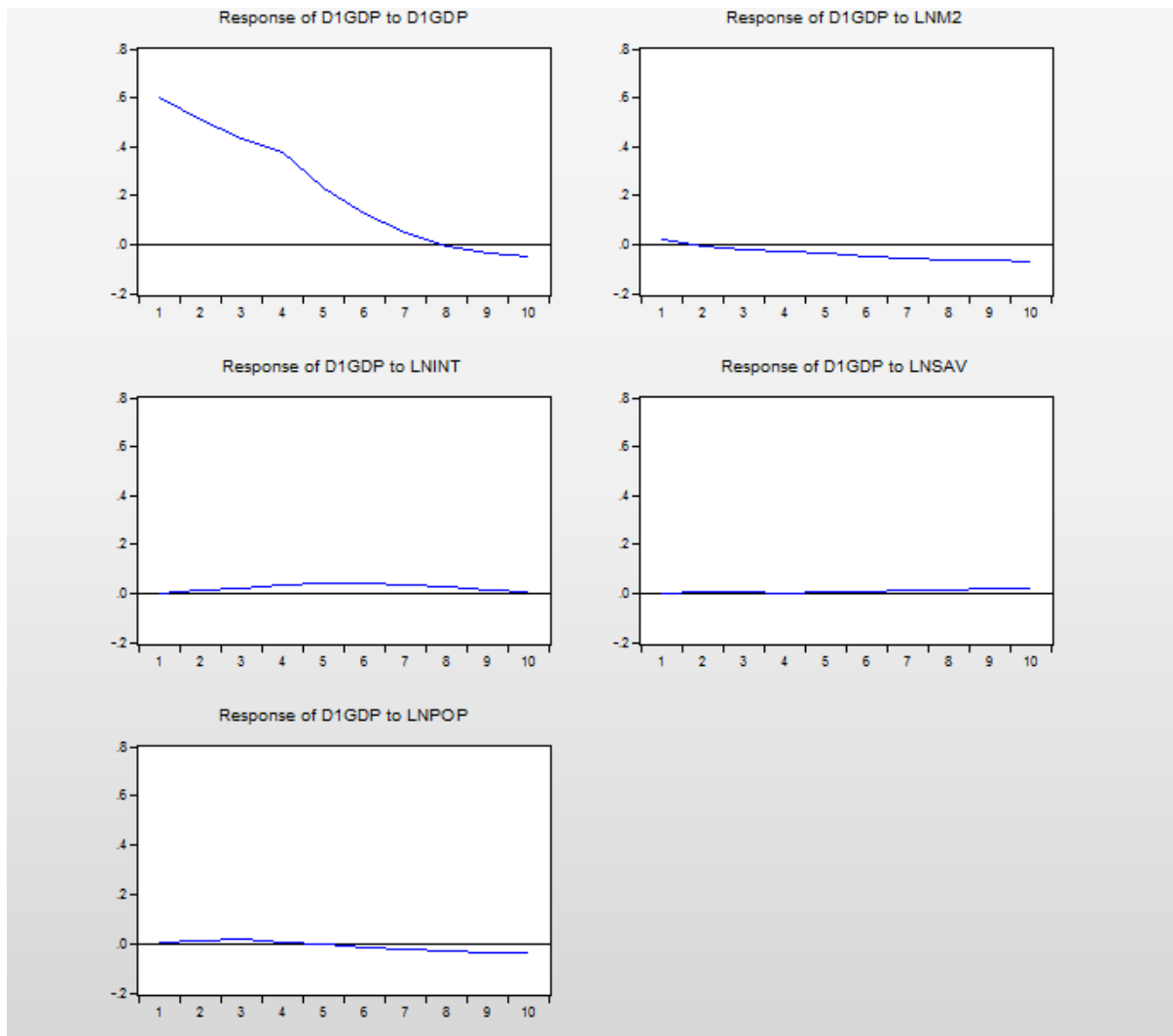
3. What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of external sources at time t while no other shock hits the system in LICs?
4. What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of external sources at time t while no other shock hits the system in UMICs?

4.6.1 A Case of LICs

Model 1

Results indicate that variables in the system are greatly affected by their own shock but gradually it returns to the previous equilibrium value of zero if there are no further shocks over some period. Since this study has been carried to investigate the role of internal sources in business cycle fluctuations, only impulse response of M2, DCB, DCP, population, saving and interest rate to economic fluctuations are analyzed. The results show that in the case of LICs, if one standard positive shock is given to business cycle fluctuation, it will positively affect business cycle fluctuation in all predicted 10 quarters. Similarly one standard shock to M2 will affect fluctuation positively in quarter one whereas it will negatively affect business cycle fluctuation throughout 10 predicted quarters. Moreover, one standard shock to interest rate will initially affect business cycle fluctuation negatively in quarter one but after that it positively affects business cycle fluctuation up to 10 predicted quarters. Moreover, one standard shock to saving will affect business cycle fluctuation positively up to fourth quarter and after that it affects business cycle fluctuations negatively up to eighth quarter and then it positively affects up to 10 forecasted quarters.

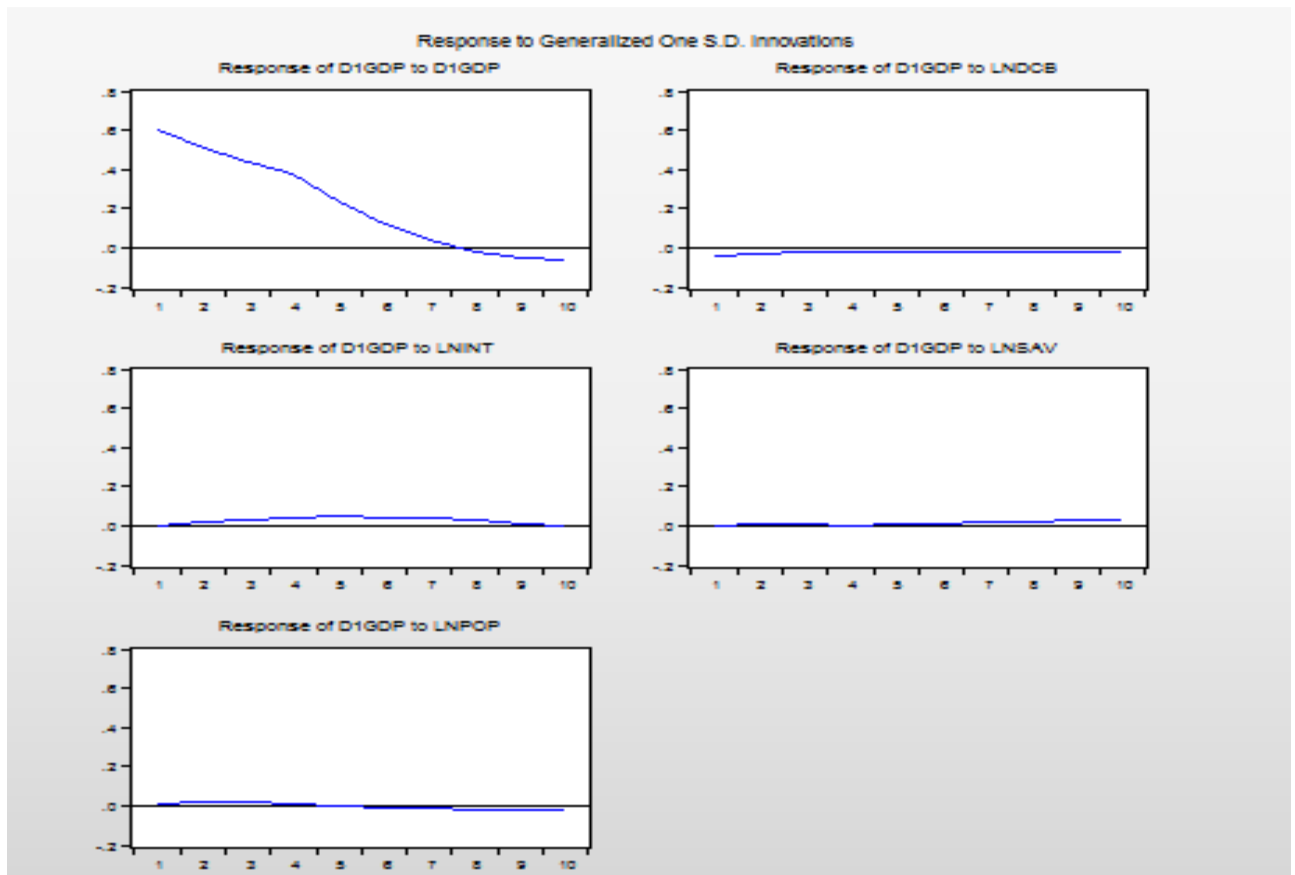
Figure 1 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in LICs: Model 1



Model 2

The results of model 2 show that if one standard shock is given to business cycle fluctuation and interest rate, it positively affects business cycle fluctuation throughout 10 predicted quarters while one standard shock to DCB will affect business cycle fluctuations negatively for 10 predicted quarters. Similarly if one standard shock is given to saving, initially it will affect business cycle fluctuation positively up to fourth quarter and then it affects business cycle fluctuation negatively for a small time period (two quarters) and then, again, its impact becomes positive for 10 predicted quarters.

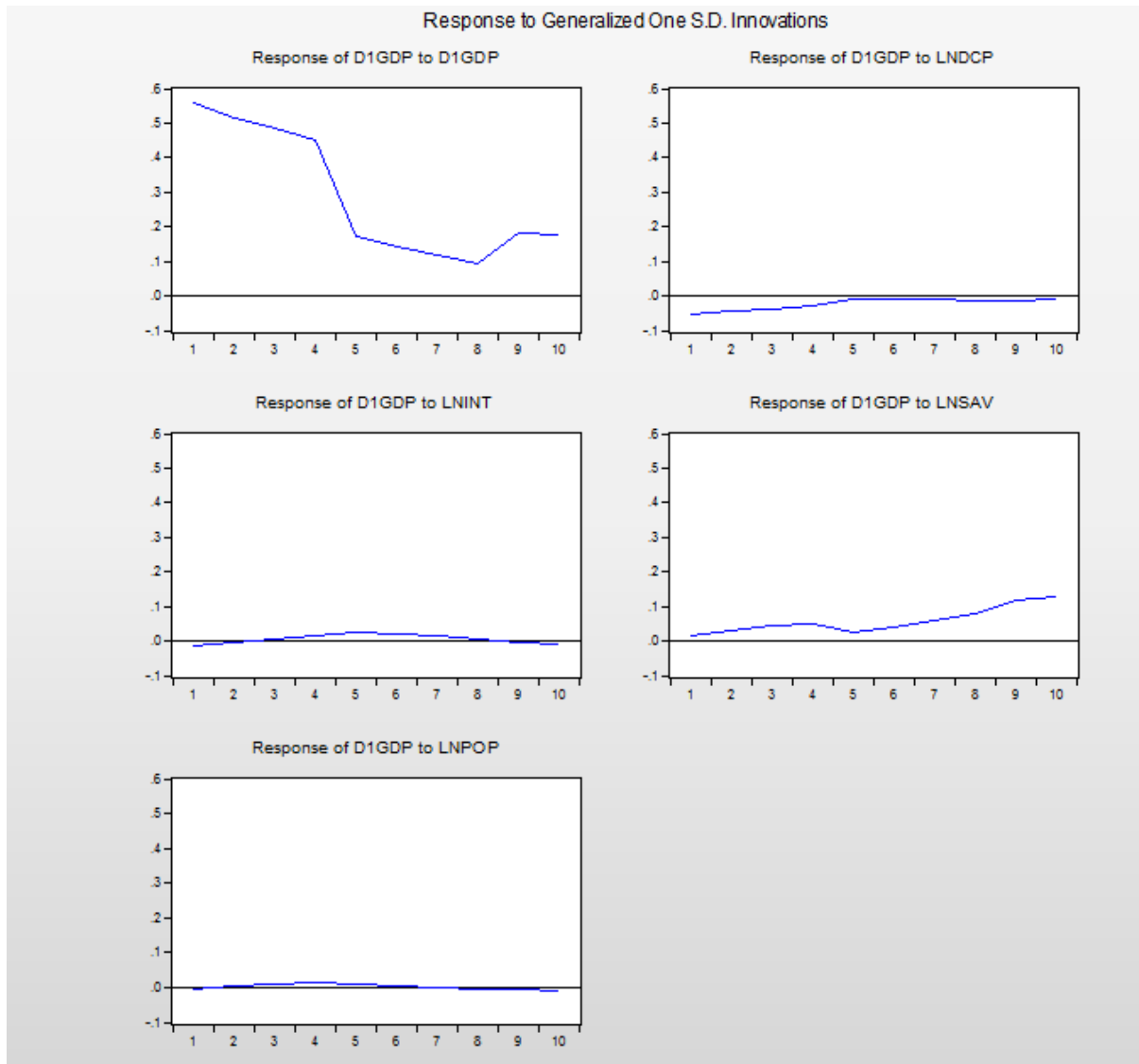
Figure 2 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in LICs: Model 2



Model 3

The results of model 3 show that if one standard shock is given to business cycle fluctuation and saving, it will affect business cycle fluctuation positively for up to 10 forecasted quarters while one standard shock to DCP will affect business cycle fluctuation negatively. Moreover, one standard positive shock to interest rate will affect business cycle fluctuation positively from quarter two to quarter 8 and then it will negatively affect business cycle fluctuation for Quarter 10.

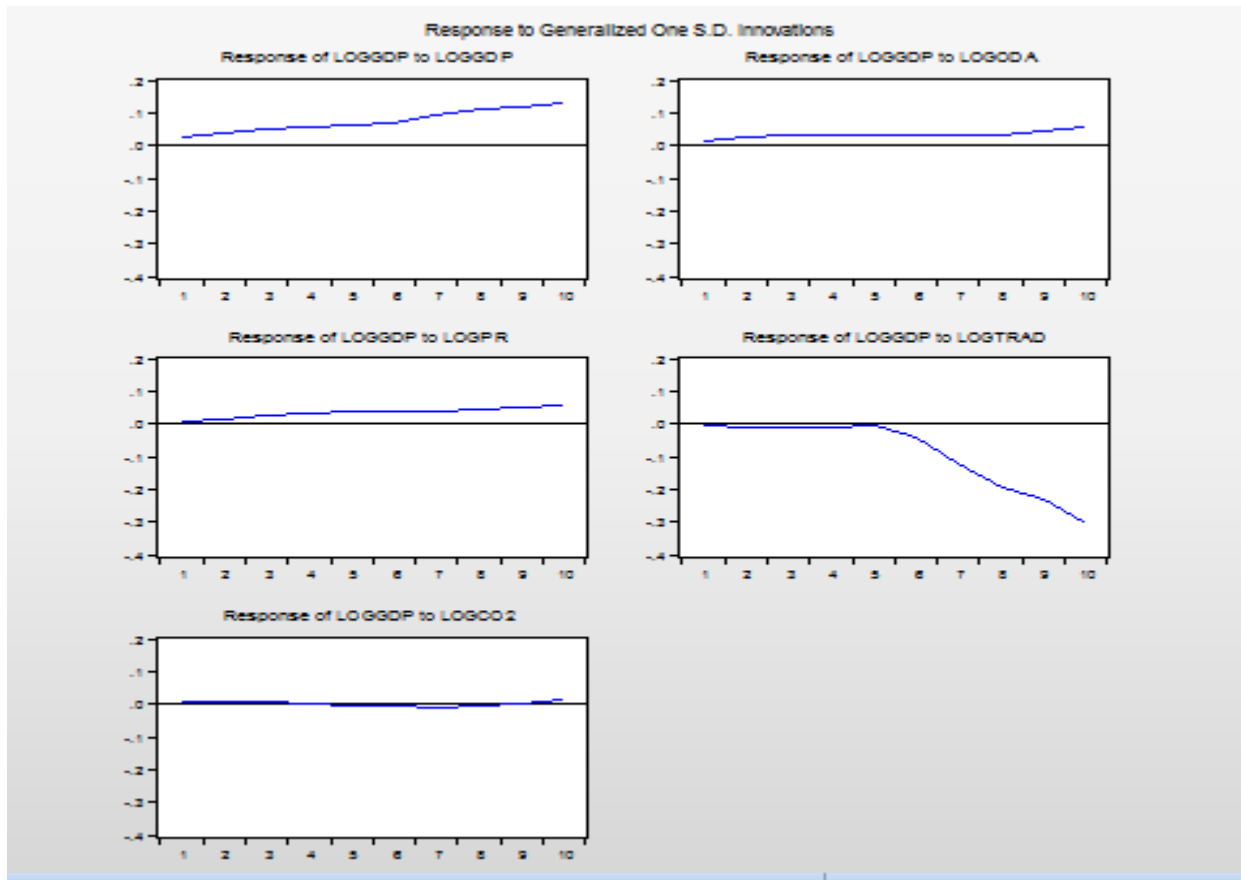
Figure 3 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in LICs: Model 3



Model 4

The results of model 4 show that if one standard positive or negative shock is given to ODA, it will affect negatively up to four quarter and then it affect positively to economic fluctuations in coming predicted quarters. Similarly, one standard shock to PR will affect economic activities positively in all predicted 10 quarters; though the effect is smaller in first three quarters but after that it increases. Similarly a positive shock to TO will negatively affect economic activities in all ten quarters. Moreover, a shock to CO₂ will negatively affect economic activities.

Figure 4 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in LICs: Model 4

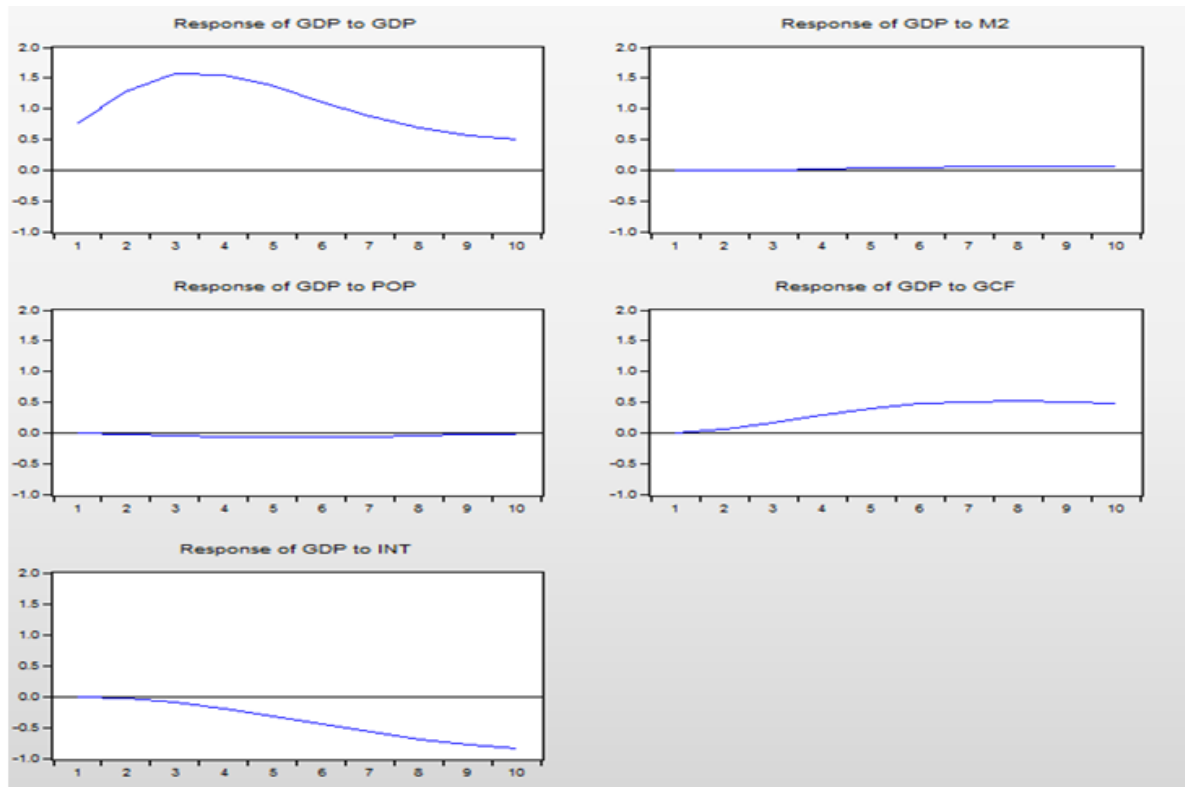


4.6.2 A Case of UMICs

Model 1

The results of impulse response in case of UMICs show that if one standard shock is given to business cycle fluctuation, it will positively react to business cycle fluctuation throughout the 10 quarters while one standard shock to M2, saving and interest rate will affect business cycle fluctuation negatively throughout 10 predicted years.

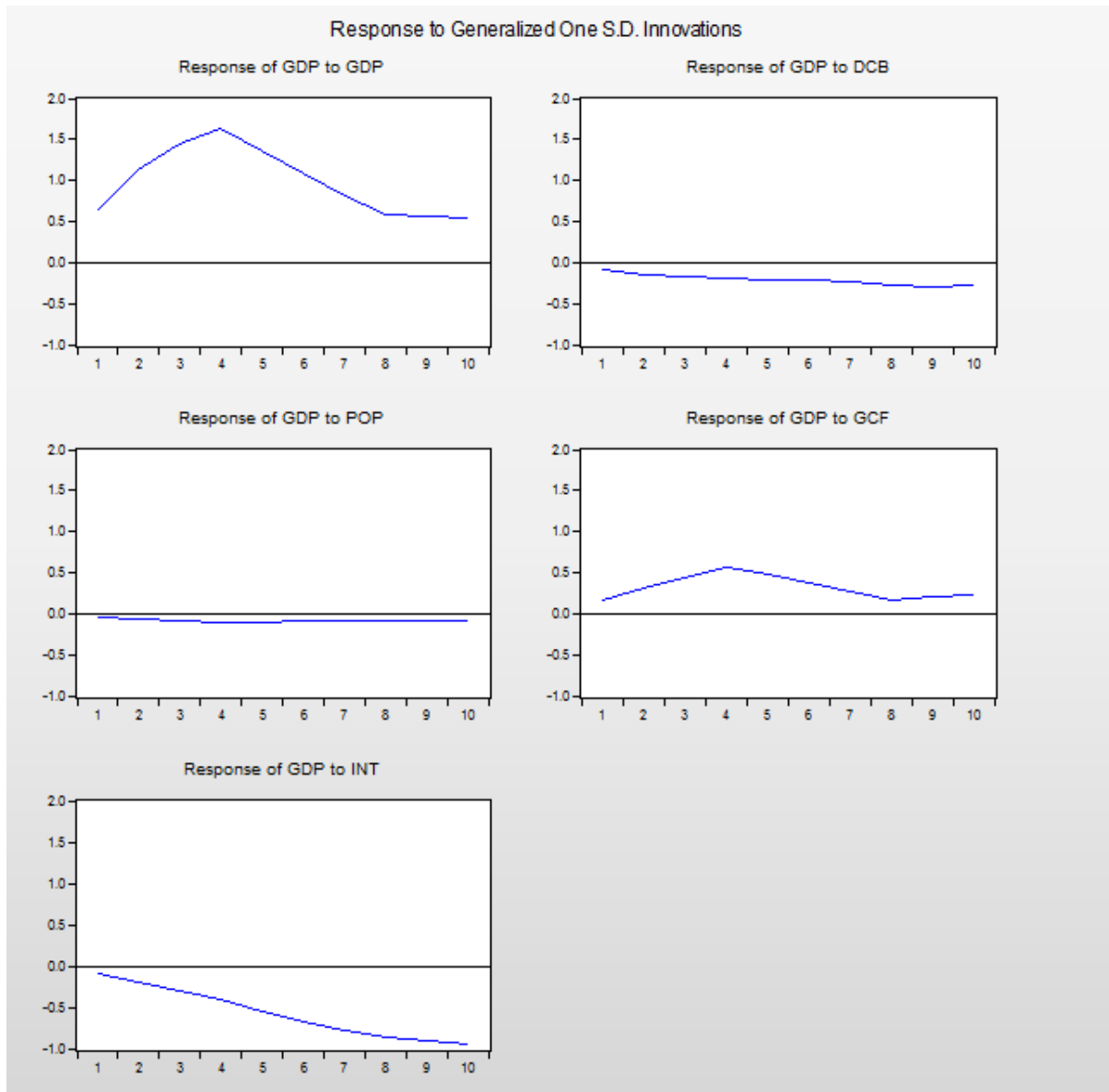
Figure 5 Response of Economic Fluctuation to Generalized One Standard Internal Source Innovation in UMICs: Model 1



Model 2

The results of impulse response in model 2 show that if onestandard shock is given to business cycle fluctuation and saving, it will positively react to business cycle fluctuation throughout 10 quarters while one standard shock to DCB, population and interest rate has a negative affect for 10 predicted quarters.

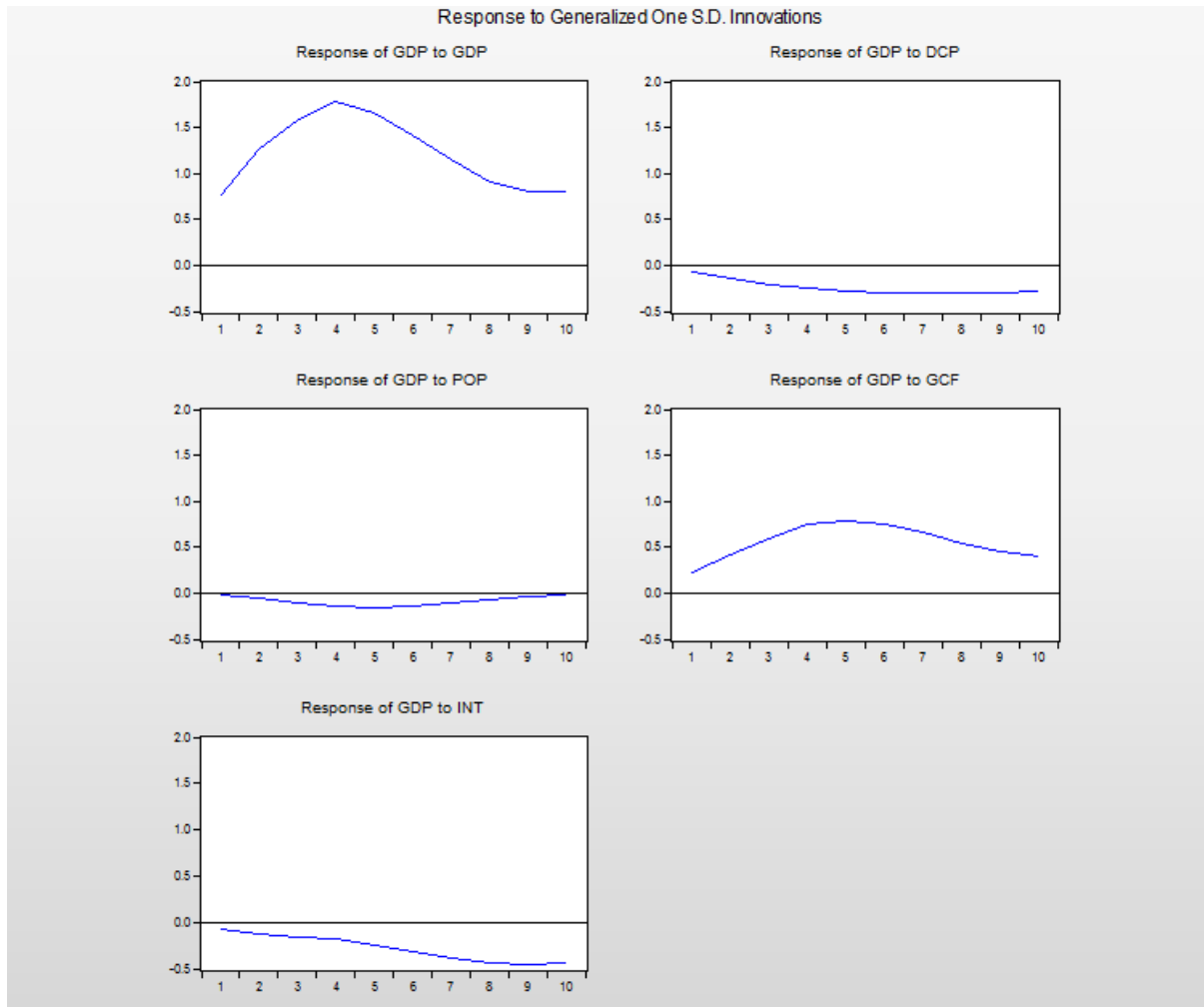
Figure 6 Response of Economic Fluctuation to Generalized One Standard Internal Sources Innovation in UMICs: Model 2



Model 3

The results of impulse response in the model show that if one standard shock is given to business cycle fluctuation and saving, it will positively affect business cycle fluctuation throughout the 10 quarters while one standard shock to DCP, population and interest rate negatively affects business cycle fluctuations up to 10 predicted quarters.

Figure 7 Response of Economic Fluctuation to Generalized One Standard Internal Source Innovation in UMICs: Model 3



Model 4

The results of model 4 show that if one standard shock is given to ODA, it will negatively affect business cycle fluctuations throughout 10 quarters. Moreover, one standard shock to PR will positively affect business cycle fluctuation up to 10 forecasted quarters. Initially, PR shock has a small impact on economic activities, but it becomes increase with the passage of time. Similarly, one standard shock to trade openness will positively affects economic fluctuation up to 5 quarter and after that business cycle fluctuations will be negatively affected for next 5 quarters. The impact of one standard shock to climate will positively affect economic fluctuation; initially fluctuations will decreases up to third quarter and then start to increases.

Figure 8 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in UMICs: Model 4

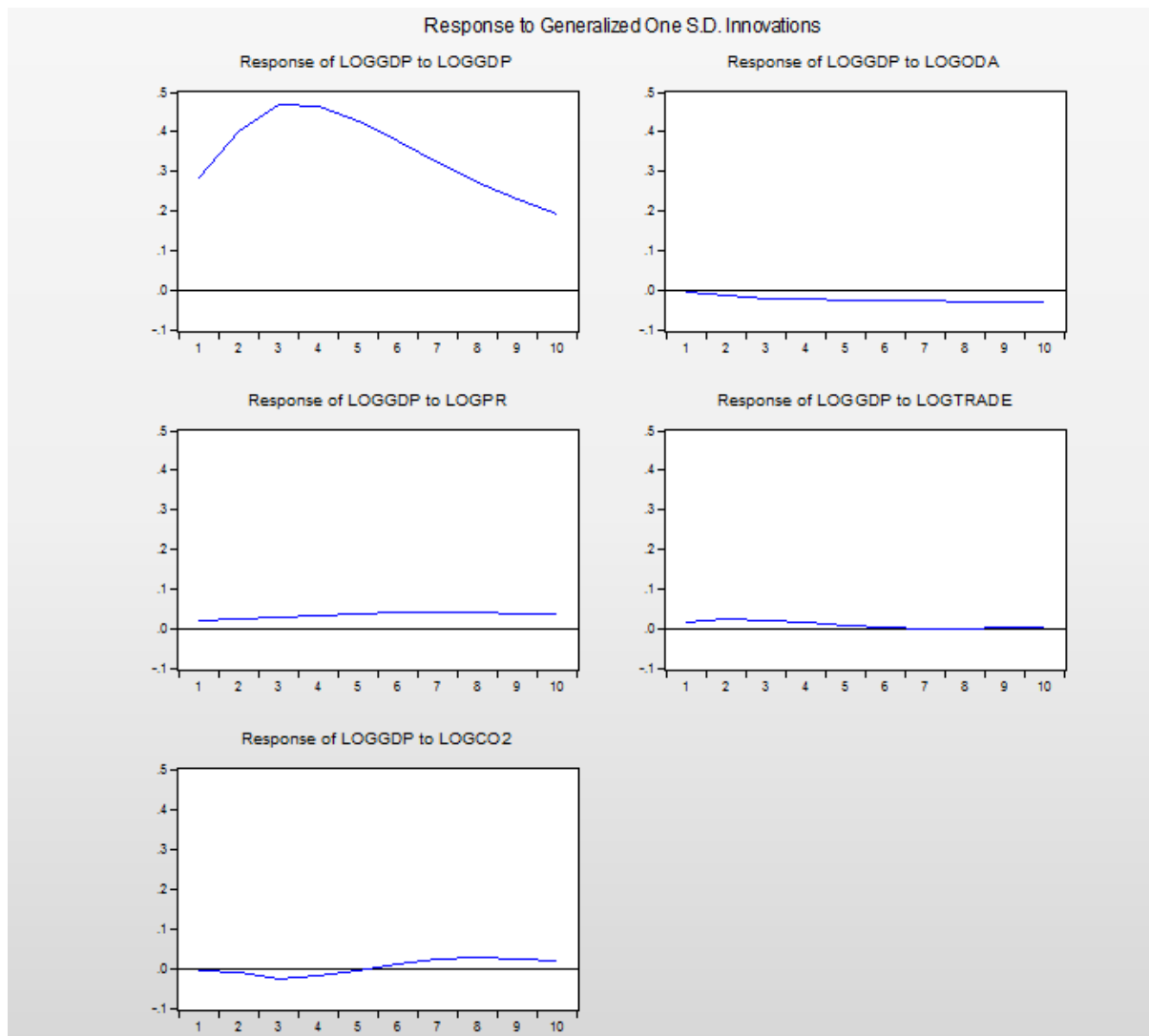


Figure 9 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 1

Response to Generalized One S.D. Innovations

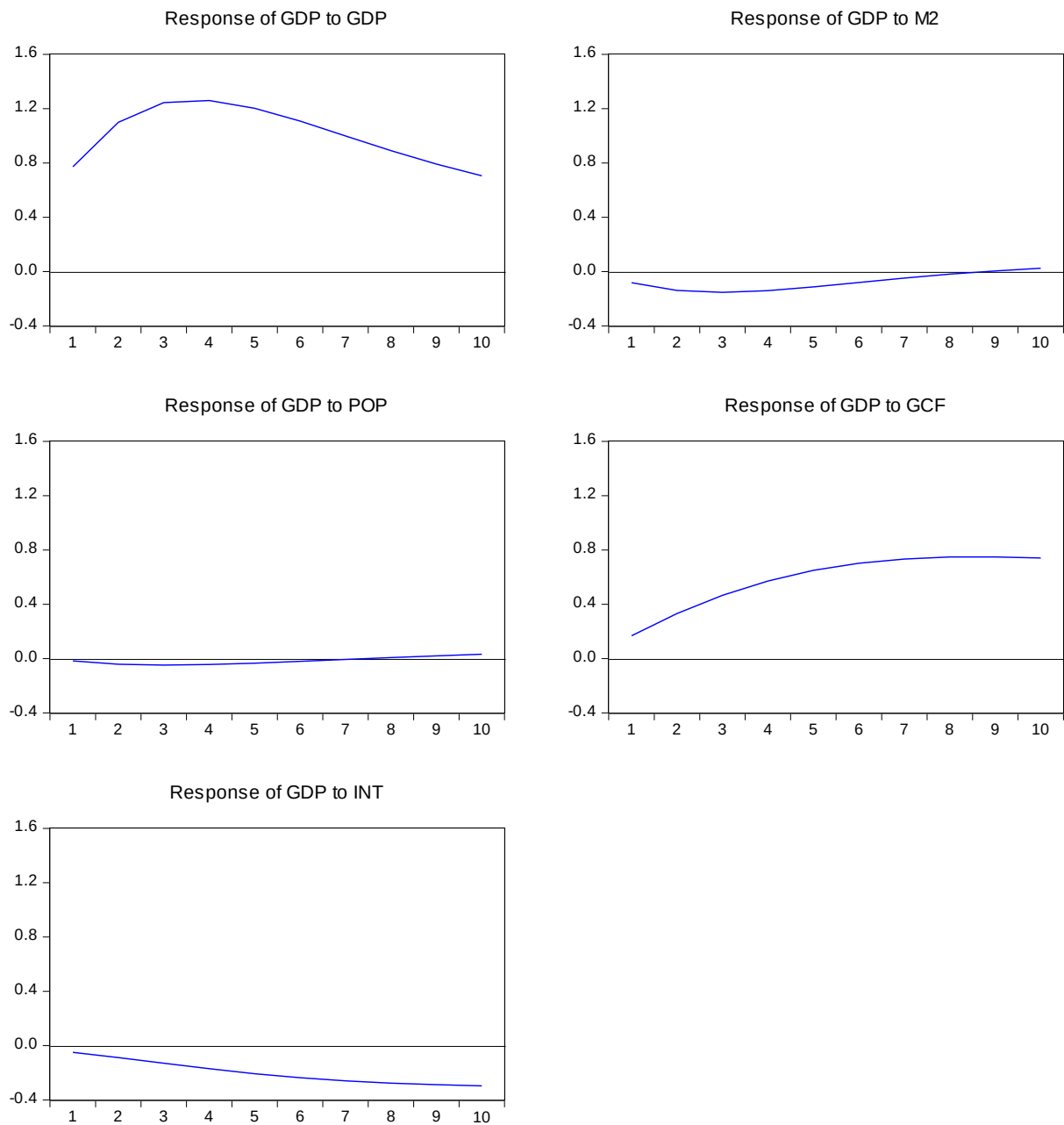


Figure 10 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 2

Response to Generalized One S.D. Innovations

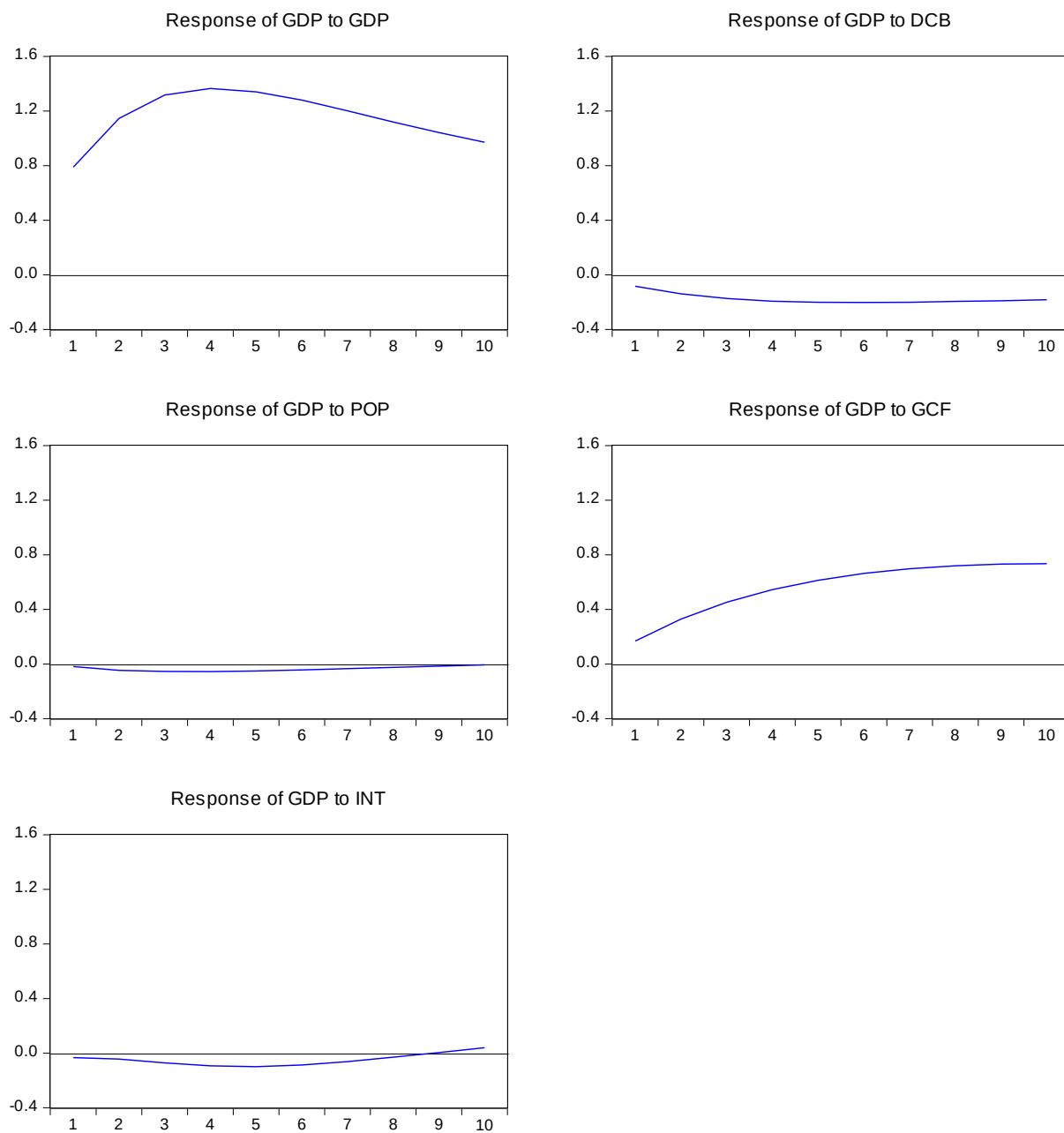


Figure 11 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 3

Response to Generalized One S.D. Innovations

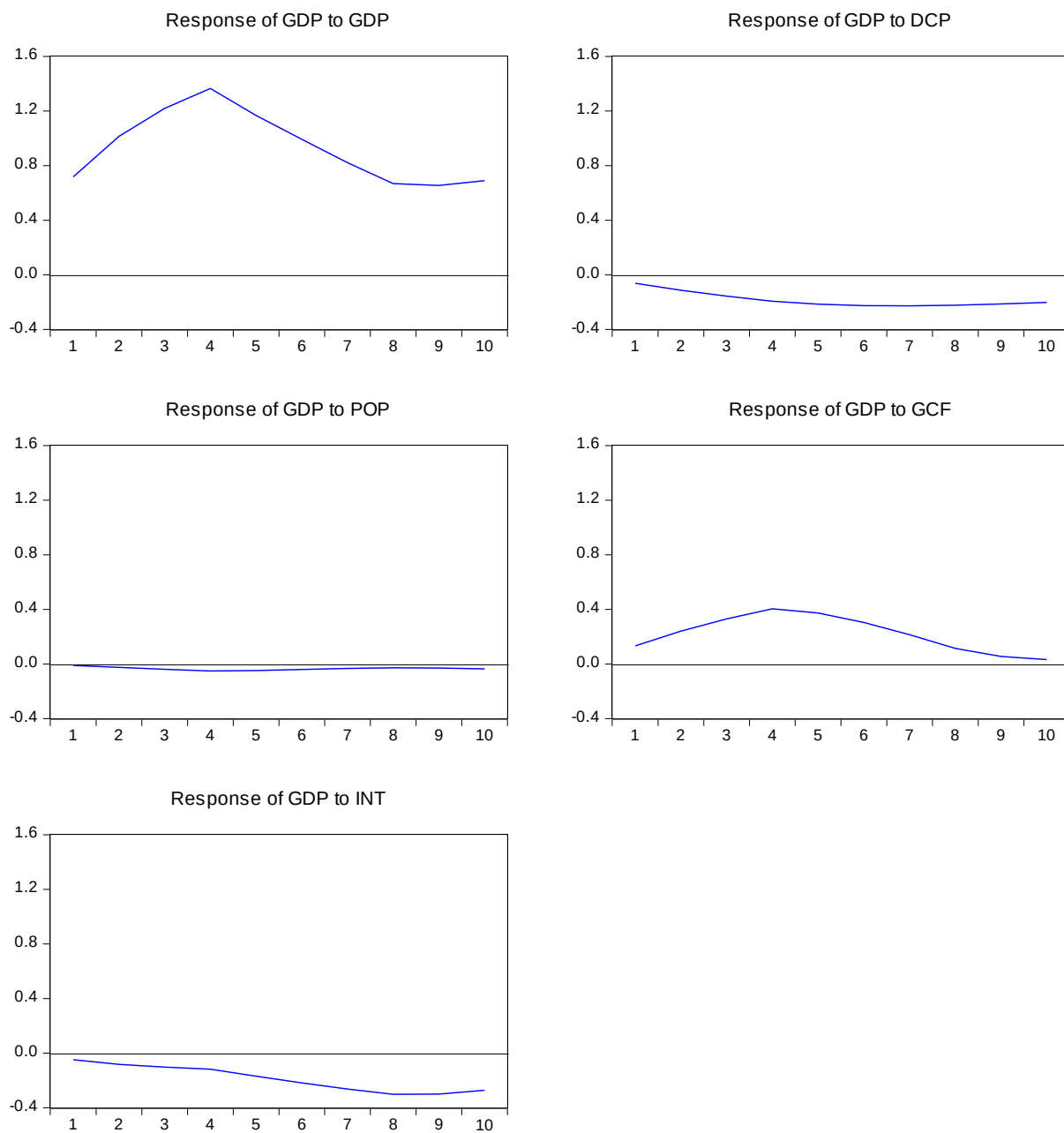
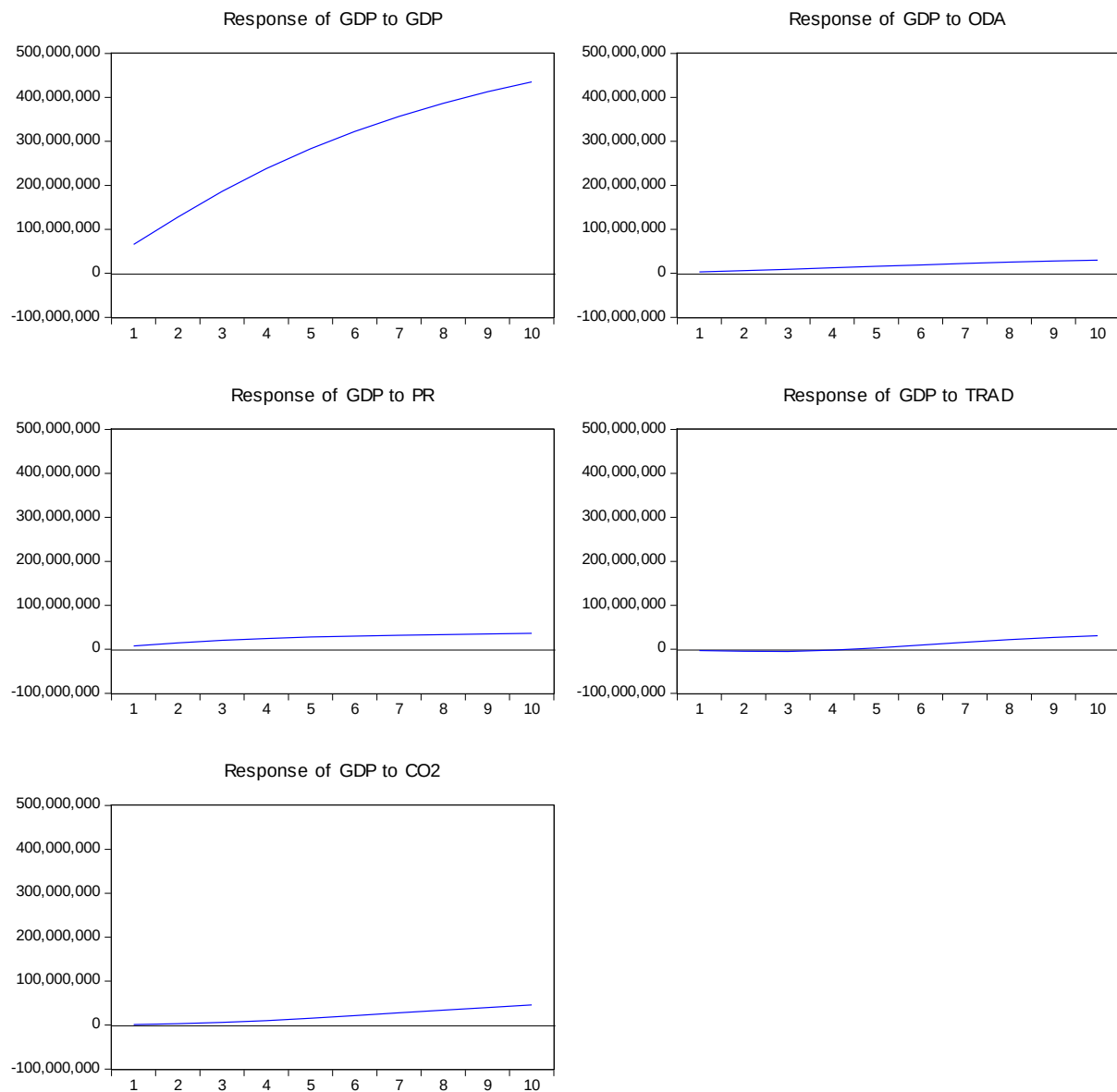


Table 19 Response of Economic Fluctuation to Generalized One Standard External Sources Innovation in Full Sample: Model 4

Response to Generalized One S.D. Innovations



4.7 Variance Decomposition

Variance decomposition observes the percentage of innovation each variable is contributing to the other variables in the VAR system. This enables us to know which of the variables are relatively endogenous or exogenous to the system by simply decomposing the proportion variance due to its own shock and shock of other variables in the system. For example, if the shocks of other independent variables in the system explain less of the forecast error-variance of the dependent variable, it means that the dependent variable is exogenous to the system.

However, if it turns out that most of the shocks of the independent variables explain the forecast error-variance of the dependent variable, it means the latter is endogenous to the system. Moreover, this analysis determines how much forecast error variance can be explained by the exogenous shocks to other variables. This can be explained by the percentage changes in one variable and percentage of change in variance to the other variables. Variance decomposition is calculated with the help of following formula:

$$R_{i,j,s}^2 = 100 \sum_{k=0}^s \psi_{i,j,k}^2 / \sum_{k=0}^s \sum_{k=0}^s \psi_{i,j,k}^2$$

Where $\sum_{k=0}^s \psi_{i,j,k}^2$ represents the sum of the variance of error components that occur due to y_j and $\sum_{k=0}^s \sum_{k=0}^s \psi_{i,j,k}^2$ is the sum of the innovation response.

The variance decomposition method was applied to answer following research questions:

- I. What is the relative contribution of internal shocks to business cycle fluctuation in LICs?
- II. What is the relative contribution of internal shocks to business cycle fluctuation in UMICs?
- III. What is the relative contribution of external shocks to business cycle fluctuation in LICs?
- IV. What is the relative contribution of external shocks to business cycle fluctuation in UMICs?

Table 20 Variance Decomposition of GDP (Model 1)

Low Income Countries							Upper Middle Income Countries					
Period	S.E.	GDP	LNLM2	LNPOP	LNSAV	LNINT	S.E.	GDP	LNLM2	LNPO P	LNSA V	LNINT
1	0.600	100.0	0.00	0.000	0.000	0.000	0.772	100.0	0.000	0.00	0.00	0.00
2	0.786	99.8	0.092	0.013	0.015	0.017	1.485	89.8	3.000	0.015	3.149	4.000
3	0.900	89.6	2.238	0.042	3.022	5.059	2.180	79.4	3.001	0.052	6.506	11.002
4	0.976	87.4	3.363	0.039	3.019	6.164	2.837	78.8	3.001	0.105	6.037	13.004
5	1.005	79.0	5.555	0.038	6.022	9.302	3.313	67.1	5.002	0.145	8.657	19.072
6	1.015	78.6	5.798	0.049	7.027	10.433	.633	59.2	6.019	0.168	12.244	23.309
7	1.019	72.2	6.095	0.087	8.037	12.524	3.843	56.0	6.065	0.174	14.684	24.786
8	1.021	71.7	7.445	0.150	9.054	12.564	3.983	54.2	6.150	0.171	14.919	26.935
9	1.025	70.2	7.829	0.231	9.076	13.571	4.091	53.2	6.256	0.164	14.972	26.341

10	1.029	69.7	8.234	0.323	9.103	13.566	4.192	52.6	6.352	0.157	15.016	26.963
----	-------	------	-------	-------	-------	--------	-------	------	-------	-------	--------	--------

Table 21 Variance Decomposition of GDP Full Sample (Model 1)

Period	S.E.	GDP	M2	POP	SAV	INT
1	0.771316	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.346622	99.44605	0.026117	0.016764	0.496136	0.014929
3	1.845235	98.41041	0.026951	0.019709	1.460819	0.082108
4	2.257318	96.90979	0.018706	0.017426	2.834397	0.219681
5	2.592371	94.99564	0.017870	0.013792	4.542165	0.430531
6	2.864513	92.75587	0.032602	0.011522	6.492518	0.707491
7	3.087635	90.30269	0.064515	0.012491	8.582668	1.037633
8	3.273389	87.75214	0.111432	0.017931	10.71272	1.405777
9	3.430785	85.20733	0.169509	0.028550	12.79742	1.797193
10	3.566465	82.74852	0.234643	0.044654	14.77283	2.199358

Table 22 Variance Decomposition of GDP (Model 2)

Low Income Countries							Upper Middle Income Countries					
Period	S.E.	GDP	Lndcb	Lnpop	Lnsav	Lnint	S.E.	GDP	Lndcb	Lnpop	Lnsav	Lnint
1	0.604	100	0.000	0.000	0.000	0.000	0.657	100	0.0000	0.0000	0.00000	0.0000
2	0.791	99.9	0.012	0.010	0.021	0.036	1.288	99.8	0.0022	0.0012	0.05360	0.0491
3	0.905	96.8	1.020	0.034	1.033	1.110	1.914	99.5	0.0085	0.0051	0.21504	0.2289
4	0.981	94.6	2.017	0.033	1.031	2.262	2.495	98.8	0.0189	0.0131	0.51700	0.6142
5	1.008	90.4	4.021	0.031	2.039	3.449	2.839	97.2	0.0153	0.0215	0.63975	2.1023
6	1.017	86.2	5.045	0.037	3.057	5.611	3.064	84.4	1.0467	0.0328	7.69751	7.7291
7	1.019	80.0	7.091	0.059	5.085	7.715	3.228	80.5	1.1590	0.0468	9.70139	10.540
8	1.020	77.8	8.153	0.097	6.130	8.756	3.369	75.4	1.3933	0.0623	10.66081	13.454
9	1.022	71.6	9.221	0.148	8.186	11.758	3.509	70.5	2.6165	0.0797	10.67455	18.031
10	1.025	70.4	9.588	0.204	8.250	11.766	3.654	65.9	2.7864	0.0979	10.75067	22.446

Table 23 Variance Decomposition of GDP for Full Sample (Model 2)

Period	S.E.	GDP	DCB	POP	SAV	INT
1	0.788801	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.394125	99.52927	0.017572	0.017594	0.433957	0.001603
3	1.927159	98.76968	0.042567	0.023096	1.158374	0.006280
4	2.377861	97.77014	0.071135	0.024403	2.110514	0.023806
5	2.753771	96.58198	0.101214	0.023183	3.255547	0.038077
6	3.066908	95.25243	0.131562	0.020733	4.555153	0.040117
7	3.329595	93.82404	0.161318	0.018032	5.961966	0.034640
8	3.552686	92.33596	0.189856	0.015840	7.424500	0.033844
9	3.745023	90.82483	0.216718	0.014713	8.893384	0.050358
10	3.913476	89.32392	0.241584	0.015020	10.32630	0.093180

Table 24 Variance Decomposition of GDP (Model 3)

Low Income Countries							Upper Middle Income Countries					
Period	S.E.	GDP	Lndcp	Lnpop	Lnsav	Lnint	S.E.	GDP	Lndcp	Lnpop	Lnsav	Lnint
1	0.560	100.00	0.000	0.000	0.000	0.000	0.774	100	0.0000	0.0000	0.000	0.000
2	0.762	99.91	0.001	0.006	0.059	0.014	1.487	99.8	0.0120	0.0160	0.128	0.000
3	0.903	97.76	1.004	0.020	0.167	1.045	2.179	91.4	0.0406	0.0540	3.438	5.001
4	1.010	94.53	2.024	0.044	1.291	2.099	2.832	88.9	0.0825	0.1096	4.896	7.002
5	1.025	89.42	3.027	0.059	2.317	5.167	3.303	83.1	0.1773	0.1524	7.426	9.064
6	1.036	87.26	3.028	0.063	2.436	7.209	3.618	77.2	0.3312	0.1771	9.918	13.290
7	1.044	78.96	5.027	0.062	4.715	13.22	3.826	76.2	0.5363	0.1852	9.278	14.754
8	1.051	70.44	6.028	0.062	7.235	17.29	3.966	65.0	0.7758	0.1822	11.459	23.487
9	1.073	69.42	6.027	0.063	7.259	18.22	4.076	63.0	1.0027	0.1750	11.491	24.267
10	1.094	66.21	7.031	0.065	8.480	19.12	4.179	62.3	1.1810	0.1672	11.438	24.853

Table 25 Variance Decomposition of GDP Full Sample (Model 3)

Period	S.E.	GDP	DCP	POP	SAV	INT
1	0.717569	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.243681	99.74673	0.041964	0.004954	0.196558	0.009791
3	1.746248	99.37717	0.106232	0.014559	0.484277	0.017760
4	2.223006	98.96580	0.179084	0.026971	0.805446	0.022695
5	2.520327	98.42676	0.342115	0.034496	1.058296	0.138335
6	2.719393	97.85606	0.555898	0.038249	1.134245	0.415545
7	2.853300	97.17757	0.803477	0.040166	1.090571	0.888215
8	2.945874	96.29923	1.066451	0.041613	1.023179	1.569528
9	3.032941	95.50525	1.275212	0.043838	1.005623	2.170075
10	3.123069	94.95316	1.415017	0.047857	1.036679	2.547291

Table 26 Variance Decomposition of GDP (Model 4)

Period	Low Income Countries						Upper Middle Income Countries					
	S.E.	GDP	ODA	PR	TRAD	CO2	S.E.	GDP	ODA	PR	TRAD	CO2
1	0.01543	100.00	0.0000	0.000	0.00000	0.0000	0.77442	100.0	0.000	0.000	0.000	0.000
2	0.02968	98.566	0.8521	0.014	0.16772	0.2579	1.4839	99.994	0.0028	0.0011	0.0015	4.53
3	0.04450	94.701	1.4485	0.044	0.61826	2.0038	2.07625	99.971	0.022	0.0049	0.000	5.91
4	0.06039	90.395	1.3115	0.069	1.60560	4.0433	2.5096	99.914	0.069	0.011	0.0031	2.83
5	0.31159	8.3201	2.4909	30.55	57.9998	0.3807	2.79073	99.821	0.145	0.021	0.0114	5.14
6	0.39522	5.3332	2.0475	31.17	60.9455	0.2940	2.9499	93.699	0.246	0.033	2.0210	5.87
7	0.42641	5.1385	1.7593	31.32	61.3369	0.2543	3.02584	89.562	0.36288	0.0455	4.0285	5.58
8	0.43650	6.8171	2.2603	30.82	59.6768	0.2432	3.05389	83.427	0.48364	0.0573	6.0318	7.33
9	1.37527	15.886	5.0081	27.54	51.5116	0.0247	3.06080	83.304	0.59638	0.0668	6.0319	0.015
10	1.94463	13.100	4.8388	27.86	54.0974	0.0739	3.06241	82.200	0.69252	0.0733	7.0331	0.031

Table 27 Variance Decomposition of GDP for Full Sample (Model 4)

Period	S.E.	GDP	PR	ODA	CO2	TRAD
1	65426186	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.43E+08	99.96389	0.000733	0.000157	0.002321	0.004026
3	2.33E+08	99.89431	0.004355	0.001482	0.015754	0.034400
4	3.30E+08	99.78722	0.010532	0.004442	0.042865	0.096168
5	4.32E+08	99.65022	0.018407	0.008681	0.081588	0.179794
6	5.37E+08	99.49530	0.027288	0.013629	0.128652	0.274424
7	6.43E+08	99.33265	0.036679	0.018820	0.180972	0.372157
8	7.51E+08	99.16934	0.046239	0.023947	0.236042	0.468222
9	8.59E+08	99.00974	0.055738	0.028841	0.291970	0.560117
10	9.67E+08	98.85634	0.065023	0.033420	0.347394	0.646777

Estimated variance decomposition results for LICs and UMICs are reported in Tables 20, 22, 24 and 26. Clearly the majority of the fluctuation in GDP is caused by itself. The fluctuation in economic growth in the past years appears to generate a momentum for it to rise as indicated in model 1. Moreover, 99% of the variation of GDP due to innovations is caused by itself in the short run, while in the long run its own contribution drops to 69%. The

contribution of M2 in variation of business cycle fluctuation increases from almost zero to 8.234%, while population accounts for .32% of variation. The contribution of saving to economic disturbance is 9.103% in the long run while the interest rate contributes 13.566% in business cycle fluctuation in case of LICs. However, in the case of UMICs, the contribution of economic fluctuation in business cycle fluctuation drops from 100% to 52% in the long run. However, the contribution of M2, POP, saving and interest rate increase from zero to 6.352%, .157%, 15.016% and 26.963% respectively.

Similarly, in model 2, in LICs, own contribution drops from 99% to 70% while in UMICs the contribution of GDP fluctuation drops from 100 to 65% in the long run. Moreover, the contribution of DCB, POP, SAV, and interest rate in business cycle fluctuation increases from almost zero to 9.588%, .20%, 8.250% and 11.766% respectively, while in the case of UMICs the contribution increases from zero to 2.78%, 0.09%, 10.75% and 22.44% respectively.

Similarly, in model 3, almost 99% of the variation of GDP due to innovations is caused by itself in the short run, while in the long run its own contribution drops to 66% in LICs. The contribution of DCP, POP, SAV, and interest rate in variation of GDP growth increases from almost zero to 7.03%, .06%, 8.48% and 19.21% respectively, while in the case of UMICs the contribution of GDP fluctuations, DCP, POP, saving and interest rate is 62%, 1.18%, 0.16%, 11.43% and 24.85% in the long-run period.

However, the picture in model 4 is different to some extent in the case of LICs. The own shock contribution of GDP fluctuation drops from 100% to 13% in the long run while the contribution of ODA, PR, TRAD, and CO₂ increases up to 4.8388%, 27.86%, 54.0974%, and .0739%, respectively. Surprisingly, the results indicate that external factors – ODA, PR, TRAD and CO₂ – that are difficult to control by policymakers of LICs make a major and significant contribution to business cycle fluctuation. The above results indicate that there are

four main channels of transmission of external shocks to LICs: ODA, PR, TRAD and CO₂. However, the situation is different in the case of UMICs, the contribution of GDP variation, ODA, PR, TRAD, and CO₂ in business cycle fluctuation is 0.69%, 0.07%, 7.07%, 0.03%, and 0.0009% respectively. Thus, results indicate that external sources of disturbance do not play a significant role in business cycle fluctuation in the case of UMICs.

Moreover, it has been observed that poor nations experienced twice as much fluctuation in economic activities as compared to rich countries during the last 20 years. The empirical literature suggested two types of explanation for this difference. First, poor nations are subject to larger shocks as compared to rich economies (Imbs, 2006; N. V. Loayza, Ranciere, Servén, & Ventura, 2007; E. G. Mendoza, 1995; Uribe & Yue, 2006), and second, these economies are unable to bear the effects of these shocks. Moreover, inappropriate fiscal policies and structural characteristics of poor economies exacerbate the impacts of these shocks rather than mitigate them (R. Caballero & A. Krishnamurthy, 2001; Caballero & Krishnamurthy, 2004; Fatás & Mihov, 2006).

The empirical literature suggested that the main drivers of economic fluctuation in LICs are external shocks. The empirical results of this study indicate that foreign aid and trade shocks explain larger fluctuation in LICs. Almost 4% of fluctuations are originated due to foreign aid shock and 27 % are because of personal remittances shocks while 54% are caused by trade shocks. Our results are consistent with the findings of M. A. Kose and Riezman (2001) that trade shocks explain 45% of variation in economic activities in poor nations and in some cases external shocks account for 74% of fluctuation. Our results are consistent with the findings of latest empirical studies, that 50 to 60% of variation in economic growth is explained by external shocks in poor Latin American countries (Österholm & Zettelmeyer, 2007).

Similarly, trade shocks play a significant role in stemming macroeconomic fluctuation (Hoffmaister, Roldós, & Wickham, 1998) in LICs. Moreover, adverse trade shocks – originate from shock to relative prices of imported capital goods or relative prices of exported primary products – produce a prolonged recession while positive trade shocks generate expansion in short-run period. The results of this study are consistent with Deaton (1999) who examined the role of international commodity prices – proxy for TO – in macroeconomic fluctuation in poor nations and documented that a sudden 10% increase in commodity price causes 6% increase in output and vice versa. These facts indicate the importance of sudden shocks to trade, which can induce recession as well as expansion dependent on the nature of shocks.

Another important factor which contributes extensively in macroeconomic fluctuation is foreign aid shocks and the results of variance decomposition indicate that foreign aid explained 4 % of variation in macroeconomic activities. The results are consistent with Agbontaen and Iyoha (2013) who examined the unanticipated shocks to foreign aid on macroeconomic fluctuation and concluded that sudden shocks to foreign aid amplify deficit in government spending as well as current account balance and transmit this negative shock throughout the economy and generate strong persuasive effect on economic growth. Moreover, the contribution of PR shock and climate shock to macroeconomic fluctuation is 27 % and 0.07% in LICs. Results are consistent with Jansen, Vacaflorés, and Naufal (2012) who has examined a mechanism through which remittance shock affects macroeconomic aggregates. He found a significant and large contribution of shock to PR in business cycle fluctuation and concluded that personal remittance strongly affect nominal interest rate, output and nominal exchange rate that ultimately depress or expand economic activities. Moreover, In the case of LICs, among internal sources, M2 shocks account for 8.23%, monetary shocks contributes 9.10 % and household savings shocks accounts for 13.56

%variation in economic fluctuation. Moreover, among external sources, TO accounts for 54%, foreign aid for 4%, PR accounts for 27 % and climate change accounts for 0.50% variation in economic fluctuation. The results conclusively indicate that external shocks are more accountable for economic fluctuation in LICs. Our results are consistent with Raddatz (2008): during the last 15 years it has been observed that the relative importance of external shocks in LICs has increased and they account for a larger variation in economic growth due to a decline in variance of internal shocks and higher openness of output to external shocks (Kousar et al., 2016; Sosa & Cashin, 2009).

However, in the case of UMICs, the contribution of financial development, saving and interest rate shocks varies from 0 to 6%, 0 to 15 %, 0 to 26% in economic fluctuation while the contribution of external shocks – ODA, PR, and CO₂ – to economic fluctuation is less than 1% except trade openness (7.03%). Results indicate that internal policy variables like saving and interest rate shocks account for economic fluctuation while the contribution of external shocks to economic fluctuations is smaller and negligible. Our results are consistent with the empirical literature that documented that internal sources are driving forces of economic fluctuation in rich countries (Andrle, Bruha, & Solmaz, 2016). Another empirical study supports our results by documenting that fluctuations in economic growth are mainly explained by domestic shocks – supply shock or productivity shock – in the short run as well as in the long-run period (Akinci, 2014; Özer). Results of variance decomposition for complete VAR system is given in appendix (Table 9 -16)

4.8 Granger Causality Test

In social sciences and specifically in economics it is very important and difficult to test causality among time series because different variables affect some variables simultaneously. There are is a common challenge for researchers while examining causality:

1. Distinction between correlation and causality is not an easy test.

Granger (1969) addressed the problem of distinction between correlation and causality by introducing Granger causality – unidirectional property of time arrow to show cause proceeds affect – as a yard stick. Granger causality is based on two assumptions: first, past can predict present and future but reverse cannot hold; second, cause provides all effect-related information which no other variable can provide. However, the results of traditional Granger causality test are less reliable because it possesses some limitations (Sindano, 2009) and follows some methodological deficiencies. First, the traditional Granger causality test is unable to examine basic time series properties of a variable and if time series are co-integrated then Granger causality test includes differenced form of variables which produces miss-specified result without inclusion of lagged ECT (Odhiambo, 2009). Second, Granger causality test turns the time series stationary mechanically by differencing the variables and consequently eliminates the long-run information embodied in the original form of variables (Sindano, 2009). Therefore, the above-mentioned methodological deficiencies in traditional Granger causality method proved that statistical inferences based on traditional causality relationship are not reliable but significant statistical inference can be obtained by inclusion of lagged ECT derived from co-integration equations (Perera & Paudel, 2009; Vazakidis & Adamopoulos, 2009). Moreover, by including ECT the long run information lost through differencing is reintroduced in a statistically acceptable way (Sindano, 2009). This study used VECM Granger Causality/Block Exogeneity Wald tests with appropriate lags of variables to check the lead-lag relationship between internal and external shock and economic fluctuation in LICs as well as in UMICs (Granger, 1969, 1988). According to Granger (1969), if one time series can be predicted with the help of lag values of another time series then we can say one causes another variable. This means that Granger causality can help the researcher to forecast future value of one variable with the help of prior values of another variable.

Therefore, the following equations are used to investigate the short-run causal relationship between internal and external sources and macroeconomic fluctuation.

$$Y_t = \beta_0 + \sum_{j=1}^n \beta_{1j} Y_{t-j} + \sum_{h=1}^p \beta_{2h} X_{t-p} + \varepsilon_{1t}$$

$$X_t = \alpha_0 + \sum_{s=1}^k \alpha_{1s} X_{t-s} + \sum_{t=1}^m \alpha_{2t} Y_{t-m} + \varepsilon_{2t}$$

Where Y_t represents economic fluctuations at time t while X_t represents each internal source of fluctuations unconnected at time t . Similarly, Y_{t-j} and Y_{t-m} show the lagged macroeconomic fluctuation while X_{t-p} and X_{t-s} indicate the lagged values of internal and external sources of fluctuation separately. Moreover, ε_{1t} and ε_{2t} are uncorrelated white noise vector at time t .

The VEC Granger Causality/Block Exogeneity Wald tests provide the answer to the following research questions which were developed in Chapter 1:

- I. Is there a long-run/short-run relationship between internal sources and business cycle fluctuation in LICs?
- II. What is the direction of causality between internal sources and business cycle fluctuations in LICs?
- III. Is there a long-run/short-run relationship between external sources and business cycle fluctuation in LICs?
- IV. What is the direction of causality between external sources and business cycle fluctuations in LICs?
- V. Is there a long-run/short-run relationship between internal sources and business cycle fluctuation in UMICs?
- VI. What is the direction of causality between internal sources and business cycle fluctuations in UMICs?

VII. Is there a long-run/short-run relationship between external sources and business cycle fluctuation in UMICs?

VIII. What is the direction of causality between external sources and business cycle fluctuations in UMICs?

The results are reported in Tables 28 and 29.

Table 28 VEC Granger Causality/Block Exogeneity Wald Tests for Low Income Countries

VEC Granger Causality/Block Exogeneity Wald Tests						
χ^2 statistics of lagged 3 difference term (p-value)						
Model 1						
Dep. Var	Ind. Var					ECT _{t-1}
	D (GDP	D (LNM2)	D (LNPOP)	D (LNSAV)	D (LNINT)	
D (GDP	-	15.95* (0.0012)	0.291 (0.96)	3.039 (0.38)	0.097 (0.9921)	-0.2924 [-17.3764]
D (LNM2)	1.982 (0.576)	-	1.147 (0.76)	0.493 (0.92)	1.544 (0.672)	-0.0091 [-5.70977]
D (LNPOP)	10.08* (0.017)	0.668 (0.880)	-	1.547 (0.67)	0.130 (0.9879)	1.43E-05 [1.01878]
D (LNSAV)	0.67 (0.878)	0.365 (0.94)	2.635 (0.45)		0.026 (0.99)	0.001977 [0.80007]
D(LNINT)	6.26* (0.099)	6.506* (0.089)	0.802 (0.84)	0.08 (0.99)		0.000146 [0.20060]
Model 2						
	D (GDP	D (LNDCB)	D (LNPOP)	D (LNSAV)	D (LNINT)	ECT _{t-1}
D (GDP	-	0.243585*** (0.0970)	0.289474 (0.9620)	3.341294 0.3419	0.016594 (0.9994)	-0.295477 [-17.0622]
D (LNDCB)	1.556584 (0.6693)	-	2.396179 (0.4943)	1.027021 0.7947	9.655106** (0.0217)	-0.000894 [-0.89540]
D (LNPOP)	6.642157 (0.0842)	1.335589 (0.7207)	-	1.577283 0.6646	0.083655 (0.9937)	1.52E-05 [1.05635]
D (LNSAV)	0.938647 (0.8161)	0.131996 (0.9877)	2.986333 (0.3937)	-	0.069204 (0.9953)	0.002117 [0.83165]
D (LNINT)	9.163539 (0.0272)	25.54736* (0.0000)	2.439553 (0.4863)	0.203992 0.9769	-	0.000320 [0.43427]
Model 3						
	D (GDP	D (LNDCP)	D (LNPOP)	D (LNSAV)	D (LNINT)	ECT _{t-1}
D (GDP		0.166301 (0.9828)	0.401527 (0.9399)	4.673166 (0.1974)	0.481471 (0.9229)	-0.1378 [-9.43273]
D (LNDCP)	0.432565 (0.9334)		0.403890 (0.9394)	0.247348 (0.9696)	1.528834 (0.6756)	-0.0026 [-1.93007]
D (LNPOP)	2.323037 (0.5081)	3.261378 (0.3531)		1.479897 (0.6869)	0.193606 (0.9786)	2.46E-05 [1.87979]
D (LNSAV)	1.398137 (0.7060)	0.798979 (0.8497)	2.554591 (0.4655)		0.007143 (0.99980)	0.012703 [5.48401]
D (LNINT)	5.289748	8.145086*	1.206853	0.064541		-0.0003

	(0.1518)	(0.0431)	(0.7514)	(0.9957)		[-0.43853]
Model 4						
	D (GDP)	D (ODA)	D (PR)	D (TRAD)	D (CO2)	ECT_{t-1}
D (GDP)		18.29786* (0.0004)	1.697579 (0.6375)	0.514671 (0.9157)	2.977570 (0.3951)	-0.1789 [-2.71010]
D (ODA)	5.052718 (0.1680)		1.904300 (0.5925)	1.330484 (0.7219)	3.747374 (0.2901)	-0.0291 [-3.62840]
D (PR)	5.993099 (0.1119)	30.87458* (0.0000)		5.341088 (0.1485)	10.49880* (0.0148)	-0.0005 [-1.87113]
D (TRAD)	9.371283* (0.0247)	33.32966 (0.0000)	0.205623 (0.9767)		7.117368* (0.0682)	8.239065 [2.15221]
D (CO2)	3.253320 (0.3542)	3.536226 (0.3161)	0.613145 (0.8934)	0.460088 (0.9276)		-2.05E-08 [-2.48857]

Results of model 1 in the case of LICs indicate that there is unidirectional causality in the short run between M2 and economic fluctuation. It suggests present and future values of economic fluctuation can be predicted with the help of financial development, in other words, we can say that past values of financial development are strongly correlated with current values of economic fluctuation while all other internal economic variables are not correlated with economic fluctuation in the short run in the case of LICs.

Table 29 VEC Granger Causality/Block Exogeneity Wald Tests for Upper Middle Income Countries.						
VEC Granger Causality/Block Exogeneity Wald Tests						
	χ^2 statistics of lagged 4 difference term (p-value)					
Model 1	D(GDP)	D(LNM2)	D(LNPOP)	D(LNSAV)	D(LNINT)	ECT_{t-1}
D(GDP)		1.067171 (0.8994)	1.131828 (0.8892)	17.43797* (0.0016)	10.94284* (0.0272)	-0.00828 [-3.09635]
D(LNM2)	4.990279 (0.2883)		1.224737 (0.8740)	0.066193 (0.9995)	0.653042 (0.9570)	0.010994 [3.18559]
D(LNPOP)	8.746401* (0.0678)	2.314734 (0.6781)		0.126582 (0.9981)	119.4494* (0.0000)	-506.132 [-5.34444]
D(LNSAV)	24.66722* (0.0001)	0.610959 (0.9618)	0.548723 (0.9686)		6.401700 (0.1711)	0.054199 [0.35921]
D(LNINT)	23.58679* (0.0001)	7.568671 (0.1087)	21.41314* (0.0003)	0.149466 (0.9973)		61982864 [12.8097]
Model 2						
	D(GDP)	D(LNDCB)	D(LNPOP)	D(LNSAV)	D(LNINT)	ECT_{t-1}
D(GDP)		5.853608 (0.3207)	0.576976 (0.9890)	43.68654* (0.0000)	7.233097 (0.2039)	-0.08015 [-13.5578]
D(LNDCB)	6.450042 (0.2649)		1.639536 (0.8964)	0.764085 (0.9793)	12.13008* (0.0330)	0.026515 [4.04642]
D(LNPOP)	1.658978 (0.8940)	3.674845 (0.5971)		0.244144 (0.9986)	92.99772* (0.0000)	-16.8101 [-0.16154]
D(LNSAV)	30.73783* (0.0000)	3.390315 (0.6400)	0.022363 (1.0000)		0.403549 (0.9952)	-1.76903 [-4.65810]
D(LNINT)	88.58767* (0.0000)	9.183521 (0.1020)	22.62444* (0.0004)	8.402776 (0.1354)		-1.6E+07 [-1.38610]

Model 3						
	D(GDP)	D(LNDCP)	D(LNPOP)	D(LNSAV)	D(LNINT)	ECT _{t-1}
D(GDP)		0.041562 (0.9998)	0.917258 (0.9221)	18.39158* (0.0010)	12.28623* (0.0153)	-0.00705 [-2.74432]
D(LNDCP)	5.134570 (0.2738)		0.012324 (1.0000)	1.251817 (0.8695)	4.318264 (0.3646)	0.007677 [1.79659]
D(LNPOP)	7.837352* (0.0977)	1.176555 (0.8819)		0.126923 (0.9981)	121.0674* (0.0000)	-493.55 [-5.36374]
D(LNSAV)	25.11670* (0.0000)	0.804022 (0.9379)	0.488841 (0.9746)		6.020563 (0.1976)	0.047782 [0.32598]
D(LNINT)	19.71142* (0.0006)	2.819447 (0.5885)	21.51025* (0.0003)	0.139446 (0.9977)		60243200 [12.9184]
Model 4						
	D(GDP)	D(ODA)	D(PR)	D(TRAD)	D(CO2)	ECT _{t-1}
D(GDP)		0.417317 (0.8117)	1.837284 (0.3991)	3.04444* (0.02182)	0.207273 (0.9016)	-0.10549 [-16.5049]
D(ODA)	1.110094 (0.5740)		0.059614 (0.9706)	0.339311 (0.8440)	0.614396 (0.7355)	-422203 [-1.42356]
D(PR)	0.504647 (0.7770)	0.008053 (0.9960)		0.064230 (0.9684)	0.003788 (0.9981)	-686345 [-1.27314]
D(TRAD)	1.595330 (0.4504)	0.626322 (0.7311)	0.021796 (0.9892)		0.102918 (0.9498)	0.002561 [0.28092]
D(CO2)	0.006750 (0.9966)	0.011832 (0.9941)	0.062796 (0.9691)	0.054277 (0.9732)		5.62E-05 [0.77693]

Moreover, the M2 and GDP Granger causes interest rates in the short run, which imply that current and future values of interest rate can be predicted with the help of past values of GDP and M2. Therefore, economic fluctuation is a leading indicator for interest rate only because it indicates that in the short run with rising economic fluctuation a change in interest rate can be expected in the short run. In the case of LICs, the results of model 2 indicate that in the short run there is a unidirectional causality between DCB and economic fluctuation. It implies present and future values of economic fluctuation can be predicted with the help of DCB while all other internal economic variables are not correlated with economic fluctuation in the short run in the case of LICs. Therefore, DCB is a leading indicator for economic fluctuation only because it indicates that in the short run with rising DCB a change in economic fluctuations can be expected in the short run. Moreover, there is a bidirectional correlation between DCB and interest rate in the short run, which implies that current and future values of interest rate can be predicted with the help of past values of DCB and vice versa. The results of four models can be summarized as follows:

Model 1	Model 2	Model 3	Model 4
M2 $\longrightarrow$ GDPD1	DCB $\longrightarrow$ GDPD1	DCP $\longrightarrow$ int.	ODA $\longrightarrow$ TO
M2 $\longrightarrow$ int.	int. $\longrightarrow$ DCB		ODA $\longrightarrow$ PR
GDPD1 $\longrightarrow$ int.			GDPD1 $\longrightarrow$ TO

In the case of LICs, results of model 3 indicate that in the short run there is a unidirectional causality between DCP and interest rate. It indicates that in the short run with rising DCP a change in interest rate can be expected in the short run while all other variables do not exhibit any type of causality. In the case of LICs, the results of model 4 indicate that in the short run there is a unidirectional causality between ODA and TO, ODA and PR, the present and future values of TO and PR on the basis past values of ODA. Moreover, economic fluctuation causes TO. On the basis of past values of economic fluctuation we can forecast changes in TO.

Similarly, in the case of UMICs, results indicate that there is bidirectional causality between saving and economic fluctuations in the short-run period in models 1, 2 and 3. Moreover, the results also confirm the bidirectional causality between economic fluctuations and interest rate in models 1 and 3, and unidirectional causality between economic fluctuation and interest in model 2. Similarly, in model 2, interest rate granger causes DCB. However, in model 4, external variables do not cause economic fluctuation except TO. The results of the three models can be summarized as follows.

Model 1	Model 2	Model 3	Model 4
<u>Sav</u> $\longrightarrow$ GDPD1 $\longleftarrow$	<u>Sav</u> $\longrightarrow$ GDPD1 $\longleftarrow$	<u>Sav</u> $\longrightarrow$ GDPD1 $\longleftarrow$	TO $\longrightarrow$ GDPD1
<u>Int</u> $\longrightarrow$ GDPD1 $\longleftarrow$	<u>Int</u> $\longrightarrow$ DCB	<u>Int</u> $\longrightarrow$ GDPD1 $\longleftarrow$	
	GDPD1 $\longrightarrow$ <u>int</u>		

4.9 Summary

In this chapter, the study presented the empirical results. The study found that variables in the VAR system are co-integrated by employing (Pedroni, 1999), (Kao, 1999) and Johansen Fisher co-integration tests for robustness of results. In the next step the study estimated VECM including ECT which depicts dynamic behavior of the model (Adamopoulos, 2010) to examine the short-run and long-run dynamics. ECT indicates the speed of adjustment if any shock disturbs the long-run equilibrium state. In the next step, the study applied variance decomposition analysis to have information regarding the relative importance of each innovation in affecting other variables in the VAR system. Moreover, the study investigated impact analysis by utilizing impulse response function. The study also utilized Granger Causality test to see the direction of correlation between internal and external sources and macroeconomic fluctuation. A summary of the results is as follows.

Table 30 Summary of Results

No.	Research Questions	Methodology	Table/figure
1	What type of relationship exists in long run between internal sources – financial development, saving, population and interest rate – and business cycle fluctuation in LICs?	VECM	Table 17
2	What type of relationship exists in long run between internal sources – financial development, saving, population and interest rate – and business cycle fluctuation in UMICs?	VECM	Table 17
3	What type of relationship exists between external sources – foreign aid, TO, PR and	VECM	Table 18

	climate changes – and business cycle fluctuation in LICs?		
4	What type of relationship exists in long run between external sources – foreign aid, TO, PR and climate changes – and business cycle fluctuation in UMICs?	VECM	Table 18
5	What is the relative contribution of internal shocks to business cycle fluctuation in LICs?	Variance Decomposition	Tables 20, 22, 24
6	What is the relative contribution of internal shocks to business cycle fluctuation in UMICs?	Variance Decomposition	Tables 20, 22, 24
7	What is the relative contribution of external shocks to business cycle fluctuation in LICs?	Variance Decomposition	Table 26
8	What is the relative contribution of external shocks to business cycle fluctuation in UMICs?	Variance Decomposition	Table 26
9	Is there a short-run relationship between internal sources and business cycle fluctuation in LICs?	Granger Causality	Table 28
10	What is the direction of causality between internal sources and business cycle fluctuations in LICs?	Granger Causality	Table 28
11	Is there a short-run relationship between external sources and business cycle fluctuation in LICs?	Granger Causality	Table 28

12	What is the direction of causality between external sources and business cycle fluctuations in LICs?	Granger Causality	Table 28
13	Is there a short-run relationship between internal sources and business cycle fluctuation in UMICs?	Granger Causality	Table 29
14	What is the direction of causality between internal sources and business cycle fluctuations in UMICs?	Granger Causality	Table 29
15	Is there a short-run relationship between external sources and business cycle fluctuation in UMICs?	Granger Causality	Table 29
16	What is the direction of causality between external sources and business cycle fluctuations in UMICS?	Granger Causality	Table 29
17	What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of internal sources at time t while no other shock hits the system in LICs?	Impulse Response	Figures 1, 2, 3
18	What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of external	Impulse Response	Figure 4

	sources at time t while no other shock hits the system in LICs?		
19	What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of internal sources at time t while no other shock hits the system in UMICs?	Impulse Response	Figures 5, 6, 7
20	What is the response of business cycle fluctuation in time $t + n$ when a one standard shock is given to VAR system of external sources at time t while no other shock hits the system in UMICs	Impulse Response	Figure 8

Chapter 5

Conclusion and Policy Implications

This chapter has been divided into three sections. In Section 5.1, the study presents a summary of main findings and in Section 5.2 the study highlights theoretical and practical policy implications. In the last section, Section 5.3, the study documents the limitations of this study and proposes future research directions.

5.1 Summary of Findings

Understanding the source of economic ups and downs has sometimes been a central focus of attention for the public and for academics. Different countries face different economic and political environments, so different sources account for economic fluctuation in different economies; for example, in emerging economies, “unit root technology shocks” are considered the main source of business cycles while in developed economies, investment and mark up shocks are considered important driving forces for economic fluctuation along with productivity shock. Motivated by this line of research, this study is conducted to investigate the sources of economic fluctuation in LICs and UMICs. Moreover, inspired by the economic and political conditions of these countries, the study was conducted to segregate the sources of fluctuations into two categories: first, the sources of fluctuations that originate within the country, controllable by policymakers; and second, the sources of fluctuation that originated from outside the country and are beyond the control of policymakers. Thus, the purpose of this study is to help poor nations by providing insights on internal sources of business cycle fluctuation and possible external sources of economic fluctuation in their economies. Adequate knowledge about internal and external sources of macroeconomic fluctuation can save these economies from massive disruption and keep them on a certain growth path. This study answered three essential macroeconomic questions: What are the

internal and external sources of business cycle fluctuation in LICs and UMICs? Which shocks are empirically essential to explain macroeconomic fluctuation in LICs and UMICs? What is the relative importance of internal and external sources of economic fluctuation?

Moreover, the study adopted a philosophy that the economy as a system – entrenched with financial and structural frictions – follows a certain trend growth path and different financial and structural shocks hit the economy and cause it to diverge from a steady state growth path. This study identified three financial sources named as financial development, lending interest rate and household saving that contribute to economic fluctuation and any exogenous shocks to these variables diverge the economic system from its balanced growth path and trigger macroeconomic fluctuation. The study used three indicators – M2, DCB and DCP – for financial development to allow robust empirical results. Moreover, the study identified four structural shocks named as external sources – foreign aid, PR, TO and climate changes – that contribute to economic fluctuations and any exogenous shocks to these variables cause huge disturbance in economic activities. There is no doubt that internal and external frictions magnify economic fluctuations and slow down adjustment process and cause persistence in economic fluctuations. Therefore, the analytical framework of this study is derived from empirical studies developed to understand business cycle fluctuations in developed economies. The study used multivariate VAR or VECM to quantify the relationship of internal and external sources with business cycle fluctuations and to check long-run causality. The study utilized variance decompositions to decompose the definite forecast error variance of economic fluctuations into components that exclusively reflect the contribution of each specific shock. Therefore, the fraction of a variable's forecast error variance entirely explained by a particular exogenous shock determines the relative importance of that shock in explaining the fluctuations in macroeconomic activities. The study used GIRF – ordering invariant approach – proposed by Pesaran and Shin (1998) to explain the impact of an

exogenous shock on one variable on the other variables in the system. The study also used VEC Granger Causality/Block Exogeneity Wald tests to check short-run causality among variables in VAR system.

This study performed four models: three models with three proxies of financial development to check the relationship between internal sources and macroeconomic fluctuations and fourth model to identify the impact of external sources on macroeconomic fluctuations. The study found that in the case of LICs, financial development significantly affects economic fluctuation in the long run, in all three models. However, financial development – M2 and DCB – stabilizes economic fluctuation in the long run and is considered a tool of monetary policy to alleviate economic disturbance, while DCP positively affects economic fluctuation and increases instability in economic activities but it is significant at 10%. Usually, time series help in policymaking when they are significant at 5% or less than 5% and a variable that is significant at 10% is not desirable and does not help in policymaking (Zar, 1984). Similarly, the impulse response function indicates that one standard error positive shock to M2 and DCB will lower business cycle fluctuation throughout 10 predicted quarters. Moreover, the results of Granger Causality/Block Exogeneity Wald tests indicates that M2 and DCB are leading indicators for economic fluctuation and with the help of present and past values of M2 and DCB, a researcher can forecast future values of GDP. Moreover, in case of UMICs, the results of VECM show that financial development is insignificant in long-run period in the case of UMICs for all three models, which indicates that financial development does not play any role in macroeconomic fluctuation in the long run. However, when the study analyzed the response of business cycle fluctuation in future in response to positive one standard error shock, the study found that one standard error positive shock to M2, DCB and DCP will negatively affect economic fluctuation in 10 predicted quarters. Similarly, in the case of LICs, household saving positively and significantly affects economic

fluctuation in the long run in model 3 – model was estimated with DCP proxy for financial development – which indicates that as saving increases in LICs it will increase economic fluctuation while in the case of UMICs domestic savings negatively and significantly affect economic fluctuation, which indicates that as domestic saving increases in UMICs it will lower economic fluctuation. Therefore, with the presence of a developed capital market higher domestic saving reduces economic fluctuation but if financial intermediaries are not well developed and people are reluctant to keep their savings with financial institutions then it may increase economic fluctuations, as in the case of LICs. Similarly, the results of impulse response function indicates that in LICs one standard error shock to saving will increase economic fluctuation in initial four quarter but in next quarters it will lower economic fluctuation in LICs, while in UMICs one standard positive shock will lower economic fluctuation in all 10 predicted quarters. Moreover, the finding of Wald test represents that in LICs, saving does not cause economic fluctuations while in UMICs saving and economic fluctuations have bidirectional causality. Therefore, with the help of present and future values of saving we can forecast future values of economic fluctuations in short-run period, but in LICs present and past values of saving do not help to predict the future value of GDP. Similarly, the interest rate is positively and significantly associated with economic fluctuation in LICs as well as in UMICs. The finding of the study indicates that as interest rate increases it will increase economic fluctuations and if interest rate decreases, it will lower economic fluctuations. The results of impulse response functions indicate that positive one standard deviation in interest rate lowers economic fluctuation in first quarter but it increases fluctuation in remaining forecasted quarters. Similarly, the findings of Wald test suggest that in the case of LICs, economic fluctuations and DCP cause interest rate while interest rate causes DCB. Therefore, our findings suggest that economic fluctuations and DCP help to predict the future value of interest rate. Similarly, the present and future value of interest rate

helps to forecast value of DCB in the short run. However, in the case of UMICs, interest rate and economic fluctuation have bidirectional correlation in models 1 and 2 while in model 3 GDP causes interest rate.

Similarly the results of model 4 in both cases – LICs and UMICs – indicate the impact of external shocks on economic fluctuation. The results of VECM indicate that in the case of LICs, ODA, PR, TO and CO₂ have a significant association with economic fluctuation. However, foreign aid and PR stabilize economic activities because ODA and PR have a negative and significant relationship with economic fluctuation, as PR diminishes it will increase economic instability. Moreover, trade integration and CO₂ have a positive and significant association with economic fluctuation. This indicates that as TO and emission of CO₂ increase there is an increase in economic fluctuations in the long run. However, in the case of UMICs, only TO has a significant and positive effect on economic fluctuations while the effects of all other variables are insignificant.

Results indicate that in the race for economic development, UMICs also minimize trade barriers and integrate with international trade market, so only TO have a positive and significant impact on macroeconomic fluctuation. Similarly, the study measures the relative importance of internal and external sources in economic fluctuation for LICs and UMICs with the help of variance decomposition. Results indicate that in the short-run period internal shock to economic fluctuations contributes more to economic instability in LICs as well as in UMICs while the contribution of external sources to economic fluctuation of LICs becomes larger in the long run as compared to UMICs. The results of GIRF in the case of LICs show that if one standard positive shock is given to business cycle fluctuation, ODA, it will affect economic fluctuations in the first four quarters negatively while in remaining forecasted quarters it will positively affect economic fluctuation. Similarly, one standard positive shock to PR will affect economic activities positively economic fluctuation in all predicted 10

quarters while TO will lower economic fluctuations in the first four quarters but after that it starts to raise economic fluctuations. Moreover, a shock to CO₂ will negatively affect economic activities in future. Furthermore, in the case of UMICs, the results of GIRF indicate that one standard positive shock to business cycle fluctuation and PR will positively affect business cycle fluctuation up to 10 forecasted quarters, while ODA initially affects economic fluctuations positively in Quarter one but after that it gradually starts to affect economic fluctuation negatively and its impact becomes zero in Quarter six and after that it will again positively affect economic fluctuations.

Moreover, shock to TO positively affects economic fluctuation for all predicted quarters except initial three quarters where impact is negative but small. The impact of climate shock affects economic fluctuation positively in first three quarters, but after that its impact on economic fluctuations becomes negative in all forecasted quarters. The study examined short-run causality among variables in a VAR system with VEC Granger Causality/Block Exogeneity Wald tests. In the case of LICs, results indicate that there is a unidirectional causality between ODA and TO and between ODA and PR while economic fluctuations cause TO in the short run. However, in the case of UMICs, only TO causes economic fluctuations in short-run period.

The results of this study are generalizable to all LICs as well as to all UMICs because all LICs are same in their institutional and structural characteristics and all UMICs are same in their institutional and structural characteristics.

5.2 Policy Implications and Recommendations of the Study

The findings of this study help the policymakers of LICs and UMICs in their design of monetary and foreign policies to regulate economic activities. LICs heavily depend on foreign resources for economic development; thereby, a small external shock will generate a

significant contribution to economic fluctuations. The findings of the study suggest important policy implications for LICs and UMICs. The results of the first three models which have been estimated to examine the effect of internal sources to macroeconomic fluctuations help policymakers to design policies when economic activities deviate from balanced growth path. The results suggest that in LICs financial development and interest rate are effective tools to control instability in economic activities. Therefore, in LICs, increases in financial development – M2, DCB and DCP – and lowering the rate of interest at a time of recession are appropriate policies to control instability. Moreover, in a recession, policymakers avoid introducing incentives to increase saving because it will not help to control economic fluctuation rather it will amplify economic fluctuation. Therefore, in LICs, the problem of macroeconomic fluctuations can be curtailed with little effort. I have argued that economic fluctuations can be alleviated in LICs not magically but by developing intelligent financial institutions and legislative changes. In LICs, if economic disturbance prolong then the only because of this disturbance is institutional setups.

The results of this study suggest that practitioners should introduce rules and regulations that ensure the operational independence of state banks in LICs, so that state bank can undertake more prudent policies regarding financial development and interest rate to achieve its primary goal of stability in economic activities. The findings of the study suggest that in case of high output fluctuations, easy monetary policy is recommended because it lowers the interest rate which will mitigate the output fluctuations by increasing private investment spending. Although a lower interest rate lowers the saving growth rate in LICs, the effect of a low interest rate on economic fluctuations outweighs the negative saving impacts. By contrast, tight monetary policy increases interest rate, appreciates domestic currency and contracts output which cause macroeconomic fluctuation. Therefore, in LICs a loose monetary policy is recommended to control instability in economic activities.

However, in UMICs, policymakers should keep in consideration household saving and interest rate as tools to control instability in economic activities. Policymakers should propose incentives to increase household savings because in UMICs household saving has a negative and significant relationship with economic fluctuations. Thus, an increase in household savings can create capital formation which brings technical innovation and progress and shifts the economy to large scale of production, specialization and improved productivity of labor which resultantly reduces economic fluctuation. Policymakers of UMICs control instability in economic activities by utilizing available limited resources efficiently with the help of household saving and increase the size of NI and employment which reduces output fluctuations. The results of this study motivate the policymaker to utilize household saving to reduce the burden of foreign debt and lead the state toward prosperity and stable economic activities. Moreover, the study suggests saving as a tool to break the vicious circle of poverty in these economies. Moreover, monetary policy can control fluctuation by lowering interest rate because it motivates investors to invest in even less profitable projects which, ultimately, help the economy to escape from fluctuation.

As we have discussed earlier, LICs are extremely vulnerable to external shocks and policymakers are unable to resist external shocks. This study suggests that LICs focus on developing effective policies regarding utilization of aid and PR to overcome macroeconomic instability. The results of this study indicate that effective foreign aid policies can lower macroeconomic fluctuations. The agencies involved in receiving and dispersing foreign aid take most efficient and effective strategies to achieve the predicated goals. To determine the effectiveness of foreign aid it is presumed that all individuals who are involved in getting and distribution process of foreign aid put aside their own interest and perform in the best interest of LICs and allocate foreign aid in an effective manner to accomplish the required task.

Moreover, the findings of the study suggest more trade integration causes economic fluctuation, so in order to mitigate the instabilities policymakers should revise trade policies. It has been observed that low income economies rely heavily on primary products and any shock to the prices of these primary products affects foreign exchange earning which causes economic fluctuations. Thus, results suggest that countries pursue policies that promote trade diversification. Only appropriate policies that enhance trade diversification will reduce dependence on other countries and fluctuations in foreign exchange earnings and be helpful for economic growth and development, while the trade policies which enhance trade integration and specialization in specific industries may intensify economic disturbances. Therefore, this study suggests that effective trade policies are desirable to minimize economic fluctuation. In addition, the results indicate that as emission of greenhouse gases increases it to increase higher temperature that will lower economic activities and generate economic fluctuation.

The results of this study recommend that low emission of greenhouse gases is required to improve economic activities; it provides space for policymakers to introduce environmental policies that help to control temperature and at the same time the results of the study invite research on crops and plants that can survive even in high temperatures. However, the scenario in UMICs is somewhat different and results suggest that UMICs are not heavily dependent on foreign resources for their economic development and they utilize their domestic resources efficiently in order to develop their economies. The results suggest that trade liberalization enhances economic instability in these economies while the effects of all other external sources are insignificant. Therefore, the results suggest that the effect of TO on economic fluctuations depends on trade conditions and economic circumstances. Even the empirical studies which document a negative association between TO and economic

fluctuations argued that the relationship has become ambiguous and doubtful if trade policy is without appropriate and favorable conditions.

5.3 Limitations and Future Research Directions

This study investigates the relationship of monetary shocks - internal shock – with business cycle fluctuation. Further studies should be conducted by including real shocks and fiscal policy shocks along with monetary shocks or monetary policy to quantify the impact of internal shocks on macroeconomic fluctuations in low and UMICs. Similarly current study evaluates the role of external shocks in business cycle fluctuation but it neglect the role of external shocks in business cycle synchronization. Further study can be conducted to identify that which variable among external shock cause business cycle synchronization.

References

- Aastveit, K. A., Natvik, G. J., & Sola, S. (2013). Economic uncertainty and the effectiveness of monetary policy: Econ papers, No 2013/17.
- Abadan-Unat, N., Keleş, R., & Penninx, R. (1975). Migration and development: A study of the Effects of International Labor Migration on Bogazlyan District. Ankara: Ajans-Turk Press.
- Abdychiev, A., Jirasavetakul, L.-B. F., Jonelis, A., Leigh, L., Moheeput, A., Parulian, F., & Touna Mama, A. (2015). Increasing productivity growth in middle income countries: IMF working paper, WP/15/2.
- Abel, A. B., Dixit, A. K., Eberly, J. C., & Pindyck, R. S. (1995). Options, the value of capital, and investment: National Bureau of Economic Research.
- Abiad, A., Mishra, P., & Topalova, P. (2014). How Does Trade Evolve in the Aftermath of Financial Crises? *IMF Economic Review*, 62(2), 213-247.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). Reversal of fortune: Geography and institutions in the making of the modern world income distribution: National Bureau of Economic Research.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of Economic Growth*, 1, 385-472.
- Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen, Y. (2003). Institutional causes, macroeconomic symptoms: fluctuations, crises and growth. *Journal of Monetary Economics*, 50(1), 49-123.
- Acemoglu, D., & Zilibotti, F. (1997). Was Prometheus unbound by chance? Risk, diversification, and growth. *Journal of Political Economy*, 105(4), 709-751.
- Acosta, P. A., Lartey, E. K., & Mandelman, F. S. (2009). Remittances and the Dutch disease. *Journal of international Economics*, 79(1), 102-116.
- Adam, C., Kessy, P., & Langford, B. (2016). evolving Monetary policy Frameworks in Low-Income Countries: the Tanzanian experience *Monetary Analysis at Central Banks* (pp. 93-129): Springer.
- Adamopoulos, A. (2010). Financial development and economic growth an empirical analysis for Ireland. *International Journal of Economic Sciences and Applied Research*(1), 75-88.
- Adams, R. H. (2006). International remittances and the household: Analysis and review of global evidence. *Journal of African Economies*, 15(suppl 2), 396-425.
- Adams, R. H., & Page, J. (2005). Do international migration and remittances reduce poverty in developing countries? *World development*, 33(10), 1645-1669.
- Adams, R. M., Fleming, R. A., Chang, C.-C., McCarl, B. A., & Rosenzweig, C. (1995). A reassessment of the economic effects of global climate change on US agriculture. *Climatic Change*, 30(2), 147-167.
- Addison, T., Mavrotas, G., & McGillivray, M. (2005). Development assistance and development finance: evidence and global policy agendas. *Journal of International Development*, 17(6), 819-836.
- Adema, Y., & Pozzi, L. (2015). Business cycle fluctuations and household saving in OECD countries: A panel data analysis. *European Economic Review*, 79, 214-233.

- Agarwal, R., & Horowitz, A. W. (2002). Are international remittances altruism or insurance? Evidence from Guyana using multiple-migrant households. *World development*, 30(11), 2033-2044.
- Agbontaen, O., & Iyoha, M. (2013). Macroeconomic stability and the impact of foreign aid on economic growth in Nigeria: EcoMod.
- Agénor, P.-R. (2000). *Monetary policy under flexible exchange rates: An introduction to inflation targeting* (Vol. 124): World Bank Publications.
- Agénor, P.-R., McDermott, C. J., & Prasad, E. S. (2000). Macroeconomic fluctuations in developing countries: some stylized facts. *The World Bank Economic Review*, 14(2), 251-285.
- Aghion, P., Angeletos, G.-M., Banerjee, A., & Manova, K. (2010). Fluctuations and growth: Credit constraints and the composition of investment. *Journal of Monetary Economics*, 57(3), 246-265.
- Aghion, P., Bacchetta, P., Ranciere, R., & Rogoff, K. (2009). Exchange rate fluctuations and productivity growth: The role of financial development. *Journal of Monetary Economics*, 56(4), 494-513.
- Aghion, P., Comin, D., Howitt, P., & Tecu, I. (2006). When does domestic savings matter for economic growth? *IMF Economic Review*.
- Aghion, P., Fally, T., & Scarpetta, S. (2007). Credit constraints as a barrier to the entry and post-entry growth of firms. *Economic Policy*, 22(52), 732-779.
- Agrawal, A., and N. Perrin. 2009. Climate adaptation, local institutions and rural livelihoods. Pages 350-367 in W. N. Adger, L. Lorenzoni, K. L. O'Brien, editors. *Adapting to climate change: thresholds, values, governance*. Cambridge University Press, New York, New York, USA. <http://dx.doi.org/10.1017/cbo9780511596667.023>
- Ahmed, J. and Martinez-Zarzoso, I. (2013). Blessing or curse: The stabilizing role of remittances, foreign aid and FDI to Pakistan. May 2013, discussion papers, Center for European Governance and Economic Development Research, No. 153. <http://econpapers.repec.org/paper/zbwcegedp/153.htm>
- Ahmed, S., Levin, A., & Wilson, B. A. (2004). Recent US macroeconomic stability: good policies, good practices, or good luck? *Review of Economics and Statistics*, 86(3), 824-832.
- Akaike, H. (1969). Fitting autoregressive models for prediction. *Annals of the institute of Statistical Mathematics*, 21(1), 243-247.
- Akaike, H. (1979). A Bayesian extension of the minimum AIC procedure of autoregressive model fitting. *Biometrika*, 66(2), 237-242.
- Akinboade, O. A., & Makina, D. (2009). Bank lending and business cycles: South African evidence. *African Development Review*, 21(3), 476-498.
- Akinci, O. (2014). Financial frictions and macroeconomic fluctuations in emerging economies. *International Finance Discussion Papers, Board of Governors of the Federal Reserve System* (1120).
- Akramov, K. T. (2012). *Foreign aid allocation, governance, and economic growth*: University of Pennsylvania Press.
- Alege, P. O. (2008). *Macroeconomic Policies and Business Cycles in Nigeria: 1970-2004*. Covenant University.
- Alesina, A., & Dollar, D. (2000). Who gives foreign aid to whom and why? *Journal of Economic Growth*, 5(1), 33-63.

- Ali, M. B. (2012). Macroeconomic Factors Influencing Foreign Remittances: The Case of Bangladesh. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 2(3), 217-229.
- Allen, B., Chan, K. K., Milne, A., & Thomas, S. (2012). Basel III: Is the cure worse than the disease? *International Review of Financial Analysis*, 25, 159-166.
- Allen, F., & Giovannetti, G. (2009). *Fragile countries and the current economic crisis*. Paper presented at the Conference on "Moving towards the European Report on Development".
- Alonso, J., Glennie, J., & Sumner, A. (2014). Recipients and Contributors: Middle income countries and the future of development cooperation. *Recuperado de http://effectivecooperation.org/wordpress/wpcontent/uploads/2014/04/Recipients-and-Contributors-MICs-and-the-futureof-development-cooperat.._.pdf*.
- Altavilla, C., & De Grauwe, P. (2010). Forecasting and combining competing models of exchange rate determination. *Applied Economics*, 42(27), 3455-3480.
- Altig, D., Christiano, L. J., Eichenbaum, M., & Linde, J. (2011). Firm-specific capital, nominal rigidities and the business cycle. *Review of Economic Dynamics*, 14(2), 225-247.
- Altug, S., Neyapti, B., & Emin, M. (2012). Institutions and business cycles. *International Finance*, 15(3), 347-366.
- Alvarez-Ramirez, J., & Fernández-Anaya, G. (2009). Inflation Feedback Regulation under Demand Shocks and Uncertain Potential Macroeconomic Output. *Emerging Topics in Macroeconomics*, pp 75-96.
- Ambler, S., Cardia, E., & Zimmermann, C. (2004). International business cycles: What are the facts? *Journal of Monetary Economics*, 51(2), 257-276.
- Amuedo-Dorantes, C., & Pozo, S. (2006). Remittances as insurance: evidence from Mexican immigrants. *Journal of Population Economics*, 19(2), 227-254.
- Andersen, L., & Babula, R. (2008). The link between openness and long-run economic growth. *Journal of International Commerce and Economics*, 2, 31-50.
- Anderson, E. (2008). *Practices and implications of aid allocation*. Paper presented at the Background study for the 2008 Development Cooperation Forum, UN Economic and Social Council (ECOSOC)(mimeo).
- Andrews, C., Das, M., Elder, J., Ovadiya, M., & Zampaglione, G. (2012). Social protection in low income countries and fragile situations: challenges and future directions. *Social Protection & Labor Discussion Paper. Washington, DC: World Bank*.
- Andrle, Michal, Jan Brůha, and Serhat Solmaz, 2016, "On the Sources of Business Cycles: Implications for DSGE Models," Czech National Bank Working Paper No. 3/2016.
- Ang, J. B. (2010). Does foreign aid promote growth? Exploring the role of financial liberalization. *Review of Development Economics*, 14(2), 197-212.
- Angeles, L., & Neanidis, K. C. (2009). Aid effectiveness: the role of the local elite. *Journal of Development Economics*, 90(1), 120-134.
- Angeloni, I., Kashyap, A. K., Mojon, B., & Terlizzese, D. (2003). Monetary Transmission in the Euro Area: Does the Interest Rate Channel Explain it All? : National Bureau of Economic Research.
- Anyanwu, J. C., & Erhijakpor, A. E. (2010). Do international remittances affect poverty in Africa? *African Development Review*, 22(1), 51-91.
- Apaa-Okello, J., & Anguyo, F. (2006). The Cyclical Implications of Immigrant Workers' Remittances to Uganda. *Bank of Uganda, Kampala*.

- Arellano, C., Bulíř, A., Lane, T., & Lipschitz, L. (2009). The dynamic implications of foreign aid and its variability. *Journal of Development Economics*, 88(1), 87-102.
- Arellano, C., & Mendoza, E. G. (2002). Credit frictions and 'sudden stops' in small open economies: An equilibrium business cycle framework for emerging markets crises: National Bureau of Economic Research.
- Arestis, P., & Sawyer, M. (2004). On the effectiveness of monetary policy and of fiscal policy. *Review of Social Economy*, 62(4), 441-463.
- Arestis, P. and Sawyer, M. C. (2002). Can Monetary Policy Affect the Real Economy? Levy Economics Institute Working Paper No. 355. Available at SSRN: <https://ssrn.com/abstract=335620> or <http://dx.doi.org/10.2139/ssrn.335620>
- Arias, A., Hansen, G. D., & Ohanian, L. E. (2007). Why have business cycle fluctuations become less volatile? *Economic theory*, 32(1), 43-58.
- Asiedu, E., & Villamil, A. P. (2002). Imperfect enforcement, foreign investment, and foreign aid. *Macroeconomic Dynamics*, 6(04), 476-495.
- Athukoralge, P.-c. (2001). *Crisis and recovery in Malaysia: the role of capital controls*: Edward Elgar Publishing.
- Atkeson, A. (1991). International lending with moral hazard and risk of repudiation. *Econometrica: Journal of the Econometric Society*, 59(4), 1069-1089.
- Attanasio, O. P., Picci, L., & Scorsu, A. E. (2000). Saving, growth, and investment: a macroeconomic analysis using a panel of countries. *Review of Economics and Statistics*, 82(2), 182-211.
- Azam, J.-P., Devarajan, S., & O'Connell, S. A. (1999). *Aid dependence reconsidered* (Vol. 2144): World Bank Publications.
- Azam, M., & Khan, A. (2011). Workers' remittances and economic growth: evidence from Azerbaijan and Armenia. *Global Journal of Human-Social Science Research*, 11(7).
- Azariadis, C., & Guesnerie, R. (1986). Sunspots and cycles. *The Review of Economic Studies*, 53(5), 725-737.
- Bacha, E. L. (1990). A three-gap model of foreign transfers and the GDP growth rate in developing countries. *Journal of Development economics*, 32(2), 279-296.
- Baharumshah, A. Z., Masih, A. M. M., & Azali, M. (2002). The stock market and the ringgit exchange rate: a note. *Japan and the World Economy*, 14(4), 471-486.
- Baharumshah, A. Z., Sarmidi, T., & Tan, H. B. (2003). Dynamic linkages of Asian stock markets. *Journal of the Asia Pacific Economy*, 8(2), 180-209.
- Bailey, R. C., Head, G., Jenike, M., Owen, B., Rechtman, R., & Zechenter, E. (1989). Hunting and gathering in tropical rain forest: Is it possible? *American Anthropologist*, 91(1), 59-82.
- Baker, S. R., Bloom, N., & Davis, S. J. (2015). Measuring economic policy uncertainty: National Bureau of Economic Research.
- Banerjee, A. V. (2011). *Poor Economics*: Random House India.
- Barro, R. (1989). Modern business cycle theory. Harvard University Press and Basil Blackwell.
- Barsky, R. B., & Kilian, L. (2002). Do we really know that oil caused the great stagflation? A monetary alternative *NBER Macroeconomics Annual 2001, Volume 16* (pp. 137-198): MIT Press.
- Barsky, R. B., & Sims, E. R. (2011). News shocks and business cycles. *Journal of Monetary Economics*, 58(3), 273-289.

- Barth, J. R., Caprio Jr, G., & Levine, R. (2001). Banking systems around the globe: do regulation and ownership affect performance and stability? *Prudential supervision: What works and what doesn't* (pp. 31-96): University of Chicago Press.
- Baum, A., Checherita-Westphal, C., & Rother, P. (2013). Debt and growth: New evidence for the euro area. *Journal of International Money and Finance*, 32, 809-821.
- Baum, C. F., Barkoulas, J. T., & Caglayan, M. (2001). Nonlinear adjustment to purchasing power parity in the post-Bretton Woods era. *Journal of International Money and Finance*, 20(3), 379-399.
- Baumeister, C., and Kilian, L. (2012), "Real-Time Forecasts of the Real Price of Oil," *Journal of Business and Economic Statistics*, 30, 326-336.
- Baxter, M. (1994). Real exchange rates and real interest differentials: Have we missed the business-cycle relationship? *Journal of Monetary Economics*, 33(1), 5-37.
- Baxter, M., & Crucini, M. J. (1993). Explaining saving – investment correlations. *The American Economic Review*, 83(3), 416-436.
- Baxter, M., & King, R. G. (1991). *Productive externalities and business cycles*: Institute for Empirical Macroeconomics, Federal Reserve Bank of Minneapolis.
- Baxter, M., & King, R. G. (1993). Fiscal policy in general equilibrium. *The American Economic Review*, 83(3), 315-334.
- Baxter, M., & King, R. G. (1999). Measuring business cycles: approximate band-pass filters for economic time series. *Review of Economics and Statistics*, 81(4), 575-593.
- Baxter, M., & Kouparitsas, M. A. (2005). Determinants of business cycle comovement: a robust analysis. *Journal of Monetary Economics*, 52(1), 113-157.
- Beaudry, P., & Pages, C. (2001). The cost of business cycles and the stabilization value of unemployment insurance. *European Economic Review*, 45(8), 1545-1572.
- Beaudry, P., & Portier, F. (2004). An exploration into Pigou's theory of cycles. *Journal of Monetary Economics*, 51(6), 1183-1216.
- Beck, T., Lundberg, M., & Majnoni, G. (2001). Financial development and economic fluctuations: does finance dampen or magnify shocks. *Documento de trabajo de Políticas de Estudio* (2707).
- Bejan, M. (2006). Trade openness and output fluctuations. *Available at SSRN 965824*.
- Bekaert, G., Hoerova, M., & Duca, M. L. (2013). Risk, uncertainty and monetary policy. *Journal of Monetary Economics*, 60(7), 771-788.
- Ben-David, D. (1993). Equalizing exchange: Trade liberalization and income convergence. *The Quarterly Journal of Economics*, 108(3), 653-679.
- Bernanke, B. S. (1983). The determinants of investment: Another look. *The American Economic Review*, 73(2), 71-75.
- Bernanke, B. S., & Blinder, A. S. (1992). The federal funds rate and the channels of monetary transmission. *The American Economic Review*, 82(4), 901-921.
- Bernanke, B. S., & Gertler, M. (1995). Inside the black box: the credit channel of monetary policy transmission: National Bureau of Economic Research.
- Bernanke, B. S., & Gertler, M. (2001). Should central banks respond to movements in asset prices? *The American Economic Review*, 91(2), 253-257.
- Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of Macroeconomics*, 1, 1341-1393.
- Bernanke, B. S., & Mihov, I. (1998). *The liquidity effect and long-run neutrality*. Paper presented at the Carnegie-Rochester conference series on public policy.

- Bernard, A. B., & Jones, C. I. (1996a). Comparing apples to oranges: productivity convergence and measurement across industries and countries. *The American Economic Review*, 86(5), 1216-1238.
- Bernard, A. B., & Jones, C. I. (1996b). Productivity across industries and countries: time series theory and evidence. *The Review of Economics and Statistics*, 78(1), 135-146.
- Bertelli, A. M., & Whitford, A. B. (2009). Perceiving credible commitments: how independent regulators shape elite perceptions of regulatory quality. *British Journal of Political Science*, 39(03), 517-537.
- Bertoli, S., Cornia, G. A., & Manaresi, F. (2008). Aid Effort and its Determinants. A comparison of Italy with the OECD norm. Department of Economics working paper no. 11. Florence, Italy: University of Florence.
- Bettin, G., Presbitero, A. F., & Spatafora, N. L. (2015). Remittances and vulnerability in developing countries. *The World Bank Economic Review*, 1h053.
- Beuran, M., Raballand, G., & Revilla, J. E. (2011). Improving aid effectiveness in aid-dependent countries: lessons from Zambia. *Centre d'économie de la Sorbonne Working Paper* (2011.40).
- Beveridge, S., & Nelson, C. R. (1981). A new approach to decomposition of economic time series into permanent and transitory components with particular attention to measurement of the 'business cycle'. *Journal of Monetary Economics*, 7(2), 151-174.
- Bieseke, M., Weinberg, P., & Cloete, D. (1990). *Shaken roots*: EDA Publications.
- Birdsall, N., & Deese, B. (2004). Hard Currency Unilateralism doesn't work for foreign aid, either. *Washington Monthly*, 36(3), 39-42.
- Blackburn, K., & Pelloni, A. (2004). On the relationship between growth and fluctuations. *Economics Letters*, 83(1), 123-127.
- Blanchard, O., & Simon, J. (2001). The long and large decline in US output fluctuations. *Brookings Papers on Economic Activity*, 2001(1), 135-164.
- Bloom, N., Floetotto, M., Jaimovich, N., Saporta Eksten, I., & Terry, S. (2014). Really uncertain business cycles. *US Census Bureau Center for Economic Studies Paper No. CES-WP-14-18*.
- Blyde, J. S., Daude, C., & Fernández-Arias, E. (2010). Output collapses and productivity destruction. *Review of World Economics*, 146(2), 359-387.
- Boivin, J., & Giannoni, M. P. (2006). Has monetary policy become more effective? *The Review of Economics and Statistics*, 88(3), 445-462.
- Boldrin, M., & Woodford, M. (1990). Equilibrium models displaying endogenous fluctuations and chaos: a survey. *Journal of Monetary Economics*, 25(2), 189-222.
- Boone, P. (1994). *The impact of foreign aid on savings and growth*: London School of Economics and Political Science, Centre for Economic Performance.
- Boone, P. (1996). Politics and the effectiveness of foreign aid. *European Economic Review*, 40(2), 289-329.
- Booth, D. (2012). Aid effectiveness: bringing country ownership (and politics) back in. *Conflict, Security & Development*, 12(5), 537-558.
- Bora-Durdu, C., & Sayan, S. (2008). Emerging market business cycles with remittance fluctuations. Federal Reserve Board. *International Finance Discussion Papers*, 946.
- Bordo, M. D. (2008). An historical perspective on the crisis of 2007-2008: National Bureau of Economic Research.
- Borio, C., Furfine, C., & Lowe, P. (2001). Procyclicality of the financial system and financial stability: issues and policy options. *BIS papers*, 1, 1-57.

- Borio C.E.V. and Lowe P. W. (2002). Asset Prices, Financial and Monetary Stability: Exploring the Nexus. BIS Working Paper, No. 114.
- Borio, C. E. & Lowe, P. W. (2004). Securing sustainable price stability: should credit come back from the wilderness? BIS Working Paper (157)
- Borjas, G. J., Grogger, J., & Hanson, G. H. (2008). Imperfect substitution between immigrants and natives: a reappraisal: National Bureau of Economic Research.
- Borjas, G. J., & Ramey, V. A. (1995). Foreign competition, market power, and wage inequality. *The Quarterly Journal of Economics*, 110(4), 1075-1110.
- Bosello, F., De Cian, E., Eboli, F., & Parrado, R. (2009). Macro economic assessment of climate change impacts: a regional and sectoral perspective. *Impacts of Climate Change and Biodiversity Effects. Final report of the CLIBIO project, European Investment Bank, University Research Sponsorship Programme.*
- Bosello, F., Eboli, F., & Pierfederici, R. (2012). Assessing the Economic Impacts of Climate Change-An Updated CGE Point of View. FEEM Note di Lavoro, No. 2.2012.
- Bosello, F., Nicholls, R. J., Richards, J., Roson, R., & Tol, R. S. (2012). Economic impacts of climate change in Europe: sea-level rise. *Climatic Change*, 112(1), 63-81.
- Bosello, F., Roson, R., & Tol, R. S. (2007). Economy-wide estimates of the implications of climate change: Sea level rise. *Environmental and Resource Economics*, 37(3), 549-571.
- Bosetti, V., Carraro, C., Massetti, E., & Tavoni, M. (2008). International energy R&D spillovers and the economics of greenhouse gas atmospheric stabilization. *Energy Economics*, 30(6), 2912-2929.
- Braun, M., & Larrain, B. (2005). Finance and the business cycle: international, inter-industry evidence. *The Journal of Finance*, 60(3), 1097-1128.
- Braun, M., & Raddatz, C. (2007). Trade liberalization, capital account liberalization and the real effects of financial development. *Journal of International Money and Finance*, 26(5), 730-761.
- Braun, P. A., & Mitnik, S. (1993). Misspecifications in vector autoregressions and their effects on impulse responses and variance decompositions. *Journal of Econometrics*, 59(3), 319-341.
- Brealey, R. A., Myers, S. C., Allen, F., & Mohanty, P. (2012). *Principles of corporate finance*: Tata McGraw-Hill Education.
- Buch, C. M., & Kukulenz, A. (2004). Worker remittances and capital flows to developing countries. *ZEW-Centre for European Economic Research Discussion paper*(04-031).
- Buckle, R. A., Kim, K., Kirkham, H., McLellan, N., & Sharma, J. (2007). A structural VAR business cycle model for a volatile small open economy. *Economic Modelling*, 24(6), 990-1017.
- Bugamelli, M., & Paternò, F. (2005). *Do workers' remittances reduce the probability of current account reversals?* (Vol. 3766): World Bank Publications.
- Bugamelli, M., & Paternò, F. (2011). Output growth fluctuations and remittances. *Economica*, 78(311), 480-500.
- Bugarin, M. S., Ellery Jr, R., Gomes, V., & Teixeira, A. (2002). The Brazilian depression in the 1980s and 1990s. *Unpublished manuscript*.
- Bulíř, A., & Hamann, A. J. (2003). Aid fluctuations: an empirical assessment. *IMF Staff papers*, 50(1), 64-89.
- Bulíř, A., & Hamann, A. J. (2007). Fluctuations of development aid: an update. *IMF Economic Review*, 54(4), 727-739.

- Burke, M., Hsiang, S. M., & Miguel, E. (2015). Global non-linear effect of temperature on economic production. *Natur*, 527, 235-239
- Burns, A. F., & Mitchell, W. C. (1946). Measuring business cycles. *NBER Books*.
- Burnside, A. C., & Dollar, D. (1997). Aid, policies, and growth. *World Bank policy research working paper* (569252).
- Burnside, A. C., & Dollar, D. (2004). Aid, policies, and growth: revisiting the evidence. *World Bank policy research working paper* (3251).
- Burnside, C., & Dollar, D. (2000). Aid, growth, the incentive regime, and poverty reduction. *The World Bank: Structure and Policies*, 3, 210.
- Burnside, C., Eichenbaum, M., & Fisher, J. D. (2004). Fiscal shocks and their consequences. *Journal of Economic Theory*, 115(1), 89-117.
- Burris, M. W., & Pendyala, R. M. (2002). Discrete choice models of traveler participation in differential time of day pricing programs. *Transport Policy*, 9(3), 241-251.
- Bussolo, M., de Hoyos, R., Medvedev, D., & van der Mensbrugghe, D. (2008). Global climate change and its distributional impacts. *Washington, DC: World Bank*.
- Caballero, R., & Krishnamurthy, A. (2001a). A "vertical" analysis of crises and intervention: fear of floating and ex-ante problems: National Bureau of Economic Research.
- Caballero, R. J., & Krishnamurthy, A. (2001b). International and domestic collateral constraints in a model of emerging market crises. *Journal of Monetary Economics*, 48(3), 513-548.
- Caballero, R. J., & Krishnamurthy, A. (2004). Fiscal policy and financial depth: National Bureau of Economic Research.
- Caldara, D., & Herbst, E. (2015). *Monetary Policy, Credit Spreads, and Business Cycle Fluctuations*. mimeo, Board of Governors of the Federal Reserve System (US).
- Calderón, C., & Levy-Yeyati, E. (2007). Three degrees of vulnerability: External shocks in developing countries. *World Bank, Washington, DC*.
- Calderón, C., & Levy-Yeyati, E. L. (2009). Zooming in: From aggregate fluctuations to income distribution. *World Bank Policy Research Working Paper No. 4895*.
- Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72(1), 321-334.
- Calderon, C., Loayza, N., & Schmidt-Hebbel, K. (2004). *Openness, vulnerability, and growth*. Paper presented at the Eighth Annual Conference of the Central Bank of Chile on "External Financial Vulnerability and Preventive Policies", Santiago, Chile.
- Calderón, C., & Schmidt-Hebbel, K. (2008). Openness and growth fluctuations. *Documentos de Trabajo (Banco Central de Chile)*(483), 1.
- Cali, M., & Te Velde, D. W. (2011). Does aid for trade really improve trade performance? *World Development*, 39(5), 725-740.
- Callen, T., & Thimann, C. (1997). Empirical determinants of household saving: evidence from OECD countries, Working Paper of the International Monetary Fund.
- Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1993). Capital inflows and real exchange rate appreciation in Latin America: the role of external factors. *Staff Papers*, 40(1), 108-151.
- Calza, A., Gartner, C., & Sousa, J. (2003). Modelling the demand for loans to the private sector in the euro area. *Applied Economics*, 35(1), 107-117.
- Calza, A., Monacelli, T., & Stracca, L. (2007). Mortgage markets, collateral constraints, and monetary policy: do institutional factors matter? *Collateral Constraints, and*

- Monetary Policy: Do Institutional Factors Matter?*, CFS Working Paper Series, (Frankfurt: Center for Financial Studies).
- Campbell, J. Y., & Ammer, J. (1993). What moves the stock and bond markets? A variance decomposition for long-term asset returns. *The Journal of Finance*, 48(1), 3-37.
- Canova, F. (2005). The transmission of US shocks to Latin America. *Journal of Applied Econometrics*, 20(2), 229-251.
- Canova, F., & De Nicolo, G. (2002). Monetary disturbances matter for business fluctuations in the G-7. *Journal of Monetary Economics*, 49(6), 1131-1159.
- Carlstrom, C. T., & Fuerst, T. S. (1997). Agency costs, net worth, and business fluctuations: A computable general equilibrium analysis. *The American Economic Review*, 87(5), 893-910.
- Carroll, C. D. (1996). Buffer-stock saving and the life cycle/permanent income hypothesis: National Bureau of Economic Research.
- Carroll, C. D., Hall, R. E., & Zeldes, S. P. (1992). The buffer-stock theory of saving: Some macroeconomic evidence. *Brookings Papers on Economic Activity*, 1992(2), 61-156.
- Carroll, C. D., & Samwick, A. A. (1997). The nature of precautionary wealth. *Journal of Monetary Economics*, 40(1), 41-71.
- Carroll, C. D., & Samwick, A. A. (1998). How important is precautionary saving? *Review of Economics and Statistics*, 80(3), 410-419.
- Carroll, C. D., Slacalek, J., & Sommer, M. (2012). Dissecting saving dynamics: measuring wealth, precautionary and credit effects, IMF Working Paper 12/219.
- Carroll, C. D., & Weil, D. N. (1994). *Saving and growth: a reinterpretation*. Paper presented at the Carnegie-Rochester Conference Series on Public Policy.
- Carroll, S. J. (1994). *Women as candidates in American politics*: Indiana University Press.
- Cass, D., & Shell, K. (1983). Do sunspots matter? *The Journal of Political Economy*, 91(2), 193-227.
- Cavallo, E., & Pedemonte, M. (2016). The Relationship between National Saving and Investment in Latin America and the Caribbean. *Economía*, 16(2), 29-53.
- Cavallo, E. A. (2006). Trade, Gravity and Sudden Stops: On How Commercial Trade can increase the stability of capital flows. *Research Department Working Paper 588*. Washington, DC, United States: Inter-American Development Bank
- Cavallo, E. A., & Frankel, J. A. (2008). Does openness to trade make countries more vulnerable to sudden stops, or less? Using gravity to establish causality. *Journal of International Money and Finance*, 27(8), 1430-1452.
- Cecchetti, S. G., & Kharroubi, E. (2012). Reassessing the impact of finance on growth. *BIS Working Papers*, no 352.
- Calderón, C., & Levy-Yeyati, E. L. (2009). Zooming in: from aggregate fluctuations to income distribution. *Policy Research Working Paper 4895*
- Chami, R., Cosimano, T. F., & Fullenkamp, C. (1999). The stock market channel of monetary policy. *International Monetary Fund*, Working Paper.
- Chami, R., Hakura, D., & Montiel, P. J. (2009). Remittances: an automatic output stabilizer? *IMF Working Papers*, 1-31.
- Charlton, A., & Stiglitz, J. E. (2008). Capital market liberalization and poverty. *Capital Market Liberalization and Development*, pp. 121–138. Oxford: Oxford University Press.
- Chatterjee, S. (2000). From cycles to shocks: Progress in business cycle theory. *Business Review*, 3, 27-37.

- Chauvet, L., & Guillaumont, P. (2009). Aid, fluctuations, and growth again: When aid fluctuations matters and when it does not. *Review of Development Economics*, 13(3), 452-463.
- Chen, S. S., Donoho, D. L., & Saunders, M. A. (2001). Atomic decomposition by basis pursuit. *SIAM Review*, 43(1), 129-159.
- Chenery, H. B., & Strout, A. M. (1966). Foreign assistance and economic development. *The American Economic Review*, 56(4), 679-733.
- Chew, M. (2001). Reform of Financial Services: The Effect on the Regulator. *Sing. J. Int'l & Comp. L.*, 5, 569.
- Christensen, P. W., Doucouliagos, H., & Paldam, M. (2007). Master list of the AAL: the aid allocation literature. *Economics*, 35, 1351-1356.
- Christiano, L. J., & Eichenbaum, M. (1992). Current real-business-cycle theories and aggregate labor-market fluctuations. *The American Economic Review*, 430-450.
- Christiano, L. J., Eichenbaum, M., & Evans, C. L. (1999). Monetary policy shocks: What have we learned and to what end? *Handbook of Macroeconomics*, 1, 65-148.
- Christiano, L. J., Eichenbaum, M., & Vigfusson, R. (2004). The response of hours to a technology shock: evidence based on direct measures of technology. *Journal of the European Economic Association*, 2(2-3), 381-395.
- Christiano, L. J., & Fitzgerald, T. J. (2003). The band pass filter. *International Economic Review*, 44(2), 435-465.
- Ciftcioglu, S., & Begovic, N. (2010). Are domestic savings and economic growth correlated? Evidence from a sample of Central and East European countries: *Problems and Perspectives in Management*, 8(3), 30-35.
- Ciscar, J.-C., Feyen, L., Soria, A., Lavalle, C., Raes, F., Perry, M., . . . Dosio, A. (2014). Climate impacts in Europe-The JRC PESETA II project. European Commission Joint Research Centre: Seville, Spain, 2014.
- Claessens, S., Kose, M. A., & Terrones, M. E. (2010). *Financial cycles: what? how? when?* Paper presented at the NBER International Seminar on Macroeconomics 2010.
- Claessens, S., Kose, M. A., & Terrones, M. E. (2012). How do business and financial cycles interact? *Journal of International Economics*, 87(1), 178-190.
- Clarida, R., Gali, J., & Gertler, M. (1998). Monetary policy rules and macroeconomic stability: evidence and some theory: National Bureau of Economic Research.
- Clarida, R., Gali, J., & Gertler, M. (1999). The science of monetary policy: a new Keynesian perspective: National Bureau of Economic Research.
- Cochrane, J. H. (1994). *Shocks*. Paper presented at the Carnegie-Rochester Conference series on public policy.
- Cogley, T., & Sargent, T. J. (2005). Drifts and volatilities: monetary policies and outcomes in the post WWII US. *Review of Economic Dynamics*, 8(2), 262-302.
- Coibion, O. (2011). On the contribution of monetary policy to economic fluctuations. VOX, CEPR's policy portal.
- Collier, P., & Hoeffler, A. (2007). Unintended Consequences: Does Aid Promote Arms Races?*. *Oxford Bulletin of Economics and Statistics*, 69(1), 1-27.
- Collins, S. M. (1991). Saving behavior in ten developing countries *National saving and economic performance* (pp. 349-376): University of Chicago Press.
- Combes, J.-L., & Ebeke, C. (2011). Remittances and household consumption instability in developing countries. *World Development*, 39(7), 1076-1089.

- Cooper, D. R., & Schindler, P. S. (2006). Sampling Design. In *Business Research Methods*. 8th Edition, McGraw-Hill Irwin, 2006, p. 147.
- Cooper, D. R., Schindler, P. S., & Sun, J. (2003). *Business Research Methods. McGraw Hill International Edition, Statistics and Probability series* ISBN 0071181091, pp. 798 + CD-ROM
- Corsetti, G., Pesenti, P., & Roubini, N. (1998). What caused the Asian currency and financial crisis? Part I: A macroeconomic overview: National Bureau of Economic Research.
- Cottarelli, C., & Kourelis, A. (1994). Financial structure, bank lending rates, and the transmission mechanism of monetary policy. *Staff Papers*, 41(4), 587-623.
- Craigwell, R., Jackman, M., & Moore, W. (2010). Economic fluctuations and remittances. *International Journal of Development Issues*, 9(1), 25-42.
- Cuaresma, J. C., Fidrmuc, J., & Hake, M. (2011). Determinants of Foreign currency Loans in ceSee countries: a meta-analysis. *Focus on European Economic Integration*, 4, 69-87.
- Curriero, F. C., Heiner, K. S., Samet, J. M., Zeger, S. L., Strug, L., & Patz, J. A. (2002). Temperature and mortality in 11 cities of the eastern United States. *American journal of epidemiology*, 155(1), 80-87.
- Cynamon, B. Z., & Fazzari, S. M. (2008). Household debt in the consumer age: source of growth--risk of collapse. *Capitalism and Society*, 3(2).
- da Silva, G. F. (2002). The impact of financial system development on business cycles fluctuations: cross-country evidence. *Journal of Macroeconomics*, 24(2), 233-253.
- Dabla-Norris, E., Minoiu, C., & Zanna, L.-F. (2015). Business cycle fluctuations, large macroeconomic shocks, and development aid. *World Development*, 69, 44-61.
- Dabla-Norris, M. E., Minoiu, C., & Zanna, L.-F. (2010). *Business cycle fluctuations, large shocks, and development aid: New evidence*: International Monetary Fund.
- Dafe, F. (2016). 1 A financial sector to support development in low-income countries1. *Achieving Financial Stability and Growth in Africa*, 1.
- Dang, H.-A., Knack, S., & Rogers, F. H. (2009). International aid and financial crises in donor countries. *World Bank Policy Research Working Paper Series, Vol 4847*.
- Danthine, J. P., & Donaldson, J. B. (1993). Methodological and empirical issues in real business cycle theory. *European Economic Review*, 37(1), 1-35.
- Darrat*, A. F., Abosedra, S. S., & Aly, H. Y. (2005). Assessing the role of financial deepening in business cycles: the experience of the United Arab Emirates. *Applied Financial Economics*, 15(7), 447-453.
- Das, D. K., & Dutta, C. B. (2012). Global financial crisis and foreign development assistance shocks in least developing countries. *J Econ Dev* 38(2):1-41
- David, A. C. (2010). How do international financial flows to developing countries respond to natural disasters? *IMF Working Papers*, 1-34.
- De Bondt, G., Mojon, B., & Valla, N. (2005). Term structure and the sluggishness of retail bank interest rates in euro area countries. *ECB Working Paper No. 518*.
- De Haan, J., Inklaar, R., & Jong-A-Pin, R. (2008). Will business cycles in the euro area converge? A critical survey of empirical research. *Journal of Economic Surveys*, 22(2), 234-273.
- De la Briere, B., Sadoulet, E., De Janvry, A., & Lambert, S. (2002). The roles of destination, gender, and household composition in explaining remittances: an analysis for the Dominican Sierra. *Journal of Development Economics*, 68(2), 309-328.
- De Mello, L., Kongsrud, P. M., & Price, R. W. (2004). Saving behaviour and the effectiveness of fiscal policy. *OECD Economics Department Working Papers*, No. 397.

- De, S., Islamaj, E., Kose, M. A., & Yousefi, S. R. (2016). Remittances over the business cycle: theory and evidence. *CAMA Working Paper No. 13*.
- Deaton, A. (1989). Saving in developing countries: Theory and review. *The World Bank Economic Review*, 3(suppl 1), 61-96.
- Deaton, A. (1999). Commodity prices and growth in Africa. *The Journal of Economic Perspectives*, 13(3), 23-40.
- Deaton, A., & Paxson, C. (2000). Growth and saving among individuals and households. *Review of Economics and Statistics*, 82(2), 212-225.
- Del Negro, M. (2001). Turn, turn, turn: Predicting turning points in economic activity. *Economic Review-Federal Reserve Bank of Atlanta*, 86(2), 1.
- Del Negro, M., & Schorfheide, F. (2003). Take your model bowling: forecasting with general equilibrium models. *Economic Review-Federal Reserve Bank of Atlanta*, 88(4), 35.
- Dell'Ariccia, G., Igan, D., & Laeven, L. (2009). Credit booms and lending standards: Evidence from the subprime mortgage market. *IMF working paper*, WP/08/106.
- Dell, M., Jones, B. F., & Olken, B. A. (2008). Climate change and economic growth: evidence from the last half century: National Bureau of Economic Research.
- Dell, M., Jones, B. F., & Olken, B. A. (2009). Temperature and income: reconciling new cross-sectional and panel estimates: National Bureau of Economic Research.
- Dell, M., Jones, B. F., & Olken, B. A. (2012). Temperature shocks and economic growth: Evidence from the last half century. *American Economic Journal: Macroeconomics*, 4(3), 66-95.
- Dell, M., Jones, B. F., & Olken, B. A. (2013). What do we learn from the weather? The new climate-economy literature: National Bureau of Economic Research.
- Dell, M., Jones, B. F., & Olken, B. A. (2014). What do we learn from the weather? The new climate-economy literature. *Journal of Economic Literature*, 52(3), 740-798.
- Demirgüç-Kunt, A., & Levine, R. (2008). Finance, financial sector policies, and long-run growth. *Policy Research Working Paper 4469* (Washington, World Bank).
- Denizer, C. A., Iyigun, M. F., & Owen, A. (2002). Finance and macroeconomic fluctuations. *Contributions in Macroeconomics*, 2(1).
- Dennis, R. (2008). *Cities in Modernity: Representations and Productions of Metropolitan Space, 1840-1930* (Vol. 40): Cambridge University Press.
- Desai, R. M., & Kharas, H. (2008). The California Consensus: can private aid end global poverty? *Survival*, 50(4), 155-168.
- Deschenes, O., & Greenstone, M. (2007). The economic impacts of climate change: evidence from agricultural output and random fluctuations in weather. *The American Economic Review*, 97(1), 354-385.
- Deschenes, O., & Moretti, E. (2007). Extreme Weather Events. *Mortality and Migration. NBER Working Paper*, 14132.
- Devereux, M. B., Gregory, A. W., & Smith, G. W. (1992). Realistic cross-country consumption correlations in a two-country, equilibrium, business cycle model. *Journal of International Money and Finance*, 11(1), 3-16.
- Diebold, F. X., & Kilian, L. (2000). Unit-root tests are useful for selecting forecasting models. *Journal of Business & Economic Statistics*, 18(3), 265-273.
- Dimanche, K. S. (2010). *Foreign Aid and Economic Growth*. Florida Atlantic University.
- Dixit, A. K., & Stiglitz, J. E. (1977). Monopolistic competition and optimum product diversity. *The American Economic Review*, 67(3), 297-308.

- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. *Economic development and cultural change*, 40(3), 523-544.
- Dollar, D., & Kraay, A. (2003). Institutions, trade, and growth. *Journal of Monetary Economics*, 50(1), 133-162.
- Dollar, D., & Levin, V. (2006). The increasing selectivity of foreign aid, 1984–2003. *World development*, 34(12), 2034-2046.
- Dornbusch, R. (1979). Monetary policy under exchange rate flexibility: National Bureau of Economic Research Cambridge, Mass., USA.
- Du Plessis, S. (2006). Reconsidering the business cycle and stabilisation policies in South Africa. *Economic Modelling*, 23(5), 761-774.
- Dungey, M., & Fry, R. (2009). The identification of fiscal and monetary policy in a structural VAR. *Economic Modelling*, 26(6), 1147-1160.
- Durbarry, R., Gemmell, N., & Greenaway, D. (1998). *New evidence on the impact of foreign aid on economic growth*: Centre for Research in Economic Development and International Trade, University of Nottingham Nottingham.
- Durdu, C. B., Mendoza, E. G., & Terrones, M. E. (2009). Precautionary demand for foreign assets in Sudden Stop economies: An assessment of the New Mercantilism. *Journal of Development Economics*, 89(2), 194-209.
- Durdu, C. B., & Sayan, S. (2010). Emerging market business cycles with remittance fluctuations. *IMF Staff papers*, 57(2), 303-325.
- Easterly, W. (2002). How did heavily indebted poor countries become heavily indebted? Reviewing two decades of debt relief. *World development*, 30(10), 1677-1696.
- Easterly, W. (2003). Can foreign aid buy growth? *The Journal of Economic Perspectives*, 17(3), 23-48.
- Easterly, W. (2005). National policies and economic growth: a reappraisal. *Handbook of Economic Growth*, 1, 1015-1059.
- Easterly, W., Islam, R., & Stiglitz, J. (2000). *Shaken and stirred*. Paper presented at the Explaining Growth Fluctuations, presented at the ABCDE Conference, World Bank.
- Easterly, W., Islam, R., & Stiglitz, J. E. (2001). *Shaken and stirred: explaining growth fluctuations*. Paper presented at the Annual World Bank conference on development economics.
- Easterly, W., & Kraay, A. (2000). Small states, small problems? Income, growth, and fluctuations in small states. *World development*, 28(11), 2013-2027.
- Eboli, F., Parrado, R., & Roson, R. (2010). Climate-change feedback on economic growth: explorations with a dynamic general equilibrium model. *Environment and Development Economics*, 15(5), 515-533.
- Edelberg, W., Eichenbaum, M., & Fisher, J. D. (1999). Understanding the effects of a shock to government purchases. *Review of Economic Dynamics*, 2(1), 166-206.
- Edelstein, P., & Kilian, L. (2009). How sensitive are consumer expenditures to retail energy prices? *Journal of Monetary Economics*, 56(6), 766-779.
- Edwards, P., Ferner, A., & Sisson, K. (1996). The conditions for international human resource management: two case studies. *International Journal of Human Resource Management*, 7(1), 20-40.
- Edwards, S. (1996). Why are Latin America's savings rates so low? An international comparative analysis. *Journal of Development Economics*, 51(1), 5-44.

- Edwards, S. (1998). The Chilean pension reform: A pioneering program *Privatizing social security* (pp. 33-62): University of Chicago Press.
- Eichengreen, B. J. (1992). *Should the Maastricht Treaty be saved?* : International Finance Section, Department of Economics, Princeton University Princeton.
- Ekanayake, E., & Chatrna, D. (2010). The effect of foreign aid on economic growth in developing countries. *Journal of International Business and Cultural Studies*, 3, 1.
- El-Sakka, M. I., & McNabb, R. (1999). The macroeconomic determinants of emigrant remittances. *World development*, 27(8), 1493-1502.
- El Hamid, H. A. (2013). Foreign aid and economic growth in Egypt: A cointegration analysis. *International Journal of Economics and Financial Issues*, 3(3), 743.
- Elbadawi, I., Schmidt-Hebbel, K., Soto, R., & Vergara, R. (2011). *Why do countries have fiscal rules?* Paper presented at the manuscript presented at the Conference on Economic Policy in Emerging Countries, in Honor of Vittorio Corbo.
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 251-276.
- Erdemgil, F., Şanlı, S., Şanlı, N., Özkan, G., Barbosa, J., Guiteras, J., & Beltran, J. (2007). Determination of pK a values of some hydroxylated benzoic acids in methanol–water binary mixtures by LC methodology and potentiometry. *Talanta*, 72(2), 489-496.
- Estrada, G. B., Park, D., & Ramayandi, A. (2010). Financial development and economic growth in developing Asia. *Asian Development Bank Economics Working Paper* (233).
- Evans, C. L. (1992). Productivity shocks and real business cycles. *Journal of Monetary Economics*, 29(2), 191-208.
- Evans, J. S. B., & Over, D. E. (2013). *Rationality and reasoning*: Psychology Press.
- Faini, R. (1994). Workers remittances and the real exchange rate. *Journal of Population Economics*, 7(2), 235-245.
- Farmer, R. E., & Woodford, M. (1997). Self-fulfilling prophecies and the business cycle. *Macroeconomic Dynamics*, 1, 740-740.
- Fase, M. M. (1995). The demand for commercial bank loans and the lending rate. *European Economic Review*, 39(1), 99-115.
- Fatás, A., & Mihov, I. (2006). The macroeconomic effects of fiscal rules in the US states. *Journal of Public Economics*, 90(1), 101-117.
- Fatima, F. (2014). Foreign Aid and Economic Growth. *Available at SSRN 2407348*.
- Feldstein, M., & Bacchetta, P. (1991). National saving and international investment *National saving and economic performance* (pp. 201-226): University of Chicago press.
- Field, C. D. (1995). *Impact of expected climate change on mangroves*. Paper presented at the Asia-Pacific Symposium on Mangrove Ecosystems.
- Finn, M. G. (2000). Perfect competition and the effects of energy price increases on economic activity. *Journal of Money, Credit and banking*, 32(3), 400-416.
- Fiorito, R., & Kollintzas, T. (1994). Stylized facts of business cycles in the G7 from a real business cycles perspective. *European Economic Review*, 38(2), 235-269.
- Fischer, S. (1977). Long-term contracts, rational expectations, and the optimal money supply rule. *The Journal of Political Economy*, 85(1), 191-205.
- Fisher, I. (1933). The debt-deflation theory of great depressions. *Econometrica: Journal of the Econometric Society*, 1(4), 337-357.
- Fisher, J. D. (2006). The dynamic effects of neutral and investment-specific technology shocks. *Journal of Political Economy*, 114(3), 413-451.

- Flug, K., Kasir-Kaliner, N., & Ribon, S. (2000). Unemployment and Education in Israel: the Business Cycle, Structural Change, and Technological Advances, 1986–1998. *Economic Quarterly*, 3, 374-416.
- Foster, J. (1995). The relationship between remittances and savings in small Pacific island states: some econometric evidence. *Asian and Pacific Migration Journal*, 4(1), 117-138.
- Fourie, L., Botha, I., & Mears, R. (2011). Credit extension in South Africa: A business cycle perspective for the period 1985 to 2009. *African Journal of Business Management*, 5(34), 13074.
- Frankel, J. (2011). Are bilateral remittances countercyclical? *Open Economies Review*, 22(1), 1-16.
- Frankel, J. A., & Romer, D. (1999). Does trade cause growth? *American Economic Review*, 89(3), 379-399.
- Frankel, J. A., & Rose, A. K. (1998). The endogeneity of the optimum currency area criteria. *The Economic Journal*, 108(449), 1009-1025.
- Freund, C. L., & Spatafora, N. (2005). Remittances: transaction costs, determinants, and informal flows. *World Bank Policy Research Working Paper* (3704).
- Friedman, M., & Schwartz, A. J. (1975). Money and business cycles. *The State of Monetary Economics* (pp. 32-78): NBER.
- Friedman, M., & Schwartz, A. J. (2008). *A monetary history of the United States, 1867-1960*: Princeton University Press.
- Fuhrer, J. C. (1998). An Optimising Model for Monetary Policy Analysis: Can Habit Formation Help? : Federal Reserve Bank of Boston.
- Fuhrer, J. C., & Schuh, S. (2001). Beyond Shocks: What Causes Business Cycles? An Overview. *Handbook of Monetary Policy*, 1.
- Fulginiti, L. E., & Perrin, R. K. (1997). LDC agriculture: Nonparametric Malmquist productivity indexes. *Journal of Development Economics*, 53(2), 373-390.
- Gabaix, X. (2011). The granular origins of aggregate fluctuations. *Econometrica*, 79(3), 733-772.
- Gali, J. (1996). Technology, employment, and the business cycle: Do technology shocks explain aggregate fluctuations: National Bureau of Economic Research.
- Galí, J. (2002). New perspectives on monetary policy, inflation, and the business cycle: National Bureau of Economic Research.
- Galí, J. (2015). *Monetary policy, inflation, and the business cycle: an introduction to the new Keynesian framework and its applications*: Princeton University Press.
- Gali, J., López-Salido, J. D., & Vallés, J. (2003). Technology shocks and monetary policy: assessing the Fed's performance. *Journal of Monetary Economics*, 50(4), 723-743.
- Gali, J., & Monacelli, T. (2005). Monetary policy and exchange rate fluctuations in a small open economy. *The Review of Economic Studies*, 72(3), 707-734.
- Galí, J., & Rabanal, P. (2005). Technology Shocks and Aggregate Fluctuations: How Well Does the Real Business Cycle Model Fit Postwar US Data? *NBER Macroeconomics Annual 2004, Volume 19* (pp. 225-318): MIT Press.
- Gang, I. N., & Khan, H. A. (1990). Foreign aid, taxes, and public investment. *Journal of Development Economics*, 34(1), 355-369.
- Garnaut, R. (2011). *The Garnaut review 2011: Australia in the global response to climate change*: Cambridge University Press.

- Gatti, D. D., Di Guilmi, C., Gaffeo, E., Giulioni, G., Gallegati, M., & Palestrini, A. (2005). A new approach to business fluctuations: heterogeneous interacting agents, scaling laws and financial fragility. *Journal of Economic Behavior & Organization*, 56(4), 489-512.
- Gavin, M., Hausmann, R., Perotti, R., & Talvi, E. (1996). Managing fiscal policy in Latin America and the Caribbean: Fluctuations, procyclicality, and limited creditworthiness. Inter-American Development Bank.
- Genberg, H., McCauley, R. N., Persaud, A., & Park, Y. C. (2005). *Official reserves and currency management in Asia: myth, reality and the future*: International Center for Monetary and Banking Studies Geneva.
- Georgellis, Y., & Oluitan, R. (2009). *Bank Credit and Economic Growth: The Nigerian Experience*. Paper presented at the Centre for the Study of African Economy (CSAE) Conference, Oxford University, UK.
- Gertler, M. (1988). Financial structure and aggregate economic activity: an overview: National Bureau of Economic Research Cambridge, Mass., USA.
- Gertler, M., & Kiyotaki, N. (2010). Financial intermediation and credit policy in business cycle analysis. *Handbook of Monetary Economics*, 3(3), 547-599.
- Geske, R., & Roll, R. (1983). The fiscal and monetary linkage between stock returns and inflation. *The Journal of Finance*, 38(1), 1-33.
- Ghosh, A., & Phillips, S. (1998). Warning: Inflation may be harmful to your growth. *Staff Papers*, 45(4), 672-710.
- Gilchrist, S., & Zakrajšek, E. (2011). Monetary policy and credit supply shocks. *IMF Economic Review*, 59(2), 195-232.
- Gilchrist, S., & Zakrajšek, E. (2012). Credit spreads and business cycle fluctuations. *The American Economic Review*, 102(4), 1692-1720.
- Giovanni, J. d., & Levchenko, A. A. (2009). Trade openness and fluctuations. *The Review of Economics and Statistics*, 91(3), 558-585.
- Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1), 144-152.
- Glennie, J. (2011). The role of aid to middle-income countries: a contribution to evolving EU development policy. London: Overseas Development Institute.
- Glick, R., & Rogoff, K. (1995). Global versus country-specific productivity shocks and the current account. *Journal of Monetary Economics*, 35(1), 159-192.
- Goldstein, M. (1998). *The Asian financial crisis: Causes, cures, and systemic implications* (Vol. 55): Peterson Institute.
- Gomanee, K., Girma, S., & Morrissey, O. (2005). Aid and Growth in Sub-Saharan Africa. *Journal of International Development*, 17(8), 1055-1105.
- Gomanee, K., Morrissey, O., Mosley, P., & Verschoor, A. (2005). Aid, government expenditure, and aggregate welfare. *World Development*, 33(3), 355-370.
- Goodhart, C., & Hofmann, B. (2008). House prices, money, credit, and the macroeconomy. *Oxford Review of Economic Policy*, 24(1), 180-205.
- Gordon, R. J. (1984). Supply shocks and monetary policy revisited: National Bureau of Economic Research Cambridge, Mass., USA.
- Gradzka, E., & Roache, S. K. (2007). *Do Remittances to Latin America Depend on the US Business Cycle?*: International Monetary Fund.
- Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica: Journal of the Econometric Society*, 424-438.

- Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of Econometrics*, 39(1), 199-211.
- Granger, C. W., & Terasvirta, T. (1993). Modelling non-linear economic relationships. *OUP Catalogue*.
- Greenwald, B., & Stiglitz, J. E. (1991). Towards a reformulation of monetary theory: competitive banking. *Economic and Social Review*, 23(1), 1.
- Greenwood, J., Hercowitz, Z., & Krusell, P. (1997). Long-run implications of investment-specific technological change. *The American Economic Review*, 87, 342-362.
- Greenwood, J., Hercowitz, Z., & Krusell, P. (2000). The role of investment-specific technological change in the business cycle. *European Economic Review*, 44(1), 91-115.
- Greenwood, J., Sanchez, J. M., & Wang, C. (2013). Quantifying the impact of financial development on economic development. *Review of Economic Dynamics*, 16(1), 194-215.
- Gualdi, S., Somot, S., Li, L., Artale, V., Adani, M., Bellucci, A., . . . Dell'Aquila, A. (2013). The CIRCE simulations: Regional climate change projections with realistic representation of the Mediterranean Sea. *Bulletin of the American Meteorological Society*, 94(1), 65-81.
- Gupta, K. L., & Islam, M. A. (1983). Foreign Capital, Savings and Growth: Some Descriptive Indicators. In *Foreign Capital, Savings and Growth* (pp. 4-20). Springer Netherlands.
- Gupta, P. (2005). Macroeconomic determinants of remittances: evidence from India (No. 2005-2224). International Monetary Fund.
- Gupta, S., Clements, B., & Tiongson, E. R. (2004). Foreign aid and consumption smoothing: evidence from global food aid. *Review of Development Economics*, 8(3), 379-390.
- Gupta, S., Pattillo, C. A., & Wagh, S. (2009). Effect of remittances on poverty and financial development in Sub-Saharan Africa. *World development*, 37(1), 104-115.
- Haag, G., Mueller, U., & Troitzsch, K. G. (2012). *Economic evolution and demographic change: formal models in social sciences* (Vol. 395): Springer Science & Business Media.
- Haberler, G. (1946). *Prosperity and depression* (Vol. 24): Transaction Publishers.
- Hafer, R. W., & Sheehan, R. G. (1989). The sensitivity of VAR forecasts to alternative lag structures. *International Journal of Forecasting*, 5(3), 399-408.
- Haider, A., ud Din, M., & Ghani, E. (2012). Monetary policy, informality and business cycle fluctuations in a developing economy vulnerable to external shocks. *The Pakistan Development Review*, 51(4), pp. 609-681.
- Hall, R. E. (1980). *Labor supply and aggregate fluctuations*. Paper presented at the Carnegie-Rochester Conference Series on Public Policy.
- Hallet, M. (2009). Economic cycles and development aid: What is the evidence from the past. *ECFIN Economic Brief*, 5.
- Hamilton, J. D. (1994). *Time series analysis* (Vol. 2): Princeton university press Princeton.
- Hamilton, J. D. (2005). What's real about the business cycle? : National Bureau of Economic Research.
- Hannan, E. J., & Quinn, B. G. (1979). The determination of the order of an autoregression. *Journal of the Royal Statistical Society. Series B (Methodological)*, 41(2), 190-195.
- Hansen, H., & Johansen, S. (1999). Some tests for parameter constancy in cointegrated VAR-models. *The Econometrics Journal*, 2(2), 306-333.

- Hansen, H., & Tarp, F. (2001). Aid and growth regressions. *Journal of Development Economics*, 64(2), 547-570.
- Harvey, A. C., & Jaeger, A. (1993). Detrending, stylized facts and the business cycle. *Journal of Applied Econometrics*, 8(3), 231-247.
- Hasan, I., & Marton, K. (2003). Development and efficiency of the banking sector in a transitional economy: Hungarian experience. *Journal of Banking & Finance*, 27(12), 2249-2271.
- Hawtrey, R. G. (1919). *Currency and credit*: London, Longmans.
- Hayek, F. A. (1999). Good Money. Part I: The New World (The Collected Works of FA Hayek, vol. 5), ed. Stephen Kresge: Chicago: University of Chicago Press, and London: Routledge.
- Hayek, F. A., & White, L. H. (2007). *The pure theory of capital* (Vol. 12): University of Chicago Press.
- Herzer, D., & Morrissey, O. (2009). *The long-run effect of aid on domestic output*: University of Nottingham. Centre for research in economic development and international trade (CREDIT).
- Hnatkovska, V., & Loayza, N. (2004). *Fluctuations and growth* (Vol. 3184): World Bank.
- Hodrick, R. J., & Prescott, E. C. (1997). Postwar US business cycles: an empirical investigation. *Journal of Money, Credit, and Banking*, 29(1), 1-16.
- Hoffmaister, A. W., Roldós, J. E., & Wickham, P. (1998). Macroeconomic fluctuations in sub-Saharan Africa. *Staff Papers*, 45(1), 132-160.
- Holdridge, L. R., & Grenke, W. C. (1971). Forest environments in tropical life zones: a pilot study. *Forest environments in tropical life zones: a pilot study*. Pergamon press, New York, p. 74.
- Hsiang, S. M., & Burke, M. (2014). Climate, conflict, and social stability: what does the evidence say? *Climatic Change*, 123(1), 39-55.
- Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the influence of climate on human conflict. *Science*, 341(6151), 1235367.
- Hubbard, R. G. (1997). Capital-market imperfections and investment: National Bureau of Economic Research.
- Huff, W. (1999). Singapore's economic development: four lessons and some doubts. *Oxford Development Studies*, 27(1), 33-55.
- Huff, W. G. (1995). What is the Singapore model of economic development? *Cambridge Journal of Economics*, 19(6), 735-759.
- Huffman, W. E., & Lothian, J. R. (1984). The gold standard and the transmission of business cycles, 1833-1932 *A Retrospective on the Classical Gold Standard, 1821-1931* (pp. 455-512): University of Chicago Press.
- Huizinga, H., & Zhu, D. (2006). Financial Structure and Macroeconomic Fluctuations: Theory and Evidence. CEPR Working Paper, No.5697, 2006.
- Huntington, E. (1915). *Climate and civilization*: Harper & Bros.
- Iacoviello, M. (2005). House prices, borrowing constraints, and monetary policy in the business cycle. *American Economic Review*, 95(3), 739-764.
- Ibrahim, M. (2003). Macroeconomic forces and capital market integration A VAR analysis for Malaysia. *Journal of the Asia Pacific Economy*, 8(1), 19-40.
- Ibrahim, M. H. (2006). Stock prices and bank loan dynamics in a developing country: The case of Malaysia. *Journal of Applied Economics*, 9(1), 71.

- Ifrim, M. (2011). Some Monetarist Reflections On Business Cycles. *Analele Stiintifice ale Universitatii "Alexandru Ioan Cuza" din Iasi-Stiinte Economice*, 58, 433-440.
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53-74.
- Imbs, J. (2004). Trade, finance, specialization, and synchronization. *Review of Economics and Statistics*, 86(3), 723-734.
- Imbs, J. (2006). The real effects of financial integration. *Journal of international Economics*, 68(2), 296-324.
- IPCC (2014). *Climate Change 2014—Impacts, Adaptation and Vulnerability: Regional Aspects*: Cambridge University Press.
- IPCC (2014). Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. *Cambridge University Press, Cambridge, UK and New York, NY*.
- Ireland, P. N. (2004). Technology shocks in the new Keynesian model. *Review of Economics and Statistics*, 86(4), 923-936.
- Irfan, M. (2011). Remittances and poverty linkages in Pakistan: Evidence and some suggestions for further analysis. *Working Papers & Research Reports*, 2011.
- Irwin, D. A., & Terviö, M. (2002). Does trade raise income?: Evidence from the twentieth century. *Journal of International Economics*, 58(1), 1-18.
- Isaksson, A. (2001). Financial liberalisation, foreign aid, and capital mobility: evidence from 90 developing countries. *Journal of International Financial Markets, Institutions and Money*, 11(3), 309-338.
- Isard, P. (2006). *The macroeconomic management of foreign aid: opportunities and pitfalls*: International Monetary Fund.
- Islam, F., Shahbaz, M., Ahmed, A. U., & Alam, M. M. (2013). Financial development and energy consumption nexus in Malaysia: a multivariate time series analysis. *Economic Modelling*, 30, 435-441.
- Jacob, D., Bärring, L., Christensen, O. B., Christensen, J. H., de Castro, M., Deque, M., . . . Jones, R. (2007). An inter-comparison of regional climate models for Europe: model performance in present-day climate. *Climatic Change*, 81(1), 31-52.
- Jahn, M. (2013). Economics of extreme weather events in cities: Terminology and regional impact models: HWWI Research Paper.
- Jansen, D. W., Vacaflares, D. E., & Naufal, G. S. (2012). The macroeconomic consequences of remittances. *ISRN Economics*, 2012.
- Jarque, C. M., & Bera, A. K. (1980). Efficient tests for normality, homoscedasticity and serial independence of regression residuals. *Economics Letters*, 6(3), 255-259.
- Jaumotte, F., & Spatafora, N. (2007). Asia rising: a sectoral perspective. *IMF Working Papers*, 1-46.
- Johansen, S. (1995). *Likelihood-based inference in cointegrated vector autoregressive models*: Oxford University Press on Demand.
- Jongwanich, J., & Kohpaiboon, A. (2008). Private investment: Trends and determinants in Thailand. *World development*, 36(10), 1709-1724.
- Jurado, K., Ludvigson, S. C., & Ng, S. (2015). Measuring uncertainty. *The American Economic Review*, 105(3), 1177-1216.
- Kaldor, N. (1961). Capital accumulation and economic growth *The theory of capital* (pp. 177-222): Springer.

- Kaldor, N. (1976). Inflation and recession in the world economy. *The Economic Journal*, 86(344), 703-714.
- Kalemli-Ozcan, S., Sørensen, B. E., & Yosha, O. (2001). Economic integration, industrial specialization, and the asymmetry of macroeconomic fluctuations. *Journal of International Economics*, 55(1), 107-137.
- Kamin, S. B. (1999). The current international financial crisis:: how much is new? *Journal of International Money and Finance*, 18(4), 501-514.
- Kaminsky, G., & Reinhart, C. (1996). Banking and Balance of Payments Crises: Models and Evidence. *Board of Governors of the Federal Reserve Working Paper (Washington: Board of Governor of the Federal Reserve)*.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90(1), 1-44.
- Karras, G. (2006). Foreign aid and long-run economic growth: empirical evidence for a panel of developing countries. *Journal of International Development*, 18(1), 15-28.
- Kashyap, A. K., & Stein, J. C. (1995). *The impact of monetary policy on bank balance sheets*. Paper presented at the Carnegie-Rochester Conference Series on Public Policy.
- Kaufman, G. G. (2003). A proposal for efficiently resolving out-of-the-money swap positions at large insolvent banks. Working paper, Loyola University.
- Kaya, H. (2010). Saving Investment Association in Turkey. Topics in Middle Eastern and North African Economics, *MEEA Online Journal*, 12, Retrived from <http://www.luc.edu/orgs/meea/>
- Keynes, J. M. (1930). A treatise on money: An Irish Quarterly Review, 19(76), 687-690.
- Keynes, J. M. (1936). The general theory of interest, employment and money: London: Macmillan.
- Khaldun, I. (1982). al Muqaddimah. *Penerjemah Ahmadie Thoha, (Jakarta: Pustaka Firdaus, 2000)*.
- Khan, M. A., & Ahmed, A. (2007). Foreign aid—Blessing or curse: Evidence from Pakistan. *The Pakistan Development Review*, 46(3), 215-240.
- Khan, M. S., & Ssnhadji, A. S. (2001). Threshold effects in the relationship between inflation and growth. *IMF Staff papers*, 48(1), 1-21.
- Khan, M. S., & Senhadji, A. S. (2003). Financial development and economic growth: A review and new evidence. *Journal of African Economies*, 12(suppl 2), ii89-ii110.
- Khomo, M. M., & Aziakpono, M. J. (2007). Forecasting recession in South Africa: a comparison of the yield curve and other economic indicators. *South African Journal of Economics*, 75(2), 194-212.
- Kim, D.-H., & Lin, S.-C. (2010). Dynamic relationship between inflation and financial development. *Macroeconomic Dynamics*, 14(03), 343-364.
- King, R. G., & Levine, R. (1993a). Finance and growth: Schumpeter might be right. *The Quarterly Journal of Economics*, 108(3), 717-737.
- King, R. G., & Levine, R. (1993b). Finance, entrepreneurship and growth. *Journal of Monetary Economics*, 32(3), 513-542.
- King, R. G., & Plosser, C. I. (1984). Money, credit, and prices in a real business cycle. *The American Economic Review*, 74(3), 363-380.
- King, R. G., & Rebelo, S. T. (1999). Resuscitating real business cycles. *Handbook of Macroeconomics*, 1, 927-1007.
- Kingori, N. (2015). *Market structure, macro economic shocks and banking risk in Kenya*. University of Nairobi.

- Kinkyo, T. (2007). Explaining Korea's lower investment levels after the crisis. *World Development*, 35(7), 1120-1133.
- Kiprop, G. J. (2013). *the relationship between financial deepening and the growth of small and medium enterprises in Kenya*. University of Nairobi.
- Kitchin, J. (1923). Cycles and trends in economic factors. *The Review of Economic Statistics*, 5(1,) 10-16.
- Kiyotaki, N. (1998). Credit and business cycles. *Japanese Economic Review*, 49(1), 18-35.
- Kiyotaki, N., & Moore, J. (1997). Credit chains. *Journal of Political Economy*, 105(21), 211-248.
- Kiyotaki, N., & Moore, J. (2012). Liquidity, business cycles, and monetary policy: National Bureau of Economic Research.
- Koc, I., & Onan, I. (2004). International Migrants' Remittances and Welfare Status of the Left-Behind Families in Turkey. *International Migration Review*, 38(1), 78-112.
- Kocherlakota, N. (2000). Creating business cycles through credit constraints. *Federal Reserve Bank of Minneapolis Quarterly Review*, 24(3), 2-10.
- Kollmann, R. (2001). The exchange rate in a dynamic-optimizing business cycle model with nominal rigidities: a quantitative investigation. *Journal of international Economics*, 55(2), 243-262.
- Kondratieff, N. D. (1925). The static and the dynamic view of economics. *The Quarterly Journal of Economics*, 39(4), 575-583.
- Korenok, O., & Radchenko, S. (2004). Monetary Policy Effect on the Business Cycle Fluctuations: Output vs. Index Measures of the Cycle. *EconWPA, Series(0409015)*.
- Korotayev, A. V., & Tsirel, S. V. (2010). A spectral analysis of world GDP dynamics: Kondratieff waves, Kuznets swings, Juglar and Kitchin cycles in global economic development, and the 2008–2009 economic crisis. *Structure and Dynamics*, 4(1).
- Kose, A., Prasad, E., Rogoff, K., & Wei, S.-J. (2004). Financial globalization, growth and fluctuations in developing countries: CEPR Discussion Papers.
- Kose, M. A., Prasad, E., Rogoff, K., & Wei, S.-J. (2006). The macroeconomic implications of financial globalization: a reappraisal and synthesis. *Manuscript. IMF*.
- Kose, M. A., Prasad, E. S., & Terrones, M. E. (2006). How do trade and financial integration affect the relationship between growth and fluctuations? *Journal of international Economics*, 69(1), 176-202.
- Kose, M. A., & Riezman, R. (2001). Trade shocks and macroeconomic fluctuations in Africa. *Journal of Development Economics*, 65(1), 55-80.
- Kouparitsas, M. A. (1998). Dynamic Trade Liberalization Analysis: Steady State Transitional and Inter Industry effects. FRB Chicago Working Paper 98-15.
- Kousar, M., Sabri, P. S., Ilyas, M., & Nasir, N. (2016). The Role of Internal and External Shocks in Macroeconomic Fluctuations of Developing Countries. *Science International*, 28(1), 665-672.
- Krugman, P., & Lawrence, R. (1993). Trade, jobs, and wages: National Bureau of Economic Research.
- Krugman, P. R., Dominquez, K. M., & Rogoff, K. (1998). It's baaack: Japan's slump and the return of the liquidity trap. *Brookings Papers on Economic Activity*, 1998(2), 137-205.
- Kuijs, L. (2006). How will China's saving-investment balance evolve? *World Bank policy research working paper* (3958).
- Kuznets, S. (1930). Equilibrium economics and business-cycle theory. *The Quarterly Journal of Economics*, 44(3), 381-415.

- Kwack, S. Y. (2000). An empirical analysis of the factors determining the financial crisis in Asia. *Journal of Asian Economics*, 11(2), 195-206.
- Kydland, F. E., & Prescott, E. C. (1982). Time to build and aggregate fluctuations. *Econometrica: Journal of the Econometric Society*, 50(6), 1345-1370.
- Kydland, F. E., & Prescott, E. C. (1990). Business cycles: Real facts and a monetary myth. *Federal Reserve Bank of Minneapolis Quarterly Review*, 14(2), pp. 383.
- Kydland, F. E., & Zarazaga, C. E. (1997). Is the business cycle of Argentina" different"? *Economic Review-Federal Reserve Bank of Dallas*, 21.
- Lane, P. R. (2003). Business cycles and macroeconomic policy in emerging market economies. *International Finance*, 6(1), 89-108.
- Laubscher, P. (2004). The SA business cycle over the 1990s and current prospects. *Journal for Studies in Economic and Econometrics*, 28, 21-43.
- Law, S. H., & Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking & Finance*, 41, 36-44.
- Lee, H. Y., Ricci, L. A., & Rigobon, R. (2004). Once again, is openness good for growth? *Journal of Development Economics*, 75(2), 451-472.
- Leeper, E. M., Sims, C. A., Zha, T., Hall, R. E., & Bernanke, B. S. (1996). What does monetary policy do? *Brookings Papers on Economic Activity*, 1996(2), 1-78.
- Lensink, R., & Morrissey, O. (2000). Aid instability as a measure of uncertainty and the positive impact of aid on growth. *The Journal of Development Studies*, 36(3), 31-49.
- Lensink, R., & White, H. (2001). Are there negative returns to aid? *Journal of Development Studies*, 37(6), 42-65.
- Levchenko, A. A., & Mauro, P. (2007). Do some forms of financial flows help protect against "sudden stops"? *The World Bank Economic Review*, 21(3), 389-411.
- Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1-24.
- Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature*, 35(2), 688-726.
- Levine, R., Loayza, N., & Beck, T. (1999). *Financial intermediation and growth: causality and causes* (Vol. 310): World Bank Publications.
- Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics*, 46(1), 31-77.
- Lianos, T. P. (1997). Factors determining migrant remittances: The case of Greece. *International Migration Review*, 31(1), 72-87.
- Lietaer, B., Ulanowicz, R., & Goerner, S. (2009). Options for managing a systemic bank crisis. *SAPI EN. S. Surveys and Perspectives Integrating Environment and Society* (2.1).
- Lindley, A. (2006). Migrant remittances in the context of crisis in Somali society. A case study of Hargeisa. *Humanitarian Policy Group Background Paper*, ODI (Overseas Development Institute), London.
- Loayza, N., & Hnatkovska, V. V. (2004). Fluctuations and growth. *World Bank policy research working paper* (3184).
- Loayza, N., Schmidt-Hebbel, K., & Servén, L. (2000). What drives private saving across the world? *Review of Economics and Statistics*, 82(2), 165-181.
- Loayza, N. V., Ranciere, R., Servén, L., & Ventura, J. (2007). Macroeconomic fluctuations and welfare in developing countries: An introduction. *The World Bank Economic Review*, 21(3), 343-357.

- Long Jr, J. B., & Plosser, C. I. (1983). Real business cycles. *The Journal of Political Economy*, 91(1), 39-69.
- Lucas Jr, R. E. (2003). Macroeconomic priorities. *The American Economic Review*, 93(1), 1.
- Lucas, R. E. (1972). Expectations and the Neutrality of Money. *Journal of Economic Theory*, 4(2), 103-124.
- Lucas, R. E. (1977). *Understanding business cycles*. Paper presented at the Carnegie-Rochester conference series on public policy.
- Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3-42.
- Lucas, R. E. (2002). *Lectures on economic growth*: Harvard University Press.
- Lucas B.E. (2004), International Migration to the High Income Countries: Some Consequences for Economic Development in the Sending Countries. Boston University, mimeo
- Lucas, R. E., & Sargent, T. J. (1981). *Rational expectations and econometric practice* (Vol. 2): U of Minnesota Press.
- Lucas, R. E., & Stark, O. (1985). Motivations to remit: Evidence from Botswana. *The Journal of Political Economy*, 95(5), 901-918.
- Lueth, E., & Ruiz-Arranz, M. (2007a). *Are workers' remittances a hedge against macroeconomic shocks? The case of Sri Lanka*: International Monetary Fund.
- Lueth, E., & Ruiz-Arranz, M. (2007b). *Macroeconomic Determinants of Workers' Remittances*. Paper presented at the conference, Policy Options and Challenges for Developing Asia—Perspectives from the IMF and Asia. Tokyo, Japan.
- Lueth, E., & Ruiz-Arranz, M. (2008). Determinants of bilateral remittance flows. *The BE Journal of Macroeconomics*, 8(1).
- Luterbacher, J., Dietrich, D., Xoplaki, E., Grosjean, M., & Wanner, H. (2004). European seasonal and annual temperature variability, trends, and extremes since 1500. *Science*, 303(5663), 1499-1503.
- Lütkepohl, H. (2007). General-to-specific or specific-to-general modelling? An opinion on current econometric terminology. *Journal of Econometrics*, 136(1), 319-324.
- Ma, J., & Aperghis, G. (2007). The Seleukid Royal Economy. The Finances and Financial Administration of the Seleukid Empire. *Hermathena*, 182, pp. 182-188.
- Macfarlane, I. (1993). Two propositions concerning monetary policy and the business cycle. *Rerve Bank of Australia Bulletin*, April, 8-14.
- Maćkowiak, B. (2007). External shocks, US monetary policy and macroeconomic fluctuations in emerging markets. *Journal of Monetary Economics*, 54(8), 2512-2520.
- Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61(S1), 631-652.
- Magnusson, K. (2009). The impact of US regional business cycles on remittances to Latin America. *SSE/EFI Working Paper in Economics and Finance*(710).
- Mahadeva, L., & Robinson, P. (2004). Unit Root Testing in a Central Bank. *Handbooks*.
- Malik, G. (2008). Foreign aid and economic growth: A cointegration analysis of the six poorest African countries. *Economic Analysis and Policy*, 38(2), 251-260.
- Mallick, D. (2009). Financial Development, Shocks, and Growth Fluctuations. MPRA Paper 17799, University Library of Munich, Germany.
- Manganelli, S. (2012). The impact of the securities markets programme. *Research Bulletin*, 17, 2-5.

- Manikandan, M. S., & Soman, K. (2012). A novel method for detecting R-peaks in electrocardiogram (ECG) signal. *Biomedical Signal Processing and Control*, 7(2), 118-128.
- Mankiw, N. G. (1995). Real business cycles: A new Keynesian perspective *Essential Readings in Economics* (pp. 328-341): Springer.
- Mankiw, N. G., Romer, D., & Weil, D. N. (1990). A contribution to the empirics of economic growth: National Bureau of Economic Research.
- Marcucci, J., & Quagliariello, M. (2008). Credit risk and business cycle over different regimes. *Bank of Italy Temi di Discussione (Working Paper) No, 670*.
- Marshall, A. (1890). Principles of political economy. *Maxmillan, New York*.
- Martin, P., & Rey, H. (2006). Globalization and emerging markets: With or without crash? *The American Economic Review*, 96(5), 1631-1651.
- Martin, P. L. (1991). Labor migration in Asia. *The International migration review*, 25(1), 176-193.
- Marwan, N. (2011). *Macroeconomic Impacts of Immigration in Malaysia: Trade, Remittances and Unemployment*. PhD thesis, Durham University.
- Masih, R., & Masih, A. M. (1996). Macroeconomic activity dynamics and Granger causality: New evidence from a small developing economy based on a vector error-correction modelling analysis. *Economic Modelling*, 13(3), 407-426.
- Mason, A. (1988). Saving, economic growth, and demographic change. *Population and Development Review*, 14(1), 113-144.
- Masson, P. R., Bayoumi, T., & Samiei, H. (1998). International evidence on the determinants of private saving. *The World Bank Economic Review*, 12(3), 483-501.
- Mathews, J. A. (1998). Fashioning a new Korean model out of the crisis: the rebuilding of institutional capabilities. *Cambridge Journal of Economics*, 22(6), 747-759.
- Matziorinis, K. (2007). The Causes of the Great Depression: A Retrospective. Recuperado de: http://www.canbekeconomics.com/research_papers/The_Great_Depression_and_Europe.pdf.
- McCallum, B. T. (1999). Issues in the design of monetary policy rules. *Handbook of Macroeconomics*, 1, 1483-1530.
- McCoy, A., Nziramasanga, M., & Yoder, J. (2007). *An empirical examination of the factors affecting remittance by Mexican migrants in the United States*. Paper presented at the Selected paper presented for presentation at the American Agricultural Economics Association Annual Meeting, Portland, OR.
- McGrattan, E. R. (1994a). The macroeconomic effects of distortionary taxation. *Journal of Monetary Economics*, 33(3), 573-601.
- McGrattan, E. R. (1994b). A progress report on business cycle models. *Federal Reserve Bank of Minneapolis. Quarterly Review-Federal Reserve Bank of Minneapolis*, 18(4), 2.
- McKenzie, D. (2005). Beyond remittances: the effects of migration on Mexican households. *International migration, remittances and the brain drain, McMillan and Palgrave*, 123-147.
- McKinnon, R. I. (1963). Optimum currency areas. *The American Economic Review*, 53(4), 717-725.
- Meh, C. A., & Moran, K. (2004). *Bank capital, agency costs, and monetary policy*: Bank of Canada.
- Mellinger, A. D., Sachs, J. D., & Gallup, J. L. (1999). Climate, water navigability, and economic development. *International regional science review*, 22 (2), 179-232.

- Mendelsohn, R., & Dinar, A. (1999). Climate change, agriculture, and developing countries: does adaptation matter? *The World Bank Research Observer*, 14(2), 277-293.
- Mendelsohn, R., Dinar, A., & Williams, L. (2006). The distributional impact of climate change on rich and poor countries. *Environment and Development Economics*, 11(02), 159-178.
- Mendelsohn, R., Morrison, W., Schlesinger, M. E., & Andronova, N. G. (2000). Country-specific market impacts of climate change. *Climatic change*, 45(3-4), 553-569.
- Mendoza, E. G. (1991). Capital controls and the gains from trade in a business cycle model of a small open economy. *Staff Papers-International Monetary Fund*, 480-505.
- Mendoza, E. G. (1995). The terms of trade, the real exchange rate, and economic fluctuations. *International Economic Review*, 36, 101-137.
- Mendoza, E. G., & Uribe, M. (2000). *Devaluation risk and the business-cycle implications of exchange-rate management*. Paper presented at the Carnegie-Rochester Conference Series on Public Policy.
- Mendoza, R. U., Jones, R., & Vergara, G. (2009). Will the global financial crisis lead to lower foreign aid? A first look at United States ODA. *Fordham University, Department of Economics, Fordham Economics Discussion Paper Series*.
- Mertens, K., & Ravn, M. O. (2011). Understanding the aggregate effects of anticipated and unanticipated tax policy shocks. *Review of Economic Dynamics*, 14(1), 27-54.
- Miguel, E., Satyanath, S., & Sergenti, E. (2004). Economic shocks and civil conflict: An instrumental variables approach. *Journal of Political Economy*, 112(4), 725-753.
- Milbourne, R. (1988). Disequilibrium buffer stock models: a survey. *Journal of Economic Surveys*, 2(3), 187-208.
- Minsky, H. P. (1978). *The financial instability hypothesis: a restatement*: Thames Polytechnic.
- Minsky, H. P., & Kaufman, H. (2008). *Stabilizing an unstable economy* (Vol. 1): McGraw-Hill New York.
- Mises, L. v. (1912). 1981. *The Theory of Money and Credit*. Indianapolis, Ind.: Liberty Fund.
- Mishkin, F. S. (1999). International experiences with different monetary policy regimes). Any views expressed in this paper are those of the author only and not those of Columbia University or the National Bureau of Economic Research. *Journal of Monetary Economics*, 43(3), 579-605.
- Mishra, P., & Montiel, P. (2013). How effective is monetary transmission in low-income countries? A survey of the empirical evidence. *Economic Systems*, 37(2), 187-216.
- Mishra, P., Montiel, P. J., & Spilimbergo, A. (2010). Monetary transmission in low income countries. *IMF Working Papers*, 1-42.
- Mishra, P., Montiel, P. J., & Spilimbergo, A. (2012). Monetary transmission in low-income countries: Effectiveness and policy implications. *IMF Economic Review*, 60(2), 270-302.
- Mitchell, W. C. (1927). Economic Organization and Business Cycles *Business cycles: the problem and its setting* (pp. 61-188): NBER.
- Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, 48(3), 261-297.
- Mody, A., Ohnsorge, F., & Sandri, D. (2012). precautionary savings in the Great recession. *IMF Economic Review*, 60(1), 114-138.
- Mody, A., & Sandri, D. (2012). The eurozone crisis: how banks and sovereigns came to be joined at the hip. *Economic Policy*, 27(70), 199-230.

- Mody, A., Taylor, M. P., & Kim, J. Y. (2001). Modelling fundamentals for forecasting capital flows to emerging markets. *International Journal of Finance & Economics*, 6(3), 201-216.
- Mohapatra, S., Joseph, G., & Ratha, D. (2009). Remittances and natural disasters: ex-post response and contribution to ex-ante preparedness. *World Bank Policy Research Working Paper Series*, 4972, June, Washington, DC.
- Mohapatra, S., & Ratha, D. (2011). *Remittance markets in Africa*: World Bank Publications.
- Mohapatra, S., Ratha, D., & Silwal, A. (2011). Outlook for Remittance Flows. *Migration and Development Brief*, 13.
- Mojon, B. (2000). Financial structure and the interest rate channel of ECB monetary policy. ECB Working Paper 40, European Central Bank, Frankfurt am Main.
- Montesquieu, C. L. d. S. B. (1750). *de The Spirit of Laws* (1748), trans. T. Nugent.
- Moore, F. C., & Diaz, D. B. (2015). Temperature impacts on economic growth warrant stringent mitigation policy. *Nature Climate Change*, 5(2), 127-131.
- Mulligan, R. F. (2005). The Austrian business cycle: A vector error-correction model with commercial and industrial loans. *Journal of Private Enterprise*, 22(1), 51-91.
- Mundell, R. A. (1961). A theory of optimum currency areas. *The American Economic Review*, 51(4), 657-665.
- Naudé, W. A. (2009). *The financial crisis of 2008 and the developing countries*: United Nations University, World Institute for Development Economics Research.
- Neagu, I. C., & Schiff, M. (2009). Remittance stability, cyclicity and stabilizing impact in developing countries. *World Bank Policy Research Working Paper Series*, 5077.
- Neale, E. (1932). Migration and Depression: A Note on a Neglected Point in Economic History. *Int'l Lab. Rev.*, 26, 813.
- Nelson, C. R., & Plosser, C. R. (1982). Trends and random walks in macroeconomic time series: some evidence and implications. *Journal of Monetary Economics*, 10(2), 139-162.
- Neusser, K., & Kugler, M. (1998). Manufacturing growth and financial development: evidence from OECD countries. *Review of Economics and Statistics*, 80(4), 638-646.
- Newey, W. K., & West, K. D. (1994). Automatic lag selection in covariance matrix estimation. *The review of economic studies*, 61(4), 631-653.
- Nisha, N. (2015). Impact of Macroeconomic Variables on Stock Returns: Evidence from Bombay Stock Exchange (BSE). *Journal of Investment and Management*, 4(5), 162-170.
- Nolan, C., & Thoenissen, C. (2009). Financial shocks and the US business cycle. *Journal of Monetary Economics*, 56(4), 596-604.
- Nordhaus, W. D. (1994). *Managing the global commons: the economics of climate change* (Vol. 31): MIT press Cambridge, MA.
- Nordhaus, W. D. (2006). The "Stern review" on the economics of climate change: National Bureau of Economic Research.
- Nordhaus, W. D. (2007). *The challenge of global warming: economic models and environmental policy* (Vol. 4): Yale University New Haven.
- Nordhaus, W. D., & Boyer, J. (2000). *Warming the world*: Cambridge: MIT Press.
- Ocampo, J. A. (2009). Latin America and the global financial crisis. *Cambridge Journal of Economics*, 33(4), 703-724.
- Odhiambo, N. M. (2009). Savings and economic growth in South Africa: A multivariate causality test. *Journal of Policy Modeling*, 31(5), 708-718.

- OECD. (2008). *OECD Factbook 2009: Economic, Environmental and Social Statistics*: OECD, Organisation for Economic Co-operation and Development.
- Okonjo-Iweala, N., Soludo, C. C., & Muhtar, M. (2003). *The debt trap in Nigeria: Towards a sustainable debt strategy*: Africa World Press.
- Olesen, J. E., & Bindi, M. (2002). Consequences of climate change for European agricultural productivity, land use and policy. *European Journal of Agronomy*, 16(4), 239-262.
- Olken, B. A. (2009). Corruption perceptions vs. corruption reality. *Journal of Public economics*, 93(7), 950-964.
- Oppong, A. D. (2013). Financial Development and Economic Growth: An empirical investigation of this nuexus in Ghana.
- Osili, U. O. (2007). Remittances and savings from international migration: Theory and evidence using a matched sample. *Journal of Development Economics*, 83(2), 446-465.
- Österholm, P., & Zettelmeyer, J. (2007). The effect of external conditions on growth in Latin America. *IMF Working Papers*, 1-36.
- Österholm, P., & Zettelmeyer, J. (2008). The effect of external conditions on growth in Latin America. *IMF Economic Review*, 55(4), 595-623.
- Overman, M. J., Modak, J., Kopetz, S., Murthy, R., Yao, J. C., Hicks, M. E., . . . Tam, A. L. (2012). Use of research biopsies in clinical trials: Are risks and benefits adequately discussed? *Journal of Clinical Oncology*, JCO. 2012.2043. 1718.
- Ozcicek, O., & Douglas McMillin, W. (1999). Lag length selection in vector autoregressive models: symmetric and asymmetric lags. *Applied Economics*, 31(4), 517-524.
- Özmen, E. (2007). Financial development, exchange rate regimes and the Feldstein–Horioka puzzle: Evidence from the MENA region. *Applied Economics*, 39(9), 1133-1138.
- Özmen, E., Şahinöz, S., & Yalçın, C. (2012). Profitability, Saving and Investment of Non-Financial Firms in Turkey. *Central Bank of Republic of Turkey*.
- Pachauri, R. K., Allen, M. R., Barros, V., Broome, J., Cramer, W., Christ, R., . . . Dasgupta, P. (2014). *Climate change 2014: synthesis Report. Contribution of working groups I, II and III to the fifth assessment report of the intergovernmental panel on climate change*: IPCC.
- Page, J., & Plaza, S. (2006). Migration remittances and development: A review of global evidence. *Journal of African Economies*, 15(suppl 2), 245-336.
- Paldam, M. (2003). The economic freedom of Asian tigers. *European Journal of Political Economy*, 19(3), pp. 395-650.
- Pallage, S., & Robe, M. A. (2001). Foreign aid and the business cycle. *Review of International Economics*, 9(4), 641-672.
- Pallage, S., & Robe, M. A. (2003). On the welfare cost of economic fluctuations in developing countries. *International Economic Review*, 44(2), 677-698.
- Pallage, S., Robe, M. A., & Bérubé, C. (2006). The potential of foreign aid as insurance. *IMF Staff papers*, 453-475.
- Pan, H., & Wang, C. (2013). Financial development and economic growth: a new investigation. *Journal of Economic Development*, 38(1), 27.
- Papademos, L. (2003). The contribution of monetary policy to economic growth. *Die Förderung des Wirtschaftswachstums in Europa Fostering Economic Growth*, 23.
- Parker, D. (2001). *Economic regulation: a preliminary literature review and summary of research questions arising*. Paper presented at the of Research Questions Arising, Centre on Regulation and Competition, Working Paper No 6.

- Parker, J. A., & Preston, B. (2005). Precautionary saving and consumption fluctuations. *The American Economic Review*, 95(4), 1119-1143.
- Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J., & Hanson, C. E. (2007). IPCC, 2007: climate change 2007: impacts, adaptation and vulnerability. Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate change: Cambridge University Press, Cambridge.
- Pastor, L., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The Journal of Finance*, 67(4), 1219-1264.
- Pástor, L., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of Financial Economics*, 110(3), 520-545.
- Patrick, H. T. (1966). Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14(2), 174-189.
- Paxton, P., & Knack, S. (2011). Individual and country-level factors affecting support for foreign aid. *International Political Science Review*, 0192512111406095.
- Payne, J. E., & Kumazawa, R. (2006). Capital Mobility and The Feldstein–Horioka Puzzle: Re-Examination of Less Developed Countries. *The Manchester School*, 74(5), 610-616.
- Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61(s 1), 653-670.
- Pelgrin, F., Schich, S., & De Serres, A. (2002). Increases in business investment rates in OECD countries in the 1990s: How much can be explained by fundamentals? OECD Economics Department Working Papers, no. 327.
- Perera, N., & Paudel, R. C. (2009). Financial development and economic growth in Sri Lanka. *Applied Econometrics and International Development*, 9 (1), 157-164
- Perkins, D. H. (2001). Economics of development: WW Norton & Company.
- Perli, R. (1998). Indeterminacy, home production, and the business cycle: A calibrated analysis. *Journal of Monetary Economics*, 41(1), 105-125.
- Pesaran, H. H., & Shin, Y. (1998). Generalized impulse response analysis in linear multivariate models. *Economics Letters*, 58(1), 17-29.
- Phillips, P. C., & Ouliaris, S. (1990). Asymptotic properties of residual based tests for cointegration. *Econometrica: Journal of the Econometric Society*, 58(1), 165-193.
- Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75(2), 335-346.
- Prescott, E. C. (1986). *Theory ahead of business-cycle measurement*. Paper presented at the Carnegie-Rochester conference series on public policy.
- Preston, B. L., & Jones, R. N. (2006). *Climate change impacts on Australia and the benefits of early action to reduce global greenhouse gas emissions*: CSIRO Canberra.
- Puri, S., & Ritzema, T. (1999). *Migrant worker remittances, micro-finance and the informal economy: prospects and issues*: ILO Geneva.
- Quagliariello, M. (2009). Macroeconomic uncertainty and banks' lending decisions: The case of Italy. *Applied Economics*, 41(3), 323-336.
- Quenouille, M. H. (1957). The analysis of multiple time-series. London, Griffin.
- Raddatz, C. (2007). Are external shocks responsible for the instability of output in low-income countries? *Journal of Development Economics*, 84(1), 155-187.

- Raddatz, C. (2008). Have External Shocks Become More Important for Output Fluctuations in African Countries? *Africa at a Turning Point? Growth, Aid, and External Shocks*. In D. S. Go & J. Page (Eds.), Washington, DC: The World Bank.
- Rajan, R. G., & Subramanian, A. (2005). Aid and growth: What does the cross-country evidence really show? : National Bureau of Economic Research.
- Ramey, C. T., & Ramey, S. L. (1998). Prevention of intellectual disabilities: early interventions to improve cognitive development. *Preventive Medicine*, 27(2), 224-232.
- Ramey, G., & Ramey, V. A. (1994). Cross-country evidence on the link between fluctuations and growth: National Bureau of Economic Research.
- Ramey, G., & Watson, J. (1997). Contractual fragility, job destruction, and business cycles. *The Quarterly Journal of Economics*, 112(3), 873-911.
- Ranciere, R., Tornell, A., & Westermann, F. (2003). Crises and growth: a re-evaluation: National Bureau of Economic Research.
- Ranciere, R., Tornell, A., & Westermann, F. (2006). Decomposing the effects of financial liberalization: Crises vs. growth. *Journal of Banking & Finance*, 30(12), 3331-3348.
- Rand, J., & Tarp, F. (2002). Business cycles in developing countries: are they different? *World Development*, 30(12), 2071-2088.
- Ratha, D. (2005). Workers' remittances: an important and stable source of external development finance. in S.M. Maimbo & D. Ratha (eds.), *Remittances. Development Impact and Future Prospects*, World Bank, Washington DC, pp. 19-52.
- Ratha, D. (2007). Leveraging remittances for development. *Policy Brief*, 3.
- Ratha, D., Mohapatra, S., & Scheja, E. (2011). Impact of migration on economic and social development: A Review of Evidence and Emerging Issues, The World Bank - Development Prospects Group, Migration and Remittances Unit & Poverty Reduction and Economic Management Network, Policy Research Working Paper 5558, 2011.
- Ratha, D., & Shaw, W. (2007). *South-South migration and remittances*: World Bank Publications.
- Ratha, N. K., Connell, J. H., & Bolle, R. M. (2003). Biometrics break-ins and band-aids. *Pattern Recognition Letters*, 24(13), 2105-2113.
- Rebelo, S. (2005). Real business cycle models: past, present and future. *The Scandinavian Journal of Economics*, 107(2), 217-238.
- Rigobon, R., & Rodrik, D. (2005). Rule of law, democracy, openness, and income. *Economics of Transition*, 13(3), 533-564.
- Rodriguez, F., & Rodrik, D. (2000). Trade policy and economic growth: askeptic's guide to the crossnational evidence, in (B. Bernanke and KS Rogoff, eds.). *Macroeconomics Annual*, MIT Press for NBER, Cambridge, MA.
- Rodrik, D. (2000). *Can integration into the world economy substitute for a development strategy*. Paper presented at the World Bank EBGDE European Conference.
- Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of Economic Growth*, 9(2), 131-165.
- Romer, C. D., & Romer, D. H. (2002). The evolution of economic understanding and postwar stabilization policy: National Bureau of Economic Research.
- Romer, C. D., & Romer, D. H. (2004). A new measure of monetary shocks: Derivation and implications. *The American Economic Review*, 94(4), 1055-1084.
- Romer, P. M. (1990). Capital, labor, and productivity. *Brookings papers on economic activity. Microeconomics*, 1990, 337-367.

- Romer, P. M. (1994). The origins of endogenous growth. *The Journal of Economic Perspectives*, 8(1), 3-22.
- Roodman, D. (2008). Through the looking glass, and what ols found there: on growth, foreign aid, and reverse causality. *Center for Global Development Working Paper* (137).
- Rose, A. K. (2002). The effect of common currencies on international trade: where do we stand? URL: haas.berkeley.edu/~arose.
- Roson, R., & Van der Mensbrugghe, D. (2012). Climate change and economic growth: impacts and interactions. *International Journal of Sustainable Economy*, 4(3), 270-285.
- Rostow, W. W. (1985). *Eisenhower, Kennedy, and foreign aid* (Vol. 5): University of Texas Press.
- Rotemberg, J. J., & Woodford, M. (1996). Imperfect competition and the effects of energy price increases on economic activity: National Bureau of Economic Research.
- Ruiz, I., & Vargas-Silva, C. (2014). Remittances and the Business Cycle: A Reliable Relationship? *Journal of Ethnic and Migration Studies*, 40(3), 456-474.
- Sachs, J. D. (2003). Institutions don't rule: direct effects of geography on per capita income: National Bureau of Economic Research.
- Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings papers on economic activity*, 1995(1), 1-118.
- Sachs, W. (2008). Climate change and human rights. *Development*, 51(3), 332-337.
- Salahuddin, M., & Gow, J. (2015). The Relationship between economic growth and remittances in the presence of cross-sectional dependence. *The Journal of Developing Areas*, 49(1), 207-221.
- Sander, H., & Kleimeier, S. (2004). Convergence in euro-zone retail banking? What interest rate pass-through tells us about monetary policy transmission, competition and integration. *Journal of International Money and Finance*, 23(3), 461-492.
- Sarantis, N. (2001). Nonlinearities, cyclical behaviour and predictability in stock markets: international evidence. *International Journal of Forecasting*, 17(3), 459-482.
- Sargent, T. J., & Sims, C. A. (1977). Business cycle modeling without pretending to have too much a priori economic theory. *New Methods in Business Cycle Research*, 1, 145-168.
- Sato, K., & Zhang, Z. (2006). Real Output Co-movements in East Asia: Any Evidence for a Monetary Union? *The World Economy*, 29(12), 1671-1689.
- Saunders, M. N. (2011). *Research methods for business students*, 5/e: Pearson Education India.
- Sayan, S. (2004). Guest workers' remittances and output fluctuations in host and home countries: the case of remittances from Turkish workers in Germany. *Emerging Markets Finance and Trade*, 40(6), 68-81.
- Sayan, S. (2006). Business cycles and workers' remittances: How do migrant workers respond to cyclical movements of GDP at home? *International Monetary Fund, IMF Working Paper*, 52.
- Sayan, S., & Tekin-Koru, A. (2007). Business cycles and remittances: A comparison of the cases of Turkish workers in Germany and Mexican workers in the US. (MPRA Working Paper), Munich: University Library of Munich.
- Sayan, S., & Tekin-Koru, A. (2007). Remittances. *Business Cycles and Poverty: The Recent Turkish Experience, MPRA Paper*, 6029.

- Schich, S., & Pelgrin, F. (2002). Financial development and investment: panel data evidence for OECD countries from 1970 to 1997. *Applied Economics Letters*, 9(1), 1-7.
- Schularick, M., & Taylor, A. M. (2009). *Credit booms gone bust: monetary policy, leverage cycles and financial crisis, 1870-2008*: CEPR.
- Schularick, M., & Taylor, A. M. (2012). Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008. *The American Economic Review*, 102(2), 1029-1061.
- Schumpeter, J. A. (1911/1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle* (Vol. 55): Transaction publishers.
- Schwarz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, 6(2), 461-464.
- Semerák, O. (2001). Curvature singularity around first Morgan-Morgan disc. *Classical and Quantum Gravity*, 18(17), 3589.
- Senhadji, A. S. (2003). External shocks and debt accumulation in a small open economy. *Review of Economic Dynamics*, 6(1), 207-239.
- Sewell, M. (2011). Characterization of financial time series. *RN*, 11(01), 01.
- Shapiro, M., & Watson, M. (1988). Sources of business cycles fluctuations *NBER Macroeconomics Annual 1988, Volume 3* (pp. 111-156): MIT Press.
- Shin, K., & Wang, Y. (2003). Monetary integration ahead of trade integration in East Asia? *The Institute of Social and Economic Research Osaka University, Discussion Paper no. 572*.
- Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: Journal of the Econometric Society*, 48, 1-48.
- Sims, C. A., & Zha, T. A. (1998). Does monetary policy generate recessions? : working paper, Federal Reserve Bank of Atlanta.
- Sims, J., Simard, R., & Joern, B. (1998). Phosphorus loss in agricultural drainage: Historical perspective and current research. *Journal of Environmental Quality*, 27(2), 277-293.
- Sindano, A. N. (2009). *The direction of causal relationship between financial development and economic growth in Namibia*.
- Singh, M. A. (2006). *Macroeconomic fluctuations: the policy lessons from Latin America*: International Monetary Fund.
- Singh, R. K., Murty, H., Gupta, S., & Dikshit, A. (2012). An overview of sustainability assessment methodologies. *Ecological Indicators*, 15(1), 281-299.
- Singh, T. (2010). Does domestic saving cause economic growth? A time-series evidence from India. *Journal of Policy Modeling*, 32(2), 231-253.
- Sirkeci, I., Cohen, J. H., & Ratha, D. (2012). *Migration and remittances during the global financial crisis and beyond*: World Bank Publications.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65-94.
- Solow, R. M. (1957). Technical change and the aggregate production function. *The Review of Economics and Statistics*, 39(3), 312-320.
- Sosa, S. (2008). *External shocks and business cycle fluctuations in Mexico: How important are US factors?* : International Monetary Fund.
- Sosa, S., & Cashin, M. P. (2009). *Macroeconomic Fluctuations in the Caribbean: the Role of Climatic and External shocks*: International Monetary Fund.
- Sproull, N. L. (2002). *Handbook of research methods: A guide for practitioners and students in the social sciences*: Scarecrow press.

- Stadler, G. W. (1994). Real business cycles. *Journal of Economic Literature*, 32(4), 1750-1783.
- Stals, C. (1997). Effect of the changing financial environment on monetary policy in South Africa. *Address to the annual dinner of the Economic Society of South Africa, Pretoria Branch*, 15.
- Stern, N. H. (2007). *The economics of climate change: the Stern review*: Cambridge University Press.
- Stiglitz, J. E. (2002). Participation and development: Perspectives from the comprehensive development paradigm. *Review of Development Economics*, 6(2), 163-182.
- Stock, J. H., & Watson, M. W. (2005). Understanding changes in international business cycle dynamics. *Journal of the European Economic Association*, 3(5), 968-1006.
- Stock, J. H., & Watson, M. W. (2008). *Business cycles, indicators, and forecasting* (Vol. 28): University of Chicago Press.
- Stocker, T., Qin, D., Plattner, G., Tignor, M., Allen, S., Boschung, J., Midgley, B. (2013). IPCC, 2013: climate change 2013: the physical science basis. Contribution of working group I to the fifth assessment report of the intergovernmental panel on climate change.
- Stojanov, R., & Strielkowski, W. (2013). The Role of Remittances as More Efficient Tool of Development Aid in Developing Countries. *Prague Economic Papers*, 22(4), 487-503.
- Strotmann, H., Döpke, J., & Buch, C. M. (2006). Does trade openness increase firm-level fluctuations? : Deutsche Bundesbank, Research Centre.
- Svensson, J. (2000). Foreign aid and rent-seeking. *Journal of International Economics*, 51(2), 437-461.
- Tabak, B. M., & Guerra, S. M. (2007). Stock returns and fluctuations: the Brazilian case. *Economia Aplicada*, 11(3), 329-346.
- Taylor, J. B. (1979). Staggered wage setting in a macro model. *The American Economic Review*, 69(2), 108-113.
- Taylor, J. B. (1980). Aggregate dynamics and staggered contracts. *The Journal of Political Economy*, 88(1), 1-23.
- Taylor, J. B. (1999). Staggered price and wage setting in macroeconomics. *Handbook of Macroeconomics*, 1, 1009-1050.
- Taylor, J. E., Arango, J., Hugo, G., Kouaouci, A., Massey, D. S., & Pellegrino, A. (1996). International migration and national development. *Population Index*, 62(2), 181-212.
- Taylor, M. P., & Sarno, L. (1998). The behavior of real exchange rates during the post-Bretton Woods period. *Journal of International Economics*, 46(2), 281-312.
- Temin, P. (1998). The causes of American business cycles: an essay in economic historiography: National Bureau of Economic Research.
- Tempelman, J. H. (2010). Austrian business cycle theory and the global financial crisis: Confessions of a mainstream economist. *Quarterly Journal of Austrian Economics*, 13(1), 1.
- Tesar, L. L. (1991). Savings, investment and international capital flows. *Journal of International Economics*, 31(1), 55-78.
- Thornthwaite, C. W. (1933). The climates of the earth. *Geographical Review*, 23(3), 433-440.
- Thornton, J. (2008). Explaining Procyclical Fiscal Policy in African Countries†. *Journal of African Economies*, 17(3), 451-464.
- Tinbergen, J. (1939). *Statistical Testing of Business-Cycle Theories: I. A Method and Its Application to Investment Activity* (Vol. 1): League of Nations, Economic Intelligence Service.

- Tiryaki, G. F. (2003). Financial development and economic fluctuations. *METU Studies in Development*, 30(1), 89.
- Tol, R. S. (2002). Estimates of the damage costs of climate change. Part 1: Benchmark estimates. *Environmental and Resource Economics*, 21(1), 47-73.
- Tol, R. S. (2005). Adaptation and mitigation: trade-offs in substance and methods. *Environmental Science & Policy*, 8(6), 572-578.
- Tol, R. S. (2009). The economic effects of climate change. *The Journal of Economic Perspectives*, 23(2), 29-51.
- Tomz, M., & Wright, M. L. (2007). Do countries default in "bad times"? *Journal of the European Economic Association*, 5(2-3), 352-360.
- Torres, A., & Vela, O. (2003). Trade integration and synchronization between the business cycles of Mexico and the United States. *The North American Journal of Economics and Finance*, 14(3), 319-342.
- Townsend, P. (1979). *Poverty in the United Kingdom: a survey of household resources and standards of living*: Univ of California Press.
- Tswamuno, D. T., Pardee, S., & Wunnava, P. V. (2007). Financial liberalization and economic growth: Lessons from the South African experience. *International Journal of Applied Economics*, 4(2), 75-89.
- Uhlig, H. (2004). Do technology shocks lead to a fall in total hours worked? *Journal of the European Economic Association*, 2(2-3), 361-371.
- Uribe, M., & Yue, V. Z. (2006). Country spreads and emerging countries: Who drives whom? *Journal of International Economics*, 69(1), 6-36.
- Vargas-Silva, C. (2008). Are remittances manna from heaven? A look at the business cycle properties of remittances. *The North American Journal of Economics and Finance*, 19(3), 290-303.
- Vargas-Silva, C., & Huang, P. (2006). Macroeconomic determinants of workers' remittances: Host versus home country's economic conditions. *Journal of International Trade & Economic Development*, 15(1), 81-99.
- Vargas-Silva, C. (2009). The tale of three amigos: Remittances, exchange rates, and money demand in Mexico. *Review of Development Economics*, 13(1), 1-14.
- Vazakidis, A., & Adamopoulos, A. (2009). Stock market development and economic growth. *American Journal of Applied Sciences*, 6(11), 1932.
- Velde, F. R., Weber, W. E., & Wright, R. (1999). A model of commodity money, with applications to Gresham's law and the debasement puzzle. *Review of Economic Dynamics*, 2(1), 291-323.
- Ventura, J. (2002). Bubbles and capital flows: National Bureau of Economic Research.
- Verick, S., & Islam, I. (2010). The great recession of 2008-2009: causes, consequences and policy responses. Discussion Paper No. 4934.
- Vos, R., & De Jong, N. (2003). Trade liberalization and poverty in Ecuador: a CGE macro-microsimulation analysis. *Economic Systems Research*, 15(2), 211-232.
- Wacziarg, R. (2001). Measuring the dynamic gains from trade. *The World Bank Economic Review*, 15(3), 393-429.
- Wacziarg, R., & Welch, K. H. (2008). Trade liberalization and growth: New evidence. *The World Bank Economic Review*, 22(2), 187-231.
- Waggoner, D. F., & Zha, T. (1999). Conditional forecasts in dynamic multivariate models. *Review of Economics and Statistics*, 81(4), 639-651.

- Walsh, C. E. (2009). Using monetary policy to stabilize economic activity. Federal Reserve Bank of Kansas City Financial Stability and Macroeconomic Policy, 2009 Jackson Hole Symposium, 245-296.
- Walter, H., & Breckle, S.-W. (1985). Ecological Zonation of the Geobiosphere *Ecological Systems of the Geobiosphere* (pp. 15-40): Springer.
- Waterson, M., & Lopez, A. (1983). The determinants of research and development intensity in the UK. *Applied Economics*, 15(3), 379-391.
- Weinberg, R. A. (1995). The retinoblastoma protein and cell cycle control. *Cell*, 81(3), 323-330.
- Wells, J. (2015). Foreign aid and its importance in relieving poverty. *Geodate*, 28(3), 5.
- Wilk, G. D., Wallace, R. M., & Anthony, J. (2001). High- κ gate dielectrics: Current status and materials properties considerations. *Journal of Applied Physics*, 89(10), 5243-5275.
- Woodford, M. (2001). The Taylor rule and optimal monetary policy. *The American Economic Review*, 91(2), 232-237.
- Woodruff, C. M., & Zenteno, R. (2001). Remittances and microenterprises in Mexico. *UCSD, Graduate School of International Relations and Pacific Studies Working Paper*.
- Wright, J., & Winters, M. (2010). The politics of effective foreign aid. *Annual Review of Political Science*, 13, 61-80.
- Yamada, H. (2000). M2 demand relation and effective exchange rate in Japan: a cointegration analysis. *Applied Economics Letters*, 7(4), 229-232.
- Yang, D., & Choi, H. (2007). Are remittances insurance? Evidence from rainfall shocks in the Philippines. *The World Bank Economic Review*, 21(2), 219-248.
- Zar, J. H. (1984). Comparing simple linear regression equations. *Biostatistical Analysis*, 2, 292-305.
- Zhuang, J., & Dowling, J. M. (2002). Causes of the 1997 Asian Financial Crisis: What can an early warning system model tell us? : ERD working paper series.

Appendix

Low Income Countries (Internal Sources of Fluctuations)

Table 1. Model 1

Error Correction:	D(GDP)	D(LNM2)	D(LNPOP)	D(LNSAV)	D(LNINT)
CointEq1	-0.292360	-0.009055	1.43E-05	0.001977	0.000146
	(0.01683)	(0.00159)	(1.4E-05)	(0.00247)	(0.00073)
	[-17.3764]	[-5.70977]	[1.01878]	[0.80007]	[0.20060]
D(GDP(-1))	0.139468	0.004505	-6.22E-06	-0.002732	0.000239
	(0.02354)	(0.00222)	(2.0E-05)	(0.00346)	(0.00102)
	[5.92548]	[2.03053]	[-0.31714]	[-0.79028]	[0.23564]
D(GDP(-2))	0.148701	0.004509	-6.82E-06	-0.003281	0.000217
	(0.02349)	(0.00221)	(2.0E-05)	(0.00345)	(0.00101)
	[6.32908]	[2.03603]	[-0.34867]	[-0.95086]	[0.21362]
D(GDP(-3))	0.146103	0.007225	-7.30E-06	-0.004948	-3.75E-05
	(0.02244)	(0.00212)	(1.9E-05)	(0.00330)	(0.00097)
	[6.51098]	[3.41592]	[-0.39072]	[-1.50130]	[-0.03872]
D(LNM2(-1))	-0.234020	0.486102	2.73E-05	-0.016610	0.001395
	(0.24748)	(0.02333)	(0.00021)	(0.03635)	(0.01068)
	[-0.94559]	[20.8382]	[0.13253]	[-0.45699]	[0.13057]
D(LNM2(-2))	0.092084	0.052597	2.67E-05	-0.003426	0.001643
	(0.27580)	(0.02600)	(0.00023)	(0.04050)	(0.01191)
	[0.33388]	[2.02327]	[0.11641]	[-0.08460]	[0.13795]
D(LNM2(-3))	0.237456	-0.084389	0.000166	-0.007302	0.010073
	(0.24819)	(0.02339)	(0.00021)	(0.03645)	(0.01072)
	[0.95675]	[-3.60732]	[0.80307]	[-0.20034]	[0.94008]
D(LNPOP(-1))	17.86474	0.966640	0.990970	-0.686590	-0.288945
	(28.3258)	(2.66993)	(0.02360)	(4.15994)	(1.22294)
	[0.63069]	[0.36205]	[41.9979]	[-0.16505]	[-0.23627]
D(LNPOP(-2))	-0.425335	0.434889	0.000524	-1.554156	-0.048088
	(39.8788)	(3.75890)	(0.03322)	(5.85663)	(1.72173)
	[-0.01067]	[0.11570]	[0.01578]	[-0.26537]	[-0.02793]
D(LNPOP(-3))	-32.90538	-1.649786	0.010700	3.067684	0.338774
	(28.7929)	(2.71397)	(0.02398)	(4.22855)	(1.24310)
	[-1.14283]	[-0.60789]	[0.44610]	[0.72547]	[0.27252]
D(LNSAV(-1))	0.068086	-0.005735	-0.000182	0.089329	0.000928

	(0.16024)	(0.01510)	(0.00013)	(0.02353)	(0.00692)
	[0.42491]	[-0.37970]	[-1.36613]	[3.79603]	[0.13407]
D(LNSAV(-2))	-0.036227	-0.004451	-7.53E-05	0.044422	0.000251
	(0.16080)	(0.01516)	(0.00013)	(0.02362)	(0.00694)
	[-0.22529]	[-0.29364]	[-0.56189]	[1.88107]	[0.03609]
D(LNSAV(-3))	-0.108404	-0.004334	-5.57E-05	0.005627	0.000490
	(0.16034)	(0.01511)	(0.00013)	(0.02355)	(0.00692)
	[-0.67609]	[-0.28674]	[-0.41730]	[0.23896]	[0.07073]
D(LNINT(-1))	0.486885	-0.084646	-0.000200	-0.013310	0.811919
	(0.54382)	(0.05126)	(0.00045)	(0.07987)	(0.02348)
	[0.89531]	[-1.65132]	[-0.44098]	[-0.16666]	[34.5809]
D(LNINT(-2))	0.139809	-0.011740	-8.89E-06	-0.007608	0.015724
	(0.70148)	(0.06612)	(0.00058)	(0.10302)	(0.03029)
	[0.19931]	[-0.17755]	[-0.01521]	[-0.07385]	[0.51920]
D(LNINT(-3))	0.359006	0.019107	-7.91E-05	0.011476	-0.099323
	(0.54337)	(0.05122)	(0.00045)	(0.07980)	(0.02346)
	[0.66071]	[0.37306]	[-0.17470]	[0.14381]	[-4.23384]
C	0.099638	0.005883	-4.19E-05	-0.005825	0.000468
	(0.03783)	(0.00357)	(3.2E-05)	(0.00556)	(0.00163)
	[2.63384]	[1.64987]	[-1.32840]	[-1.04844]	[0.28659]
R-squared	0.144521	0.280713	0.971852	0.014062	0.597369
Adj. R-squared	0.136938	0.274337	0.971603	0.005323	0.593800
Sum sq. resids	649.8359	5.773528	0.000451	14.01571	1.211289
S.E. equation	0.600017	0.056556	0.000500	0.088119	0.025905
F-statistic	19.05804	44.02680	3895.048	1.609030	167.3757
Log likelihood	-1646.092	2656.959	11272.73	1848.997	4079.575
Akaike AIC	1.825568	-2.897869	-12.35536	-2.010973	-4.459467
Schwarz SC	1.876957	-2.846480	-12.30397	-1.959584	-4.408078
Mean dependent	-0.011861	0.006443	0.006856	-2.24E-05	0.002510
S.D. dependent	0.645866	0.066392	0.002966	0.088354	0.040646
Determinant resid covariance (dof adj.)		1.48E-15			
Determinant resid covariance		1.41E-15			
Log likelihood		18224.84			
Akaike information criterion		-19.90652			
Schwarz criterion		-19.63446			

Table 2 Model 2

Error Correction:	D(GDP)	D(LNDCB)	D(LNPOP)	D(LNSAV)	D(LNINT)

CointEq1	-0.295477	-0.000894	1.52E-05	0.002117	0.000320
	(0.01732)	(0.00100)	(1.4E-05)	(0.00255)	(0.00074)
	[-17.0622]	[-0.89540]	[1.05635]	[0.83165]	[0.43427]
D(GDP(-1))	0.141842	0.000111	-6.48E-06	-0.002969	0.000129
	(0.02382)	(0.00137)	(2.0E-05)	(0.00350)	(0.00101)
	[5.95462]	[0.08092]	[-0.32671]	[-0.84784]	[0.12761]
D(GDP(-2))	0.152032	0.000407	-7.14E-06	-0.003509	2.53E-05
	(0.02378)	(0.00137)	(2.0E-05)	(0.00350)	(0.00101)
	[6.39199]	[0.29666]	[-0.36014]	[-1.00347]	[0.02500]
D(GDP(-3))	0.149045	-0.000439	-7.08E-06	-0.005256	3.45E-05
	(0.02275)	(0.00131)	(1.9E-05)	(0.00334)	(0.00097)
	[6.55235]	[-0.33467]	[-0.37388]	[-1.57151]	[0.03567]
D(LNDCB(-1))	0.434670	0.777174	-0.000333	-0.043789	0.010467
	(0.42025)	(0.02422)	(0.00035)	(0.06179)	(0.01789)
	[1.03430]	[32.0930]	[-0.94987]	[-0.70872]	[0.58521]
D(LNDCB(-2))	-0.057512	0.020127	-6.15E-06	-0.001322	-0.009093
	(0.53497)	(0.03083)	(0.00045)	(0.07865)	(0.02277)
	[-0.10751]	[0.65289]	[-0.01380]	[-0.01681]	[-0.39936]
D(LNDCB(-3))	-0.142341	-0.118991	-4.29E-05	0.006106	0.037418
	(0.41795)	(0.02408)	(0.00035)	(0.06145)	(0.01779)
	[-0.34057]	[-4.94071]	[-0.12312]	[0.09936]	[2.10347]
D(LNPOP(-1))	15.89662	-0.987659	0.990912	-0.942940	-0.194678
	(28.5092)	(1.64279)	(0.02375)	(4.19147)	(1.21338)
	[0.55760]	[-0.60121]	[41.7258]	[-0.22497]	[-0.16044]
D(LNPOP(-2))	0.021622	-0.230382	0.000436	-1.504574	-0.006250
	(40.1436)	(2.31320)	(0.03344)	(5.90197)	(1.70855)
	[0.00054]	[-0.09959]	[0.01304]	[-0.25493]	[-0.00366]
D(LNPOP(-3))	-28.44589	1.413563	0.011196	3.266582	0.239540
	(28.9861)	(1.67027)	(0.02415)	(4.26158)	(1.23368)
	[-0.98136]	[0.84631]	[0.46370]	[0.76652]	[0.19417]
D(LNSAV(-1))	0.061621	0.003301	-0.000193	0.088837	0.001227
	(0.16160)	(0.00931)	(0.00013)	(0.02376)	(0.00688)
	[0.38131]	[0.35447]	[-1.43682]	[3.73905]	[0.17846]
D(LNSAV(-2))	-0.053534	0.000404	-8.29E-05	0.044393	0.000418
	(0.16220)	(0.00935)	(0.00014)	(0.02385)	(0.00690)
	[-0.33005]	[0.04323]	[-0.61366]	[1.86163]	[0.06061]

D(LNSAV(-3))	-0.133328	-0.000457	-6.34E-05	0.005959	0.001111
	(0.16173)	(0.00932)	(0.00013)	(0.02378)	(0.00688)
	[-0.82438]	[-0.04904]	[-0.47081]	[0.25060]	[0.16144]
D(LNINT(-1))	0.698515	-0.069976	-0.000280	-0.020835	0.807818
	(0.56747)	(0.03270)	(0.00047)	(0.08343)	(0.02415)
	[1.23092]	[-2.13997]	[-0.59300]	[-0.24973]	[33.4468]
D(LNINT(-2))	0.163539	-0.005600	-3.91E-05	-0.009869	0.012487
	(0.72825)	(0.04196)	(0.00061)	(0.10707)	(0.03099)
	[0.22457]	[-0.13344]	[-0.06451]	[-0.09218]	[0.40287]
D(LNINT(-3))	0.403644	-0.046600	-0.000229	0.008061	-0.086668
	(0.56851)	(0.03276)	(0.00047)	(0.08358)	(0.02420)
	[0.71000]	[-1.42251]	[-0.48293]	[0.09644]	[-3.58184]
C	0.078389	-0.000600	-4.23E-05	-0.005840	8.04E-05
	(0.03806)	(0.00219)	(3.2E-05)	(0.00560)	(0.00162)
	[2.05955]	[-0.27367]	[-1.33268]	[-1.04360]	[0.04961]
R-squared	0.144270	0.586312	0.971630	0.014466	0.595518
Adj. R-squared	0.136547	0.582578	0.971374	0.005572	0.591868
Sum sq. resids	648.1124	2.152007	0.000450	14.00916	1.174014
S.E. equation	0.604604	0.034839	0.000504	0.088890	0.025733
F-statistic	18.68216	157.0522	3795.116	1.626487	163.1490
Log likelihood	-1630.663	3477.695	11061.29	1801.082	4020.040
Akaike AIC	1.840965	-3.866698	-12.33999	-1.993388	-4.472671
Schwarz SC	1.893104	-3.814559	-12.28785	-1.941249	-4.420531
Mean dependent	-0.012561	0.001944	0.006841	-2.75E-05	0.002048
S.D. dependent	0.650656	0.053924	0.002977	0.089138	0.040279
Determinant resid covariance (dof adj.)		5.58E-16			
Determinant resid covariance		5.32E-16			
Log likelihood		18777.28			
Akaike information criterion		-20.87964			
Schwarz criterion		-20.60361			

Table 3 Model 3

Error Correction:	D(GDP)	D(LNDPCP)	D(LNPOP)	D(LNSAV)	D(LNINT)
CointEq1	-0.137795	-0.002569	2.46E-05	0.012703	-0.000297
	(0.01461)	(0.00133)	(1.3E-05)	(0.00232)	(0.00068)
	[-9.43273]	[-1.93007]	[1.87979]	[5.48401]	[-0.43853]
D(GDP(-1))	0.059153	0.001572	-1.17E-05	-0.008717	0.000458
	(0.02244)	(0.00204)	(2.0E-05)	(0.00356)	(0.00104)
	[2.63631]	[0.76874]	[-0.58240]	[-2.45017]	[0.43969]

D(GDP(-2))	0.072057	0.001867	-1.24E-05	-0.009212	0.000412
	(0.02244)	(0.00204)	(2.0E-05)	(0.00356)	(0.00104)
	[3.21148]	[0.91332]	[-0.61581]	[-2.58929]	[0.39571]
D(GDP(-3))	0.068724	0.002236	-1.31E-05	-0.011526	0.000401
	(0.02245)	(0.00205)	(2.0E-05)	(0.00356)	(0.00104)
	[3.06076]	[1.09320]	[-0.64864]	[-3.23721]	[0.38500]
D(GDP(-4))	-0.375128	0.004721	-3.14E-05	-0.002688	-0.001124
	(0.02251)	(0.00205)	(2.0E-05)	(0.00357)	(0.00104)
	[-16.6673]	[2.30199]	[-1.55248]	[-0.75311]	[-1.07685]
D(LNDCP(-1))	0.025125	0.634255	7.39E-05	0.000970	-0.007186
	(0.26004)	(0.02369)	(0.00023)	(0.04123)	(0.01206)
	[0.09662]	[26.7701]	[0.31681]	[0.02353]	[-0.59594]
D(LNDCP(-2))	0.031573	0.058450	-6.00E-06	0.002127	-0.006828
	(0.30959)	(0.02821)	(0.00028)	(0.04909)	(0.01436)
	[0.10198]	[2.07213]	[-0.02158]	[0.04332]	[-0.47562]
D(LNDCP(-3))	0.097017	0.029283	-2.81E-05	-0.000252	-0.014174
	(0.30957)	(0.02821)	(0.00028)	(0.04909)	(0.01436)
	[0.31339]	[1.03817]	[-0.10119]	[-0.00514]	[-0.98728]
D(LNDCP(-4))	-0.287190	-0.212143	0.000183	0.000255	0.033551
	(0.26046)	(0.02373)	(0.00023)	(0.04130)	(0.01208)
	[-1.10261]	[-8.93921]	[0.78478]	[0.00617]	[2.77771]
D(LNPOP(-1))	11.89049	-0.034965	0.992394	-1.746008	-0.399820
	(26.7040)	(2.43309)	(0.02397)	(4.23437)	(1.23837)
	[0.44527]	[-0.01437]	[41.4022]	[-0.41234]	[-0.32286]
D(LNPOP(-2))	0.471588	0.100642	0.000333	-1.626741	-0.063109
	(37.6352)	(3.42907)	(0.03378)	(5.96768)	(1.74529)
	[0.01253]	[0.02935]	[0.00987]	[-0.27259]	[-0.03616]
D(LNPOP(-3))	2.152370	0.111425	-0.000410	-3.829791	-0.094467
	(37.6358)	(3.42913)	(0.03378)	(5.96779)	(1.74532)
	[0.05719]	[0.03249]	[-0.01215]	[-0.64174]	[-0.05413]
D(LNPOP(-4))	-17.52158	-1.133780	0.009088	8.338599	0.524897
	(27.1086)	(2.46996)	(0.02433)	(4.29852)	(1.25713)
	[-0.64635]	[-0.45903]	[0.37347]	[1.93988]	[0.41753]
D(LNSAV(-1))	-0.126327	-0.003247	-0.000165	0.102150	0.000408
	(0.15041)	(0.01370)	(0.00014)	(0.02385)	(0.00698)
	[-0.83988]	[-0.23691]	[-1.22253]	[4.28299]	[0.05852]

D(LNSAV(-2))	-0.180026	-0.005928	-4.47E-05	0.061502	-0.000412
	(0.15128)	(0.01378)	(0.00014)	(0.02399)	(0.00702)
	[-1.19005]	[-0.43012]	[-0.32931]	[2.56391]	[-0.05869]
D(LNSAV(-3))	-0.233813	-0.011155	-1.52E-05	0.027110	-0.000614
	(0.15158)	(0.01381)	(0.00014)	(0.02404)	(0.00703)
	[-1.54246]	[-0.80767]	[-0.11146]	[1.12788]	[-0.08737]
D(LNSAV(-4))	-0.549631	-0.042778	-0.000125	-0.030524	0.000516
	(0.15146)	(0.01380)	(0.00014)	(0.02402)	(0.00702)
	[-3.62890]	[-3.09983]	[-0.92165]	[-1.27095]	[0.07345]
D(LNINT(-1))	0.397625	-0.054467	-0.000213	0.003606	0.792738
	(0.51420)	(0.04685)	(0.00046)	(0.08154)	(0.02385)
	[0.77328]	[-1.16257]	[-0.46046]	[0.04423]	[33.2447]
D(LNINT(-2))	0.081075	-0.021265	1.47E-05	-0.009304	0.016848
	(0.65819)	(0.05997)	(0.00059)	(0.10437)	(0.03052)
	[0.12318]	[-0.35459]	[0.02495]	[-0.08915]	[0.55196]
D(LNINT(-3))	0.162867	0.031741	2.67E-05	0.025608	0.008627
	(0.65821)	(0.05997)	(0.00059)	(0.10437)	(0.03052)
	[0.24744]	[0.52927]	[0.04523]	[0.24536]	[0.28263]
D(LNINT(-4))	0.105210	0.001646	0.000127	0.035071	0.134141
	(0.51385)	(0.04682)	(0.00046)	(0.08148)	(0.02383)
	[0.20475]	[0.03516]	[0.27563]	[0.43043]	[5.62928]
C	0.005694	0.006436	-3.73E-05	-0.008686	0.000854
	(0.03604)	(0.00328)	(3.2E-05)	(0.00572)	(0.00167)
	[0.15796]	[1.95979]	[-1.15250]	[-1.51978]	[0.51113]
R-squared	0.230093	0.469424	0.971394	0.035267	0.603996
Adj. R-squared	0.220785	0.463010	0.971048	0.023604	0.599209
Sum sq. resids	545.2980	4.526875	0.000439	13.71063	1.172687
S.E. equation	0.560295	0.051050	0.000503	0.088844	0.025983
F-statistic	24.71988	73.18111	2808.787	3.023745	126.1581
Log likelihood	-1465.870	2748.079	10874.89	1773.470	3936.049
Akaike AIC	1.691723	-3.099578	-12.33984	-1.991438	-4.450312
Schwarz SC	1.760168	-3.031132	-12.27140	-1.922993	-4.381866
Mean dependent	-0.015213	-0.001110	0.006803	-4.74E-05	0.002219
S.D. dependent	0.634729	0.069665	0.002956	0.089912	0.041042
Determinant resid covariance (dof adj.)		1.08E-15			
Determinant resid covariance		1.01E-15			
Log likelihood		17885.21			
Akaike information criterion		-20.20490			

Schwarz criterion	-19.84712			

Low Income Countries (External Sources of Fluctuations)

Table 4 Model 4

Error Correction:	D(LOGGDP)	D(LOGODA)	D(LOGPR)	D(LOGTRAD)	D(LOGCO2)
CointEq1	-0.065351 (0.02392) [-2.73205]	0.026246 (0.03280) [0.80023]	-0.144051 (0.03261) [-4.41681]	0.428540 (1.36524) [0.31389]	-0.005675 (0.02684) [-0.21142]
D(LOGGDP(-1))	0.521763 (0.18672) [2.79435]	-0.003696 (0.25602) [-0.01443]	-0.458266 (0.25459) [-1.80004]	5.975156 (10.6570) [0.56068]	-0.210344 (0.20954) [-1.00382]
D(LOGGDP(-2))	0.074969 (0.23325) [0.32141]	0.086583 (0.31982) [0.27072]	0.079821 (0.31802) [0.25099]	-0.192562 (13.3126) [-0.01446]	0.013370 (0.26176) [0.05108]
D(LOGGDP(-3))	0.075984 (0.25389) [0.29928]	0.001540 (0.34812) [0.00442]	0.122775 (0.34617) [0.35467]	-0.349385 (14.4906) [-0.02411]	-0.027599 (0.28492) [-0.09687]
D(LOGGDP(-4))	-0.671159 (0.26059) [-2.57557]	-1.629256 (0.35730) [-4.55985]	-0.044839 (0.35530) [-0.12620]	8.524625 (14.8729) [0.57317]	-0.210490 (0.29244) [-0.71978]
D(LOGODA(-1))	-0.156501 (0.11098) [-1.41024]	0.076156 (0.15216) [0.50049]	0.154248 (0.15131) [1.01942]	-2.448712 (6.33387) [-0.38661]	0.098644 (0.12454) [0.79207]
D(LOGODA(-2))	-0.013467 (0.12190) [-0.11047]	-0.018218 (0.16715) [-0.10900]	-0.010074 (0.16621) [-0.06061]	-0.171985 (6.95747) [-0.02472]	-0.002545 (0.13680) [-0.01860]
D(LOGODA(-3))	0.004623 (0.13300) [0.03476]	0.052351 (0.18236) [0.28707]	-0.057234 (0.18134) [-0.31562]	-0.340786 (7.59091) [-0.04489]	0.027811 (0.14926) [0.18633]
D(LOGODA(-4))	0.137865 (0.16756) [0.82276]	0.221352 (0.22976) [0.96342]	0.145615 (0.22847) [0.63736]	-6.017191 (9.56372) [-0.62917]	0.170630 (0.18805) [0.90738]
D(LOGPR(-1))	-0.162618 (0.07586) [-2.14368]	-0.038747 (0.10402) [-0.37251]	0.208110 (0.10343) [2.01206]	-1.329173 (4.32965) [-0.30699]	0.058208 (0.08513) [0.68374]

D(LOGPR(-2))	-0.007193	-0.040550	0.016038	-0.143588	0.001889
	(0.08743)	(0.11989)	(0.11921)	(4.99031)	(0.09812)
	[-0.08226]	[-0.33824]	[0.13453]	[-0.02877]	[0.01925]
D(LOGPR(-3))	-0.075888	-0.159301	0.131924	0.757824	-0.046974
	(0.09930)	(0.13616)	(0.13540)	(5.66770)	(0.11144)
	[-0.76421]	[-1.16995]	[0.97436]	[0.13371]	[-0.42152]
D(LOGPR(-4))	-0.036042	0.017027	-0.270340	-1.531182	0.159333
	(0.09058)	(0.12420)	(0.12350)	(5.16971)	(0.10165)
	[-0.39792]	[0.13710]	[-2.18900]	[-0.29618]	[1.56748]
D(LOGTRAD(-1))	-0.025753	0.013414	-0.059873	0.266119	-0.004388
	(0.01114)	(0.01527)	(0.01519)	(0.63581)	(0.01250)
	[-2.31179]	[0.87816]	[-3.94185]	[0.41855]	[-0.35097]
D(LOGTRAD(-2))	-0.025428	0.013871	-0.059408	0.183061	-0.003965
	(0.01105)	(0.01515)	(0.01507)	(0.63082)	(0.01240)
	[-2.30062]	[0.91527]	[-3.94220]	[0.29020]	[-0.31969]
D(LOGTRAD(-3))	-0.024396	0.014477	-0.059555	0.149721	-0.003784
	(0.01078)	(0.01478)	(0.01469)	(0.61513)	(0.01209)
	[-2.26358]	[0.97966]	[-4.05279]	[0.24340]	[-0.31283]
D(LOGTRAD(-4))	0.321060	0.963108	0.501579	-3.472115	0.090416
	(0.20944)	(0.28717)	(0.28556)	(11.9535)	(0.23504)
	[1.53297]	[3.35379]	[1.75649]	[-0.29047]	[0.38469]
D(LOGCO2(-1))	-0.084761	0.314470	-0.047918	1.470042	0.390616
	(0.17904)	(0.24550)	(0.24412)	(10.2188)	(0.20093)
	[-0.47341]	[1.28095]	[-0.19629]	[0.14386]	[1.94407]
D(LOGCO2(-2))	-0.025104	-0.014632	-0.049065	0.147802	0.007137
	(0.19769)	(0.27107)	(0.26954)	(11.2832)	(0.22185)
	[-0.12699]	[-0.05398]	[-0.18203]	[0.01310]	[0.03217]
D(LOGCO2(-3))	0.054114	0.058727	-0.159287	-1.076279	0.035265
	(0.19687)	(0.26994)	(0.26843)	(11.2364)	(0.22093)
	[0.27487]	[0.21755]	[-0.59341]	[-0.09579]	[0.15962]
D(LOGCO2(-4))	-0.080443	0.837388	-0.154810	-1.840928	-0.376248
	(0.26711)	(0.36625)	(0.36419)	(15.2451)	(0.29976)
	[-0.30116]	[2.28640]	[-0.42508]	[-0.12076]	[-1.25518]

D(BRAEK(-1))	0.039731	0.032797	0.021816	-0.318479	0.020783
	(0.02614)	(0.03584)	(0.03564)	(1.49195)	(0.02934)
	[1.51990]	[0.91502]	[0.61209]	[-0.21346]	[0.70845]
D(BRAEK(-2))	0.069244	0.093081	-0.079489	-0.513459	0.041484
	(0.02567)	(0.03520)	(0.03500)	(1.46515)	(0.02881)
	[2.69738]	[2.64445]	[-2.27105]	[-0.35045]	[1.43998]
D(BRAEK(-3))	0.051173	0.064655	-0.059178	-0.630840	0.023281
	(0.02579)	(0.03537)	(0.03517)	(1.47215)	(0.02895)
	[1.98398]	[1.82814]	[-1.68272]	[-0.42852]	[0.80431]
D(BRAEK(-4))	0.046083	0.057981	-0.059901	-0.609403	0.021709
	(0.02404)	(0.03297)	(0.03278)	(1.37224)	(0.02698)
	[1.91671]	[1.75877]	[-1.82730]	[-0.44409]	[0.80460]
C	0.021525	-0.000615	0.040130	-0.064777	0.014444
	(0.00521)	(0.00715)	(0.00711)	(0.29758)	(0.00585)
	[4.12852]	[-0.08605]	[5.64507]	[-0.21768]	[2.46866]
R-squared	0.912671	0.911789	0.878397	0.166057	0.785344
Adj. R-squared	0.791380	0.789273	0.709505	-0.992197	0.487211
Sum sq. resids	0.004291	0.008067	0.007976	13.97706	0.005404
S.E. equation	0.015439	0.021170	0.021051	0.881194	0.017326
F-statistic	7.524653	7.442233	5.200922	0.143368	2.634205
Log likelihood	140.7476	126.8588	127.1065	-37.20431	135.6738
Akaike AIC	-5.215800	-4.584490	-4.595751	2.872923	-4.985172
Schwarz SC	-4.161506	-3.530196	-3.541457	3.927217	-3.930878
Mean dependent	0.017945	0.004571	0.019633	0.135348	0.009839
S.D. dependent	0.033803	0.046116	0.039057	0.624318	0.024196
Determinant resid covariance (dof adj.)		3.92E-20			
Determinant resid covariance		1.84E-22			
Log likelihood		726.4921			
Akaike information criterion		-25.65873			
Schwarz criterion		-19.08967			

Upper Middle Income Countries (Internal Sources of Fluctuations)

Table 5 Model 1

Error Correction:	D(GDP)	D(M2)	D(POP)	D(SAV)	D(INT)
CointEq1	-0.084709	0.025056	-220.7243	21162445	-1.009191
	(0.00626)	(0.00817)	(218.876)	(1.2E+07)	(0.36000)
	[-13.5422]	[3.06854]	[-1.00844]	[1.82068]	[-2.80328]
D(GDP(-1))	0.682444	0.025458	-474.3570	-37352989	-0.431993

	(0.02395)	(0.03126)	(837.990)	(4.5E+07)	(1.37831)
	[28.4964]	[0.81434]	[-0.56607]	[-0.83937]	[-0.31342]
D(GDP(-2))	0.037236	-0.011613	98.10057	-9212696.	0.437437
	(0.02998)	(0.03913)	(1049.00)	(5.6E+07)	(1.72538)
	[1.24209]	[-0.29674]	[0.09352]	[-0.16538]	[0.25353]
D(GDP(-3))	-0.160275	-0.032641	-64.39095	-54425068	3.863277
	(0.02391)	(0.03121)	(836.514)	(4.4E+07)	(1.37588)
	[-6.70433]	[-1.04595]	[-0.07698]	[-1.22516]	[2.80786]
D(M2(-1))	-0.003993	0.805040	-255.1033	-7802524.	-0.080401
	(0.01874)	(0.02446)	(655.607)	(3.5E+07)	(1.07833)
	[-0.21313]	[32.9150]	[-0.38911]	[-0.22411]	[-0.07456]
D(M2(-2))	-0.002097	0.000874	-8.413108	933677.7	-0.035009
	(0.02424)	(0.03164)	(848.060)	(4.5E+07)	(1.39487)
	[-0.08651]	[0.02764]	[-0.00992]	[0.02073]	[-0.02510]
D(M2(-3))	0.012388	-0.184869	-214.9049	1328700.	-0.002625
	(0.01858)	(0.02426)	(650.277)	(3.5E+07)	(1.06956)
	[0.66660]	[-7.62051]	[-0.33048]	[0.03848]	[-0.00245]
D(POP(-1))	-2.85E-07	-2.10E-07	0.985499	20.66523	1.37E-06
	(7.1E-07)	(9.2E-07)	(0.02474)	(1313.68)	(4.1E-05)
	[-0.40258]	[-0.22799]	[39.8384]	[0.01573]	[0.03371]
D(POP(-2))	-4.78E-08	1.13E-08	-0.000101	8.621884	-4.97E-07
	(9.9E-07)	(1.3E-06)	(0.03474)	(1844.95)	(5.7E-05)
	[-0.04811]	[0.00872]	[-0.00290]	[0.00467]	[-0.00869]
D(POP(-3))	5.74E-07	2.49E-07	0.012159	66.51888	2.10E-06
	(7.1E-07)	(9.2E-07)	(0.02471)	(1312.20)	(4.1E-05)
	[0.81348]	[0.27050]	[0.49209]	[0.05069]	[0.05176]
D(SAV(-1))	4.64E-11	-1.65E-12	1.05E-07	0.987657	3.35E-10
	(1.4E-11)	(1.8E-11)	(4.9E-07)	(0.02598)	(8.0E-10)
	[3.31788]	[-0.09044]	[0.21530]	[38.0130]	[0.41680]
D(SAV(-2))	3.85E-12	-1.90E-12	1.52E-08	-0.001570	5.80E-11
	(1.9E-11)	(2.5E-11)	(6.8E-07)	(0.03616)	(1.1E-09)
	[0.19779]	[-0.07488]	[0.02232]	[-0.04343]	[0.05178]
D(SAV(-3))	-6.39E-13	-9.69E-12	-1.21E-07	-0.024610	2.48E-10
	(1.4E-11)	(1.8E-11)	(4.9E-07)	(0.02616)	(8.1E-10)
	[-0.04538]	[-0.52711]	[-0.24572]	[-0.94082]	[0.30595]

D(INT(-1))	1.81E-05	-7.04E-05	0.465630	-58322.03	0.778558
	(0.00042)	(0.00054)	(14.5340)	(771823.)	(0.02391)
	[0.04346]	[-0.12983]	[0.03204]	[-0.07556]	[32.5686]
D(INT(-2))	0.000514	-0.000154	1.344169	-128497.8	0.006116
	(0.00053)	(0.00070)	(18.6387)	(989805.)	(0.03066)
	[0.96443]	[-0.22085]	[0.07212]	[-0.12982]	[0.19949]
D(INT(-3))	0.000275	-0.000469	2.749564	-573158.0	-0.193476
	(0.00043)	(0.00056)	(14.9921)	(796155.)	(0.02466)
	[0.64115]	[-0.83912]	[0.18340]	[-0.71991]	[-7.84614]
D(BREAK(-1))	-0.066409	0.186120	34.45883	2560998.	1.623512
	(0.35322)	(0.46109)	(12359.6)	(6.6E+08)	(20.3288)
	[-0.18801]	[0.40365]	[0.00279]	[0.00390]	[0.07986]
D(BREAK(-2))	-0.407561	0.062615	553.1302	-73540413	0.607525
	(0.35315)	(0.46100)	(12357.1)	(6.6E+08)	(20.3248)
	[-1.15408]	[0.13583]	[0.04476]	[-0.11207]	[0.02989]
D(BREAK(-3))	-0.503306	0.345492	-191.0819	-1.80E+08	3.719116
	(0.35192)	(0.45940)	(12314.3)	(6.5E+08)	(20.2543)
	[-1.43016]	[0.75205]	[-0.01552]	[-0.27485]	[0.18362]
C	-0.148625	0.074769	-157.6957	47519660	-2.042035
	(0.02425)	(0.03166)	(848.563)	(4.5E+07)	(1.39570)
	[-6.12871]	[2.36189]	[-0.18584]	[1.05452]	[-1.46309]
R-squared	0.556866	0.569218	0.998831	0.949134	0.530473
Adj. R-squared	0.551836	0.564328	0.998818	0.948557	0.525144
Sum sq. resids	1026.706	1749.569	1.26E+12	3.55E+21	3400836.
S.E. equation	0.783151	1.022322	27403.58	1.46E+09	45.07286
F-statistic	110.7178	116.4186	75292.92	1644.001	99.54169
Log likelihood	-1979.558	-2431.020	-19703.64	-38134.40	-8844.849
Akaike AIC	2.360753	2.893767	23.28647	45.04652	10.46617
Schwarz SC	2.424919	2.957933	23.35064	45.11068	10.53034
Mean dependent	0.021377	0.204308	346197.5	1.55E+09	-0.091562
S.D. dependent	1.169842	1.548846	797052.1	6.42E+09	65.40850
Determinant resid covariance (dof adj.)		5.15E+27			
Determinant resid covariance		4.80E+27			
Log likelihood		-68408.11			
Akaike information criterion		80.91395			
Schwarz criterion		81.31819			

Table 6 Model 2

Error Correction:	D(GDP)	D(DCB)	D(POP)	D(SAV)
-------------------	--------	--------	--------	--------

CointEq1	-0.075528	0.025020	-17.40867	-11208233
	(0.00586)	(0.00644)	(103.076)	(1.2E+07)
	[-12.8942]	[3.88290]	[-0.16889]	[-0.96148]
D(GDP(-1))	0.767063	0.025968	-70.84522	-38864855
	(0.02238)	(0.02461)	(393.743)	(4.5E+07)
	[34.2814]	[1.05503]	[-0.17993]	[-0.87278]
D(GDP(-2))	0.031498	-0.013148	8.802838	4383034.
	(0.02545)	(0.02799)	(447.787)	(5.1E+07)
	[1.23781]	[-0.46969]	[0.01966]	[0.08655]
D(GDP(-3))	0.032142	-0.009164	7.351597	5202796.
	(0.02542)	(0.02796)	(447.298)	(5.1E+07)
	[1.26449]	[-0.32774]	[0.01644]	[0.10285]
D(GDP(-4))	-0.499730	0.039386	152.8940	89303257
	(0.02550)	(0.02805)	(448.729)	(5.1E+07)
	[-19.5971]	[1.40409]	[0.34073]	[1.75971]
D(GDP(-5))	0.355521	-0.033377	-279.6569	-1.10E+08
	(0.02179)	(0.02397)	(383.471)	(4.3E+07)
	[16.3145]	[-1.39233]	[-0.72928]	[-2.52694]
D(DCB(-1))	-0.007776	0.899024	-201.9390	-50633339
	(0.02229)	(0.02452)	(392.198)	(4.4E+07)
	[-0.34888]	[36.6689]	[-0.51489]	[-1.14153]
D(DCB(-2))	0.004772	-0.000358	-0.432188	53249.02
	(0.02923)	(0.03216)	(514.440)	(5.8E+07)
	[0.16325]	[-0.01113]	[-0.00084]	[0.00092]
D(DCB(-3))	6.75E-05	0.000321	0.021945	106299.2
	(0.02912)	(0.03203)	(512.456)	(5.8E+07)
	[0.00232]	[0.01003]	[4.3e-05]	[0.00183]
D(DCB(-4))	-0.040161	-0.318909	401.8602	-30365453
	(0.02923)	(0.03216)	(514.437)	(5.8E+07)
	[-1.37378]	[-9.91669]	[0.78117]	[-0.52192]
D(DCB(-5))	0.008640	0.228125	-432.9898	-25342904
	(0.02224)	(0.02446)	(391.340)	(4.4E+07)
	[0.38849]	[9.32504]	[-1.10643]	[-0.57261]
D(POP(-1))	3.94E-09	-2.08E-07	0.942004	432.9239
	(8.3E-07)	(9.1E-07)	(0.01456)	(1646.29)
	[0.00477]	[-0.22872]	[64.7123]	[0.26297]

D(POP(-2))	-5.35E-08	1.64E-08	8.20E-07	-6.316431
	(1.1E-06)	(1.2E-06)	(0.01968)	(2225.54)
	[-0.04786]	[0.01337]	[4.2e-05]	[-0.00284]
D(POP(-3))	-2.91E-08	1.87E-09	-5.81E-06	-6.193190
	(1.1E-06)	(1.2E-06)	(0.01968)	(2225.52)
	[-0.02606]	[0.00152]	[-0.00030]	[-0.00278]
D(POP(-4))	-6.75E-07	-1.11E-06	0.680967	-14918.05
	(1.1E-06)	(1.2E-06)	(0.01969)	(2226.84)
	[-0.60299]	[-0.89961]	[34.5842]	[-6.69920]
D(POP(-5))	7.29E-07	1.31E-06	-0.630505	14590.22
	(8.2E-07)	(9.0E-07)	(0.01446)	(1634.84)
	[0.88781]	[1.44943]	[-43.6170]	[8.92457]
D(SAV(-1))	2.69E-11	-7.06E-12	1.43E-07	0.999439
	(1.2E-11)	(1.3E-11)	(2.1E-07)	(0.02409)
	[2.21983]	[-0.52997]	[0.67317]	[41.4942]
D(SAV(-2))	2.17E-12	-9.63E-13	2.41E-09	0.000363
	(1.7E-11)	(1.9E-11)	(3.0E-07)	(0.03373)
	[0.12789]	[-0.05166]	[0.00807]	[0.01077]
D(SAV(-3))	4.38E-12	-1.42E-12	1.34E-09	0.000708
	(1.7E-11)	(1.9E-11)	(3.0E-07)	(0.03372)
	[0.25851]	[-0.07619]	[0.00449]	[0.02099]
D(SAV(-4))	-7.47E-11	-3.21E-11	2.50E-08	-0.454327
	(1.7E-11)	(1.9E-11)	(3.0E-07)	(0.03392)
	[-4.38286]	[-1.71126]	[0.08326]	[-13.3938]
D(SAV(-5))	6.90E-11	3.43E-11	1.47E-07	0.450445
	(1.2E-11)	(1.4E-11)	(2.2E-07)	(0.02458)
	[5.58324]	[2.52736]	[0.67434]	[18.3251]
D(INT(-1))	0.000240	-0.000140	0.363636	32952.29
	(0.00037)	(0.00041)	(6.55530)	(741368.)
	[0.64303]	[-0.34078]	[0.05547]	[0.04445]
D(INT(-2))	0.000532	-0.000182	0.125838	78558.17
	(0.00045)	(0.00049)	(7.83173)	(885725.)
	[1.19573]	[-0.37139]	[0.01607]	[0.08869]
D(INT(-3))	0.000534	-0.000172	0.123124	80402.58
	(0.00045)	(0.00049)	(7.83153)	(885703.)
	[1.19887]	[-0.35231]	[0.01572]	[0.09078]

D(INT(-4))	-0.001425	-2.44E-05	0.390784	134133.1
	(0.00045)	(0.00049)	(7.83158)	(885708.)
	[-3.20113]	[-0.04986]	[0.04990]	[0.15144]
D(INT(-5))	0.001817	-0.000322	-0.292518	-58239.62
	(0.00038)	(0.00042)	(6.67345)	(754730.)
	[4.79128]	[-0.77134]	[-0.04383]	[-0.07717]
D(BREAK(-1))	0.131815	0.187994	137.5845	1.31E+08
	(0.29557)	(0.32514)	(5201.18)	(5.9E+08)
	[0.44597]	[0.57820]	[0.02645]	[0.22242]
D(BREAK(-2))	-0.195358	0.201269	534.9256	42551952
	(0.29513)	(0.32465)	(5193.43)	(5.9E+08)
	[-0.66194]	[0.61995]	[0.10300]	[0.07245]
D(BREAK(-3))	-0.166960	0.221423	616.1765	69127118
	(0.29505)	(0.32457)	(5192.02)	(5.9E+08)
	[-0.56587]	[0.68221]	[0.11868]	[0.11773]
D(BREAK(-4))	0.916551	-1.918712	555.2189	-2.56E+08
	(0.29511)	(0.32463)	(5193.06)	(5.9E+08)
	[3.10580]	[-5.91042]	[0.10692]	[-0.43637]
D(BREAK(-5))	-0.517734	-0.016461	86.80365	-15102879
	(0.29692)	(0.32662)	(5224.85)	(5.9E+08)
	[-1.74371]	[-0.05040]	[0.01661]	[-0.02556]
C	-0.032334	0.049437	722.8821	8440581.
	(0.01822)	(0.02005)	(320.696)	(3.6E+07)
	[-1.77424]	[2.46597]	[2.25411]	[0.23272]
R-squared	0.692627	0.712865	0.999726	0.961271
Adj. R-squared	0.686623	0.707256	0.999720	0.960514
Sum sq. resids	677.4991	819.8327	2.10E+11	2.68E+21
S.E. equation	0.653380	0.718744	11497.59	1.30E+09
F-statistic	115.3586	127.0972	186658.4	1270.643
Log likelihood	-1592.061	-1746.426	-17418.58	-36257.23
Akaike AIC	2.006252	2.196944	21.55723	44.82919
Schwarz SC	2.112778	2.303470	21.66376	44.93571
Mean dependent	0.019695	0.178720	292562.5	1.57E+09
S.D. dependent	1.167166	1.328404	687672.3	6.54E+09
Determinant resid covariance (dof adj.)		2.20E+26		
Determinant resid covariance		1.96E+26		
Log likelihood		-62789.21		
Akaike information criterion		77.81001		
Schwarz criterion		78.46915		

--	--	--	--	--

Table 7 Model 3

Error Correction:	D(GDP)	D(DCP)	D(POP)	D(SAV)	D(INT)
CointEq1	-0.011651 (0.00308) [-3.77919]	0.010176 (0.00514) [1.98000]	-574.9131 (111.180) [-5.17103]	70282367 (5648580) [12.4425]	0.033050 (0.17700) [0.18672]
D(GDP(-1))	0.619163 (0.02418) [25.6019]	0.002450 (0.04032) [0.06077]	-725.6589 (872.174) [-0.83201]	-37076588 (4.4E+07) [-0.83672]	0.319963 (1.38853) [0.23043]
D(GDP(-2))	0.006320 (0.02923) [0.21621]	-0.007238 (0.04873) [-0.14853]	259.8014 (1054.20) [0.24645]	-30903344 (5.4E+07) [-0.57699]	-0.015513 (1.67832) [-0.00924]
D(GDP(-3))	0.004567 (0.02923) [0.15625]	-0.001914 (0.04873) [-0.03928]	252.0377 (1054.22) [0.23907]	-31649006 (5.4E+07) [-0.59090]	-0.019919 (1.67836) [-0.01187]
D(GDP(-4))	-0.333129 (0.02353) [-14.1573]	0.001675 (0.03923) [0.04269]	-291.6282 (848.598) [-0.34366]	-59596720 (4.3E+07) [-1.38231]	4.040394 (1.35100) [2.99067]
D(DCP(-1))	-0.015617 (0.01481) [-1.05429]	0.825357 (0.02469) [33.4241]	-19.33159 (534.192) [-0.03619]	-23367802 (2.7E+07) [-0.86100]	-0.023658 (0.85045) [-0.02782]
D(DCP(-2))	0.000891 (0.01931) [0.04614]	-0.001281 (0.03219) [-0.03978]	-2.429623 (696.372) [-0.00349]	717211.3 (3.5E+07) [0.02027]	0.003070 (1.10865) [0.00277]
D(DCP(-3))	2.91E-06 (0.01931) [0.00015]	0.000148 (0.03219) [0.00460]	-4.082960 (696.431) [-0.00586]	393465.3 (3.5E+07) [0.01112]	-0.001635 (1.10874) [-0.00148]
D(DCP(-4))	-0.010827 (0.01476) [-0.73373]	-0.168369 (0.02460) [-6.84469]	-36.00424 (532.139) [-0.06766]	-19145056 (2.7E+07) [-0.70814]	0.592235 (0.84719) [0.69906]
D(POP(-1))	-5.04E-07 (7.0E-07) [-0.72203]	6.64E-08 (1.2E-06) [0.05706]	0.974768 (0.02517) [38.7300]	1283.691 (1278.70) [1.00391]	4.37E-06 (4.0E-05) [0.10912]
D(POP(-2))	-2.10E-08 (9.8E-07) [-0.02152]	1.73E-08 (1.6E-06) [0.01061]	-0.000805 (0.03522) [-0.02286]	97.83479 (1789.46) [0.05467]	6.29E-09 (5.6E-05) [0.00011]

D(POP(-3))	-1.09E-08	1.22E-08	-0.000809	100.2997	6.17E-08
	(9.8E-07)	(1.6E-06)	(0.03522)	(1789.46)	(5.6E-05)
	[-0.01117]	[0.00752]	[-0.02297]	[0.05605]	[0.00110]
D(POP(-4))	8.08E-07	-2.54E-07	0.036691	-2914.977	-5.20E-06
	(7.1E-07)	(1.2E-06)	(0.02551)	(1296.17)	(4.1E-05)
	[1.14212]	[-0.21534]	[1.43817]	[-2.24892]	[-0.12810]
D(SAV(-1))	4.37E-11	-1.95E-11	8.46E-07	0.894874	2.57E-11
	(1.4E-11)	(2.4E-11)	(5.2E-07)	(0.02627)	(8.2E-10)
	[3.04664]	[-0.81773]	[1.63510]	[34.0589]	[0.03121]
D(SAV(-2))	-3.74E-14	-5.55E-13	4.71E-08	-0.005776	-1.15E-11
	(1.9E-11)	(3.2E-11)	(6.9E-07)	(0.03514)	(1.1E-09)
	[-0.00195]	[-0.01737]	[0.06806]	[-0.16439]	[-0.01048]
D(SAV(-3))	1.40E-12	9.70E-14	4.41E-08	-0.005502	-1.50E-12
	(1.9E-11)	(3.2E-11)	(6.9E-07)	(0.03514)	(1.1E-09)
	[0.07312]	[0.00303]	[0.06372]	[-0.15658]	[-0.00136]
D(SAV(-4))	-1.54E-11	-1.00E-11	6.74E-07	-0.125358	-1.31E-10
	(1.5E-11)	(2.4E-11)	(5.2E-07)	(0.02662)	(8.3E-10)
	[-1.05668]	[-0.41489]	[1.28574]	[-4.70977]	[-0.15663]
D(INT(-1))	2.68E-06	-0.000169	2.250076	-288143.4	0.713739
	(0.00042)	(0.00070)	(15.1190)	(768133.)	(0.02407)
	[0.00640]	[-0.24206]	[0.14882]	[-0.37512]	[29.6527]
D(INT(-2))	5.87E-05	-5.44E-05	2.844093	-346404.2	-0.000167
	(0.00052)	(0.00087)	(18.8541)	(957900.)	(0.03002)
	[0.11225]	[-0.06240]	[0.15085]	[-0.36163]	[-0.00557]
D(INT(-3))	5.49E-05	-4.32E-05	2.828271	-347888.4	-0.000174
	(0.00052)	(0.00087)	(18.8540)	(957898.)	(0.03002)
	[0.10506]	[-0.04961]	[0.15001]	[-0.36318]	[-0.00580]
D(INT(-4))	-0.001448	-0.000392	4.121340	-988549.8	-0.270289
	(0.00042)	(0.00070)	(15.1699)	(770723.)	(0.02415)
	[-3.44337]	[-0.55839]	[0.27168]	[-1.28263]	[-11.1916]
D(BREAK(-1))	-0.290859	0.217859	1011.957	-1.72E+08	1.352039
	(0.34785)	(0.57989)	(12544.8)	(6.4E+08)	(19.9718)
	[-0.83616]	[0.37569]	[0.08067]	[-0.27060]	[0.06770]
D(BREAK(-2))	-0.483200	0.157045	1514.032	-1.97E+08	-1.041837
	(0.34763)	(0.57952)	(12536.7)	(6.4E+08)	(19.9589)
	[-1.39000]	[0.27099]	[0.12077]	[-0.30970]	[-0.05220]

D(BREAK(-3))	-0.333208	0.439362	937.3973	-1.72E+08	-0.877097
	(0.34767)	(0.57959)	(12538.2)	(6.4E+08)	(19.9613)
	[-0.95841]	[0.75806]	[0.07476]	[-0.27003]	[-0.04394]
D(BREAK(-4))	1.148400	-2.040280	3431.343	2.82E+08	2.922333
	(0.34681)	(0.57816)	(12507.3)	(6.4E+08)	(19.9121)
	[3.31130]	[-3.52892]	[0.27435]	[0.44335]	[0.14676]
C	-0.119385	0.175060	-7239.540	9.23E+08	0.256565
	(0.04506)	(0.07512)	(1625.17)	(8.3E+07)	(2.58733)
	[-2.64923]	[2.33026]	[-4.45463]	[11.1732]	[0.09916]
R-squared	0.572533	0.629147	0.998839	0.954028	0.567301
Adj. R-squared	0.565862	0.623360	0.998821	0.953310	0.560548
Sum sq. resids	950.7470	2642.238	1.24E+12	3.19E+21	3134083.
S.E. equation	0.770373	1.284265	27782.47	1.41E+09	44.23072
F-statistic	85.82618	108.7111	55143.35	1329.799	84.01357
Log likelihood	-1872.214	-2704.231	-18954.88	-36595.52	-8466.102
Akaike AIC	2.331959	3.354092	23.31804	44.98958	10.43256
Schwarz SC	2.418121	3.440255	23.40420	45.07574	10.51872
Mean dependent	0.039731	0.195862	350534.2	1.61E+09	-0.093910
S.D. dependent	1.169196	2.092626	809181.2	6.53E+09	66.72189
Determinant resid covariance (dof adj.)		7.92E+27			
Determinant resid covariance		7.19E+27			
Log likelihood		-66071.98			
Akaike information criterion		81.36852			
Schwarz criterion		81.90538			

Upper Middle Income Countries (External Sources of Fluctuations)

Table 8 Model 4

Error Correction:	D(LOGGDP)	D(LOGODA)	D(LOGPR)	D(LOGTRA)	D(LOGCO2)
CointEq1	-0.080111	0.000381	0.002755	-0.000768	-0.000516
	(0.01162)	(0.00670)	(0.00419)	(0.00062)	(0.00146)
	[-6.89263]	[0.05682]	[0.65736]	[-1.24483]	[-0.35308]
D(LOGGDP(-1))	0.488090	-0.008952	-0.028147	-0.001229	0.001672
	(0.03166)	(0.01825)	(0.01142)	(0.00168)	(0.00398)
	[15.4163]	[-0.49045]	[-2.46563]	[-0.73108]	[0.41988]
D(LOGGDP(-2))	0.127092	0.015652	-0.003645	0.001315	0.002205
	(0.03454)	(0.01992)	(0.01246)	(0.00183)	(0.00435)
	[3.67905]	[0.78593]	[-0.29268]	[0.71688]	[0.50731]
D(LOGGDP(-3))	-0.056180	0.003782	-0.004121	0.000865	-0.001494
	(0.02404)	(0.01386)	(0.00867)	(0.00128)	(0.00302)
	[-2.33671]	[0.27290]	[-0.47543]	[0.67809]	[-0.49391]

D(LOGODA(-1))	-0.029957	0.218372	-0.022467	-0.000765	-0.005936
	(0.05149)	(0.02968)	(0.01856)	(0.00273)	(0.00648)
	[-0.58182]	[7.35689]	[-1.21023]	[-0.28000]	[-0.91648]
D(LOGODA(-2))	-0.017392	0.109938	-0.012686	-0.001093	-0.005640
	(0.05186)	(0.02990)	(0.01870)	(0.00275)	(0.00652)
	[-0.33538]	[3.67726]	[-0.67845]	[-0.39690]	[-0.86454]
D(LOGODA(-3))	0.042852	-0.030254	0.005615	-0.002519	0.002206
	(0.03877)	(0.02235)	(0.01398)	(0.00206)	(0.00488)
	[1.10524]	[-1.35356]	[0.40166]	[-1.22398]	[0.45227]
D(LOGPR(-1))	-0.032353	-0.031055	0.411124	0.002011	-0.005757
	(0.07451)	(0.04295)	(0.02686)	(0.00396)	(0.00937)
	[-0.43422]	[-0.72298]	[15.3034]	[0.50848]	[-0.61424]
D(LOGPR(-2))	-0.006612	-0.008062	0.093609	-8.32E-05	-0.006491
	(0.08066)	(0.04650)	(0.02908)	(0.00428)	(0.01015)
	[-0.08197]	[-0.17338]	[3.21879]	[-0.01944]	[-0.63973]
D(LOGPR(-3))	0.044633	0.009598	-0.002266	-0.000382	-0.008419
	(0.07356)	(0.04240)	(0.02652)	(0.00390)	(0.00925)
	[0.60679]	[0.22635]	[-0.08542]	[-0.09790]	[-0.90986]
D(LOGTRADE(-1))	0.023123	-0.035745	0.141953	0.832110	0.001063
	(0.50750)	(0.29258)	(0.18299)	(0.02694)	(0.06384)
	[0.04556]	[-0.12217]	[0.77576]	[30.8871]	[0.01665]
D(LOGTRADE(-2))	-0.509193	0.138699	-0.041190	-0.003175	-0.009261
	(0.66808)	(0.38515)	(0.24088)	(0.03546)	(0.08404)
	[-0.76217]	[0.36012]	[-0.17100]	[-0.08952]	[-0.11020]
D(LOGTRADE(-3))	0.072539	0.132742	0.021271	-0.156409	0.019414
	(0.51965)	(0.29958)	(0.18736)	(0.02759)	(0.06537)
	[0.13959]	[0.44310]	[0.11353]	[-5.67004]	[0.29698]
D(LOGCO2(-1))	-0.042234	-0.039993	-0.026145	-0.004522	0.533758
	(0.19965)	(0.11510)	(0.07199)	(0.01060)	(0.02512)
	[-0.21154]	[-0.34746]	[-0.36319]	[-0.42670]	[21.2520]
D(LOGCO2(-2))	-0.437281	0.017515	-0.054150	0.000803	0.020526
	(0.22598)	(0.13028)	(0.08148)	(0.01200)	(0.02843)
	[-1.93504]	[0.13444]	[-0.66458]	[0.06697]	[0.72204]

D(LOGCO2(-3))	0.704387	0.031131	-0.040778	0.001684	-0.174196
	(0.19604)	(0.11302)	(0.07068)	(0.01041)	(0.02466)
	[3.59305]	[0.27545]	[-0.57690]	[0.16184]	[-7.06358]
D(BREAK(-1))	-0.227375	0.001294	-0.030926	0.002068	0.010438
	(0.11729)	(0.06762)	(0.04229)	(0.00623)	(0.01475)
	[-1.93859]	[0.01914]	[-0.73130]	[0.33211]	[0.70747]
D(BREAK(-2))	-0.181327	-0.018138	0.048379	-0.009531	-0.004263
	(0.11713)	(0.06753)	(0.04223)	(0.00622)	(0.01473)
	[-1.54803]	[-0.26860]	[1.14551]	[-1.53281]	[-0.28930]
D(BREAK(-3))	0.221355	-0.016948	0.025835	-0.005572	0.006280
	(0.12844)	(0.07405)	(0.04631)	(0.00682)	(0.01616)
	[1.72337]	[-0.22888]	[0.55784]	[-0.81721]	[0.38866]
C	-0.031359	-0.006203	0.010008	0.000433	-0.002508
	(0.00803)	(0.00463)	(0.00289)	(0.00043)	(0.00101)
	[-3.90753]	[-1.34085]	[3.45869]	[1.01556]	[-2.48454]
R-squared	0.202409	0.057253	0.213609	0.570844	0.311408
Adj. R-squared	0.191767	0.044675	0.203116	0.565118	0.302220
Sum sq. resids	116.1061	38.58801	15.09422	0.327178	1.837329
S.E. equation	0.285544	0.164616	0.102956	0.015158	0.035920
F-statistic	19.01984	4.551589	20.35810	99.69152	33.89404
Log likelihood	-229.0253	566.3033	1243.994	4010.382	2764.525
Akaike AIC	0.344910	-0.756653	-1.695283	-5.526845	-3.801281
Schwarz SC	0.417974	-0.683589	-1.622219	-5.453781	-3.728218
Mean dependent	-0.041933	-0.006105	0.022325	0.001612	-0.004946
S.D. dependent	0.317617	0.168421	0.115333	0.022985	0.043001
Determinant resid covariance (dof adj.)		2.31E-14			
Determinant resid covariance		2.12E-14			
Log likelihood		10438.17			
Akaike information criterion		-14.28278			
Schwarz criterion		-13.82248			

VECM for Internal sources of Fluctuation For Full Sample
Model 1.

Error Correction:	D(GDP)	D(M2)	D(POP)	D(SAV)	D(INT)
CointEq1	-0.069789	0.020507	-300.3594	36559303	0.276510
	(0.00417)	(0.00387)	(101.589)	(5372778)	(0.17191)
	[-16.7426]	[5.29405]	[-2.95663]	[6.80454]	[1.60847]
D(GDP(-1))	0.461831	0.005267	-271.6243	-22782452	0.551455

	(0.01646)	(0.01529)	(401.082)	(2.1E+07)	(0.67871)
	[28.0627]	[0.34441]	[-0.67723]	[-1.07402]	[0.81250]
D(GDP(-2))	0.069041	-0.017843	30.84628	-47256346	1.349370
	(0.01629)	(0.01514)	(396.937)	(2.1E+07)	(0.67170)
	[4.23899]	[-1.17894]	[0.07771]	[-2.25105]	[2.00889]
D(M2(-1))	-0.043350	0.833243	-152.6011	-9805441.	-0.028991
	(0.01798)	(0.01671)	(438.304)	(2.3E+07)	(0.74170)
	[-2.41044]	[49.8580]	[-0.34816]	[-0.42300]	[-0.03909]
D(M2(-2))	0.037208	-0.147371	-244.9165	10991767	0.080202
	(0.01787)	(0.01661)	(435.611)	(2.3E+07)	(0.73714)
	[2.08168]	[-8.87260]	[-0.56224]	[0.47711]	[0.10880]
D(POP(-1))	-1.71E-07	-8.21E-08	0.984678	198.4286	2.60E-06
	(7.0E-07)	(6.5E-07)	(0.01696)	(897.219)	(2.9E-05)
	[-0.24537]	[-0.12689]	[58.0430]	[0.22116]	[0.09046]
D(POP(-2))	9.80E-07	-4.66E-08	0.015780	-464.0901	-5.75E-06
	(7.0E-07)	(6.5E-07)	(0.01701)	(899.580)	(2.9E-05)
	[1.40457]	[-0.07192]	[0.92771]	[-0.51590]	[-0.19967]
D(SAV(-1))	1.00E-10	-4.65E-12	1.75E-07	0.974195	-1.91E-10
	(1.3E-11)	(1.3E-11)	(3.3E-07)	(0.01739)	(5.6E-10)
	[7.44520]	[-0.37066]	[0.53336]	[56.0301]	[-0.34391]
D(SAV(-2))	-2.26E-11	-1.69E-11	4.32E-08	-0.041216	-1.41E-10
	(1.4E-11)	(1.3E-11)	(3.3E-07)	(0.01768)	(5.7E-10)
	[-1.64723]	[-1.32564]	[0.12908]	[-2.33130]	[-0.24885]
D(INT(-1))	-0.000277	-0.000124	1.362650	-163107.0	0.818718
	(0.00040)	(0.00037)	(9.78028)	(517256.)	(0.01655)
	[-0.68913]	[-0.33326]	[0.13933]	[-0.31533]	[49.4687]
D(INT(-2))	-0.000193	-0.000210	1.982869	-451601.6	-0.176165
	(0.00040)	(0.00037)	(9.82453)	(519596.)	(0.01663)
	[-0.47911]	[-0.55946]	[0.20183]	[-0.86914]	[-10.5963]
C	-0.189750	0.067496	-716.1467	1.02E+08	0.765962
	(0.01769)	(0.01644)	(431.063)	(2.3E+07)	(0.72945)
	[-10.7280]	[4.10653]	[-1.66135]	[4.47068]	[1.05006]
R-squared	0.319572	0.563235	0.998946	0.951131	0.503642
Adj. R-squared	0.317466	0.561882	0.998943	0.950979	0.502105
Sum sq. resids	2113.780	1825.325	1.26E+12	3.51E+21	3595188.
S.E. equation	0.771316	0.716758	18797.98	9.94E+08	31.80997
F-statistic	151.7015	416.5275	306166.2	6286.440	327.7400

Log likelihood	-4126.827	-3865.300	-40137.47	-78910.14	-17386.62
Akaike AIC	2.321923	2.175203	22.52425	44.27610	9.760797
Schwarz SC	2.342721	2.196002	22.54505	44.29689	9.781595
Mean dependent	-4.73E-05	0.105313	166153.9	7.40E+08	-0.041877
S.D. dependent	0.933620	1.082872	578157.5	4.49E+09	45.08110
Determinant resid covariance (dof adj.)		9.84E+28			
Determinant resid covariance		9.67E+28			
Log likelihood		-144259.8			
Akaike information criterion		80.96761			
Schwarz criterion		81.08027			

Model 2

Error Correction:	D(GDP)	D(DCB)	D(POP)	D(SAV)	D(INT)
CointEq1	-0.045824	0.018256	-349.3126	41298471	1.235800
	(0.00366)	(0.00246)	(63.2341)	(4559756)	(0.14766)
	[-12.5195]	[7.41555]	[-5.52411]	[9.05717]	[8.36941]
D(GDP(-1))	0.467181	0.013132	-156.3520	-39934513	0.543482
	(0.01694)	(0.01140)	(292.731)	(2.1E+07)	(0.68355)
	[27.5714]	[1.15224]	[-0.53412]	[-1.89186]	[0.79509]
D(GDP(-2))	0.054756	0.000150	131.5106	-64761115	0.603329
	(0.01682)	(0.01131)	(290.608)	(2.1E+07)	(0.67859)
	[3.25513]	[0.01328]	[0.45254]	[-3.09042]	[0.88909]
D(DCB(-1))	-0.073250	0.887686	84.98532	-67038520	-0.478896
	(0.02568)	(0.01727)	(443.685)	(3.2E+07)	(1.03604)
	[-2.85219]	[51.3901]	[0.19154]	[-2.09536]	[-0.46224]
D(DCB(-2))	0.028812	-0.097554	27.11170	-43583952	0.439549
	(0.02565)	(0.01725)	(443.093)	(3.2E+07)	(1.03466)
	[1.12336]	[-5.65519]	[0.06119]	[-1.36409]	[0.42483]
D(POP(-1))	-3.49E-07	2.09E-07	0.920483	1587.061	2.28E-05
	(9.9E-07)	(6.7E-07)	(0.01709)	(1232.41)	(4.0E-05)
	[-0.35229]	[0.31376]	[53.8580]	[1.28777]	[0.57124]
D(POP(-2))	1.07E-06	-4.66E-07	0.077006	-2008.369	-4.19E-05
	(9.9E-07)	(6.6E-07)	(0.01707)	(1231.03)	(4.0E-05)
	[1.08418]	[-0.70127]	[4.51069]	[-1.63145]	[-1.05152]
D(SAV(-1))	9.94E-11	-1.57E-11	2.69E-07	0.966758	-7.84E-10
	(1.4E-11)	(9.6E-12)	(2.5E-07)	(0.01782)	(5.8E-10)
	[6.94493]	[-1.63156]	[1.08979]	[54.2383]	[-1.35812]

D(SAV(-2))	-3.63E-11	-8.48E-12	2.89E-07	-0.049907	-1.00E-09
	(1.5E-11)	(9.8E-12)	(2.5E-07)	(0.01814)	(5.9E-10)
	[-2.49319]	[-0.86593]	[1.14828]	[-2.75098]	[-1.70506]
D(INT(-1))	-0.000114	-0.000204	3.607513	-446894.8	0.807417
	(0.00041)	(0.00028)	(7.10759)	(512522.)	(0.01660)
	[-0.27713]	[-0.73883]	[0.50756]	[-0.87195]	[48.6490]
D(INT(-2))	-0.001077	0.000216	-3.152501	140318.6	-0.164508
	(0.00041)	(0.00028)	(7.10637)	(512434.)	(0.01659)
	[-2.61937]	[0.78162]	[-0.44362]	[0.27383]	[-9.91372]
C	-0.144234	0.072571	-850.5086	1.39E+08	4.027405
	(0.01832)	(0.01232)	(316.430)	(2.3E+07)	(0.73889)
	[-7.87465]	[5.89090]	[-2.68783]	[6.08121]	[5.45062]
R-squared	0.297674	0.669895	0.999270	0.952954	0.513088
Adj. R-squared	0.295456	0.668853	0.999268	0.952806	0.511550
Sum sq. resids	2167.146	980.3535	6.47E+11	3.36E+21	3526766.
S.E. equation	0.788801	0.530536	13627.31	9.83E+08	31.82084
F-statistic	134.2034	642.5633	433466.2	6413.734	333.6587
Log likelihood	-4124.021	-2737.811	-38224.99	-77319.83	-17046.30
Akaike AIC	2.366822	1.573569	21.88097	44.25284	9.761547
Schwarz SC	2.387969	1.594716	21.90211	44.27398	9.782694
Mean dependent	-0.000689	0.084690	141381.0	7.33E+08	-0.043363
S.D. dependent	0.939752	0.921943	503594.6	4.52E+09	45.53043
Determinant resid covariance (dof adj.)		2.81E+28			
Determinant resid covariance		2.77E+28			
Log likelihood		-139239.3			
Akaike information criterion		79.71633			
Schwarz criterion		79.83088			

Model 3

Error Correction:	D(GDP)	D(DCP)	D(POP)	D(SAV)	D(INT)
CointEq1	-0.026	0.001239	-120.0048	14890122	0.012316
	[-2.23149]	[1.82975]	[-8.25724]	[20.3574]	[0.53079]
D(GDP(-1))	0.393614	0.001713	-334.4194	-35429743	-0.018736
	(0.01595)	(0.01982)	(425.463)	(2.1E+07)	(0.67928)
	[24.6729]	[0.08644]	[-0.78601]	[-1.65460]	[-0.02758]
D(GDP(-2))	0.114664	0.000288	-83.67959	-14514342	0.166537
	(0.01742)	(0.02163)	(464.506)	(2.3E+07)	(0.74162)
	[6.58338]	[0.01330]	[-0.18015]	[-0.62086]	[0.22456]

D(GDP(-3))	0.034293	0.001006	-92.23619	-8961366.	0.707900
	(0.01742)	(0.02164)	(464.633)	(2.3E+07)	(0.74182)
	[1.96839]	[0.04649]	[-0.19851]	[-0.38322]	[0.95427]
D(GDP(-4))	-0.403362	0.007798	-406.5194	-7492100.	2.700061
	(0.01577)	(0.01959)	(420.601)	(2.1E+07)	(0.67152)
	[-25.5763]	[0.39806]	[-0.96652]	[-0.35393]	[4.02081]
D(DCP(-1))	-0.031528	0.824732	-5.672105	-20731929	-0.044436
	(0.01373)	(0.01705)	(366.167)	(1.8E+07)	(0.58461)
	[-2.29631]	[48.3588]	[-0.01549]	[-1.12499]	[-0.07601]
D(DCP(-2))	0.008162	0.000241	-12.34821	-257843.3	0.013378
	(0.01790)	(0.02223)	(477.375)	(2.4E+07)	(0.76217)
	[0.45599]	[0.01085]	[-0.02587]	[-0.01073]	[0.01755]
D(DCP(-3))	0.002680	0.000207	-13.42158	132972.6	0.054775
	(0.01790)	(0.02223)	(477.374)	(2.4E+07)	(0.76216)
	[0.14973]	[0.00930]	[-0.02812]	[0.00553]	[0.07187]
D(DCP(-4))	-0.013722	-0.170419	12.45912	-21583678	0.493389
	(0.01368)	(0.01699)	(364.888)	(1.8E+07)	(0.58257)
	[-1.00294]	[-10.0277]	[0.03415]	[-1.17532]	[0.84692]
D(POP(-1))	-1.25E-07	2.07E-08	0.972109	1616.766	4.79E-06
	(6.5E-07)	(8.1E-07)	(0.01735)	(873.066)	(2.8E-05)
	[-0.19255]	[0.02559]	[56.0376]	[1.85183]	[0.17283]
D(POP(-2))	-1.47E-07	6.17E-09	-0.000526	97.30253	-1.49E-07
	(9.1E-07)	(1.1E-06)	(0.02425)	(1220.46)	(3.9E-05)
	[-0.16124]	[0.00546]	[-0.02171]	[0.07973]	[-0.00385]
D(POP(-3))	-4.34E-08	5.25E-09	-0.000515	90.17040	-8.44E-07
	(9.1E-07)	(1.1E-06)	(0.02425)	(1220.46)	(3.9E-05)
	[-0.04772]	[0.00465]	[-0.02126]	[0.07388]	[-0.02181]
D(POP(-4))	3.15E-07	-1.14E-07	0.041730	-3617.826	-5.51E-06
	(6.6E-07)	(8.2E-07)	(0.01763)	(887.282)	(2.8E-05)
	[0.47591]	[-0.13872]	[2.36702]	[-4.07742]	[-0.19584]
D(SAV(-1))	5.88E-11	-1.51E-11	8.88E-07	0.881919	-1.60E-12
	(1.3E-11)	(1.6E-11)	(3.5E-07)	(0.01756)	(5.6E-10)
	[4.49683]	[-0.92787]	[2.54691]	[50.2328]	[-0.00288]
D(SAV(-2))	-1.90E-11	-3.92E-13	4.65E-08	-0.001655	-3.09E-11
	(1.7E-11)	(2.2E-11)	(4.7E-07)	(0.02343)	(7.4E-10)
	[-1.08697]	[-0.01810]	[0.09987]	[-0.07065]	[-0.04158]

D(SAV(-3))	-5.71E-12	-5.07E-13	4.79E-08	-0.002572	-1.20E-10
	(1.7E-11)	(2.2E-11)	(4.7E-07)	(0.02343)	(7.4E-10)
	[-0.32714]	[-0.02338]	[0.10295]	[-0.10978]	[-0.16208]
D(SAV(-4))	-4.24E-11	-1.75E-12	7.61E-07	-0.139308	-5.13E-11
	(1.3E-11)	(1.7E-11)	(3.6E-07)	(0.01790)	(5.7E-10)
	[-3.18144]	[-0.10563]	[2.13920]	[-7.78229]	[-0.09042]
D(INT(-1))	-0.000404	-0.000139	0.981851	-87080.06	0.714904
	(0.00039)	(0.00048)	(10.3821)	(522513.)	(0.01658)
	[-1.03855]	[-0.28672]	[0.09457]	[-0.16666]	[43.1293]
D(INT(-2))	0.000201	-1.97E-06	0.077973	-53383.78	0.000269
	(0.00049)	(0.00060)	(12.9446)	(651481.)	(0.02067)
	[0.41441]	[-0.00327]	[0.00602]	[-0.08194]	[0.01300]
D(INT(-3))	5.98E-05	-6.30E-07	0.063346	-43627.78	0.001217
	(0.00049)	(0.00060)	(12.9446)	(651481.)	(0.02067)
	[0.12319]	[-0.00105]	[0.00489]	[-0.06697]	[0.05888]
D(INT(-4))	-0.001986	-0.000272	-1.134633	-224111.9	-0.272498
	(0.00039)	(0.00048)	(10.3848)	(522648.)	(0.01658)
	[-5.10149]	[-0.56244]	[-0.10926]	[-0.42880]	[-16.4352]
C	0.015090	0.059945	-4084.091	5.22E+08	0.379434
	(0.02285)	(0.02839)	(609.485)	(3.1E+07)	(0.97309)
	[0.66030]	[2.11170]	[-6.70088]	[17.0275]	[0.38993]
R-squared	0.409649	0.626948	0.998946	0.956409	0.566299
Adj. R-squared	0.405965	0.624620	0.998939	0.956137	0.563592
Sum sq. resids	1732.654	2673.326	1.23E+12	3.12E+21	3141342.
S.E. equation	0.717569	0.891320	19137.07	9.63E+08	30.55379
F-statistic	111.1905	269.2953	151866.8	3515.748	209.2287
Log likelihood	-3670.808	-4405.227	-38188.64	-74857.39	-16376.72
Akaike AIC	2.180578	2.614247	22.56312	44.21576	9.683329
Schwarz SC	2.220380	2.654049	22.60292	44.25556	9.723131
Mean dependent	0.011196	0.093567	168488.3	7.72E+08	-0.043986
S.D. dependent	0.931017	1.454782	587627.3	4.60E+09	46.25077
Determinant resid covariance (dof adj.)		1.22E+29			
Determinant resid covariance		1.18E+29			
Log likelihood		-137391.4			
Akaike information criterion		81.19655			
Schwarz criterion		81.40461			

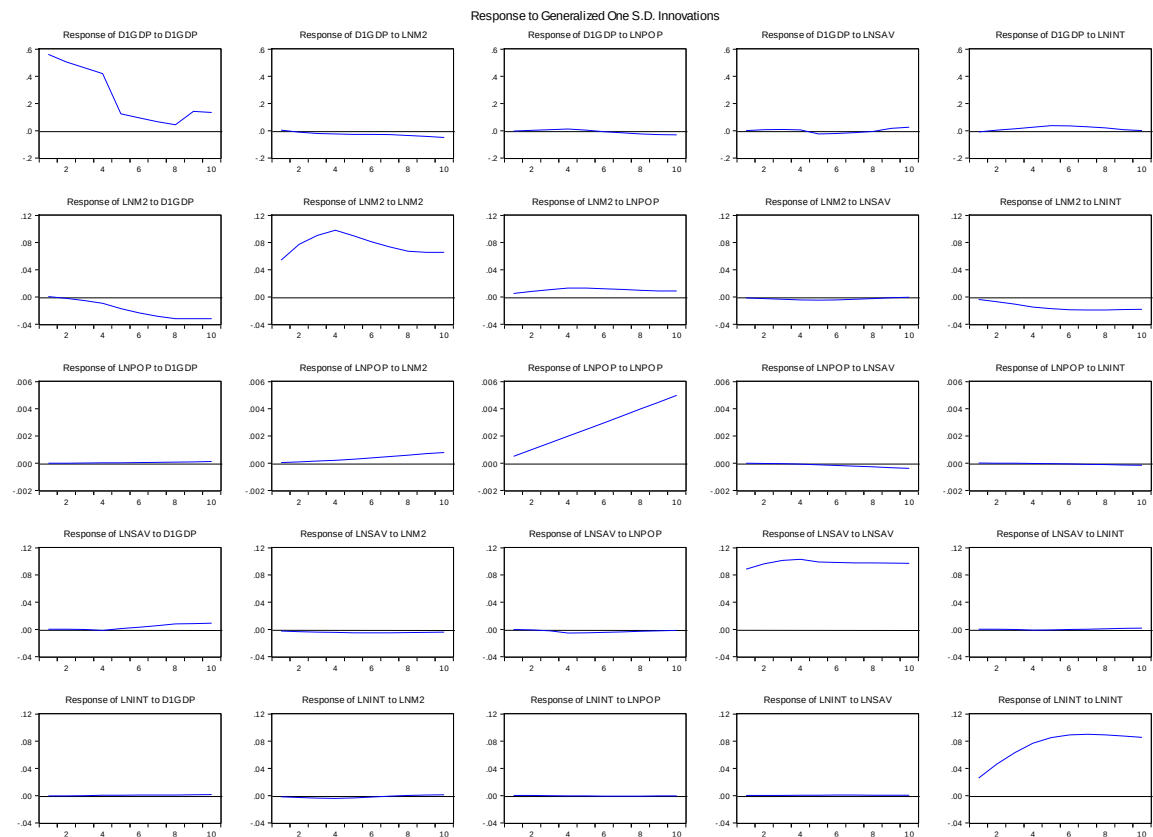
VECM for External Sources of Fluctuation for Full Sample

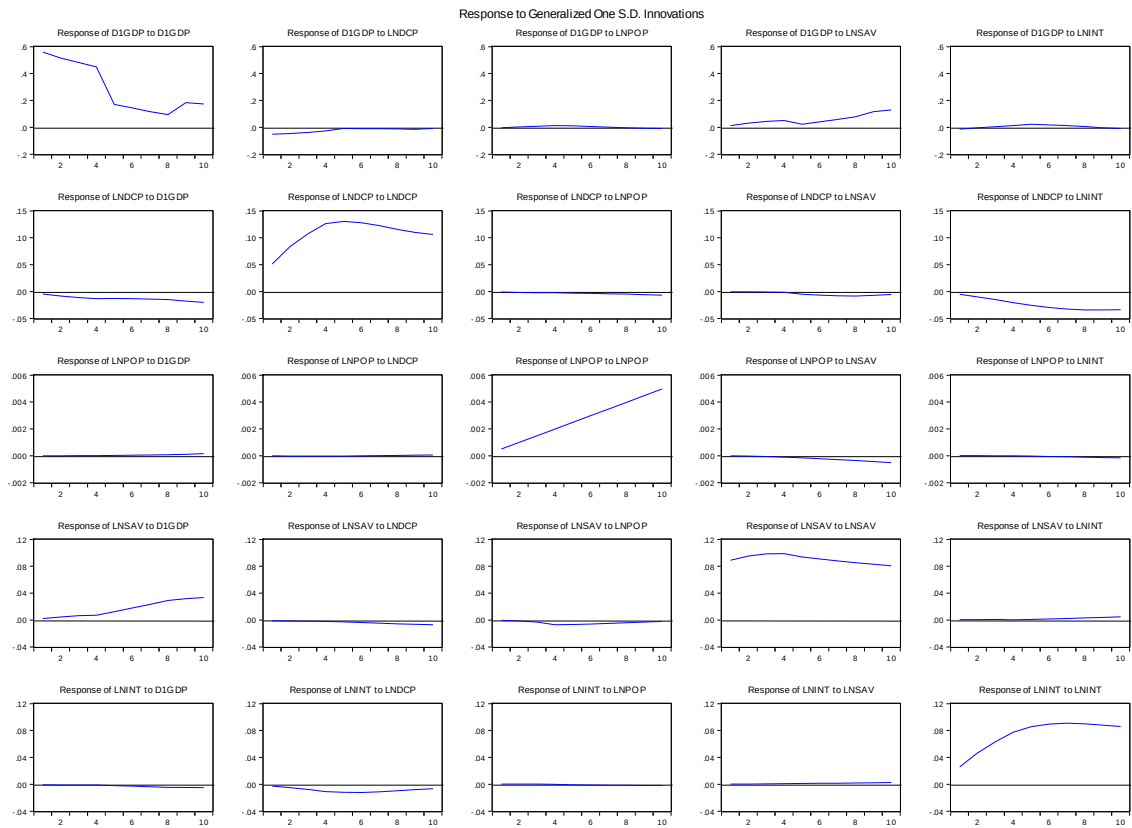
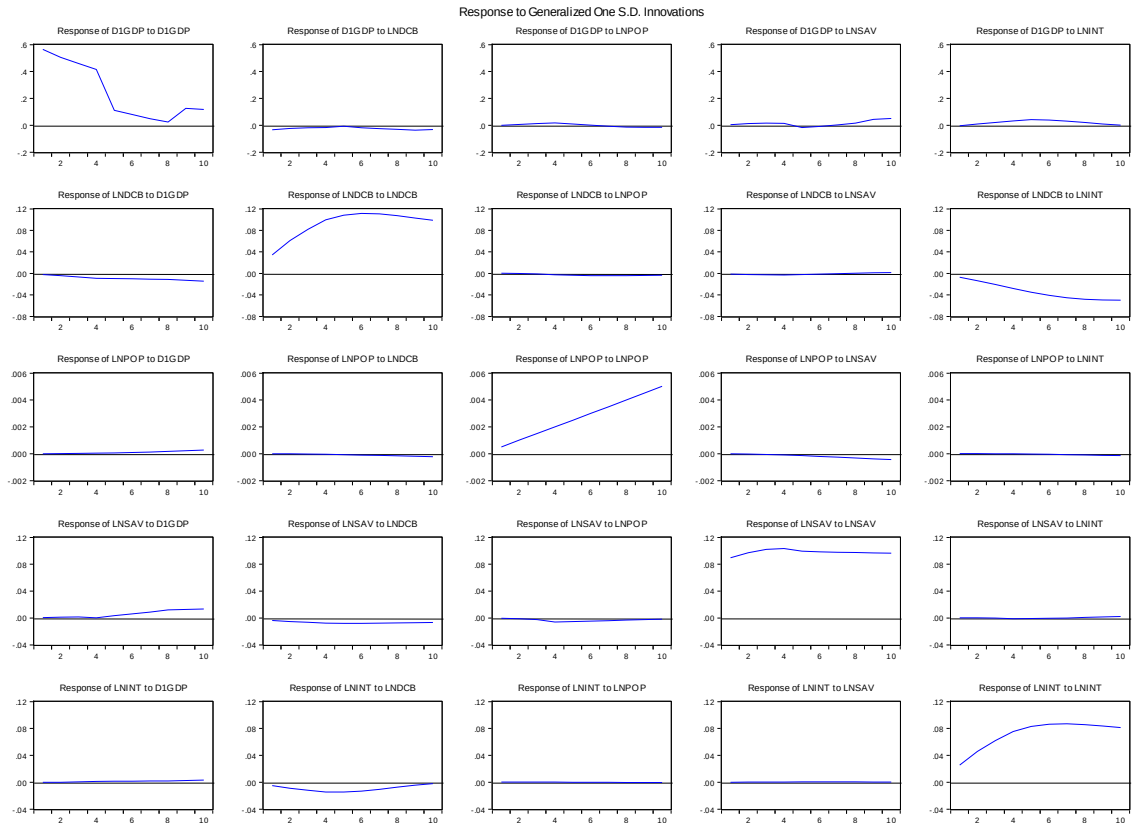
Error Correction:	D(GDP)	D(ODA)	D(PR)	D(TRAD)	D(CO2)
CointEq1	-0.07853	1.61E-05	1.0905	-0.554590	-3.3111
	[-2.54378]	[1.43540]	[3.51421]	[-21.4561]	[-2.22593]
D(GDP(-1))	0.942353 (0.01699) [55.4629]	0.002833 (0.00588) [0.48187]	-0.001082 (0.00162) [-0.66849]	15.76909 (13.5197) [1.16638]	5.63E-09 (7.8E-09) [0.72456]
D(GDP(-2))	-5.67E-05 (0.02337) [-0.00242]	-0.000727 (0.00809) [-0.08997]	3.34E-05 (0.00223) [0.01499]	-1.984331 (18.5930) [-0.10672]	8.12E-11 (1.1E-08) [0.00760]
D(GDP(-3))	-0.059593 (0.01710) [-3.48551]	0.000163 (0.00592) [0.02756]	0.000444 (0.00163) [0.27239]	-2.562099 (13.6045) [-0.18833]	1.10E-09 (7.8E-09) [0.14111]
D(ODA(-1))	0.000341 (0.04832) [0.00706]	0.871135 (0.01672) [52.1038]	0.002565 (0.00460) [0.55715]	34.63970 (38.4455) [0.90101]	6.18E-09 (2.2E-08) [0.27986]
D(ODA(-2))	0.010014 (0.06433) [0.15566]	-0.001231 (0.02226) [-0.05530]	0.000748 (0.00613) [0.12206]	-14.22904 (51.1894) [-0.27797]	9.79E-10 (2.9E-08) [0.03327]
D(ODA(-3))	0.012810 (0.05085) [0.25192]	-0.180216 (0.01760) [-10.2424]	0.005097 (0.00484) [1.05213]	-31.24530 (40.4595) [-0.77226]	4.75E-09 (2.3E-08) [0.20424]
D(PR(-1))	-0.097070 (0.17759) [-0.54659]	0.034620 (0.06145) [0.56335]	0.939547 (0.01692) [55.5318]	227.5329 (141.311) [1.61016]	6.53E-08 (8.1E-08) [0.80372]
D(PR(-2))	0.000735 (0.24411) [0.00301]	-0.008714 (0.08447) [-0.10316]	0.001548 (0.02326) [0.06654]	-29.40716 (194.238) [-0.15140]	-1.51E-09 (1.1E-07) [-0.01354]
D(PR(-3))	-0.075486 (0.18132) [-0.41631]	0.022857 (0.06274) [0.36429]	-0.077999 (0.01727) [-4.51526]	94.01063 (144.280) [0.65159]	1.02E-07 (8.3E-08) [1.22899]
D(TRAD(-1))	2.73E-05 (2.1E-05) [1.29759]	4.77E-06 (7.3E-06) [0.65624]	2.96E-06 (2.0E-06) [1.48167]	0.822738 (0.01671) [49.2261]	3.55E-12 (9.6E-12) [0.36959]

D(TRAD(-2))	5.12E-06	1.23E-06	2.28E-07	-0.006780	2.11E-13
	(2.7E-05)	(9.5E-06)	(2.6E-06)	(0.02174)	(1.2E-11)
	[0.18727]	[0.13012]	[0.08767]	[-0.31191]	[0.01692]
D(TRAD(-3))	3.96E-05	1.04E-05	3.53E-06	-0.212234	2.15E-12
	(2.2E-05)	(7.5E-06)	(2.1E-06)	(0.01728)	(9.9E-12)
	[1.82239]	[1.38484]	[1.70724]	[-12.2787]	[0.21610]
D(CO2(-1))	30008.02	4422.356	3437.621	7589467.	0.882161
	(36568.6)	(12654.2)	(3483.90)	(2.9E+07)	(0.01673)
	[0.82060]	[0.34948]	[0.98672]	[0.26082]	[52.7423]
D(CO2(-2))	2433.727	-799.6451	309.2745	-5915351.	1.68E-05
	(48931.5)	(16932.3)	(4661.73)	(3.9E+07)	(0.02238)
	[0.04974]	[-0.04723]	[0.06634]	[-0.15193]	[0.00075]
D(CO2(-3))	38131.21	7983.001	1046.116	8110461.	-0.124675
	(36882.6)	(12762.8)	(3513.82)	(2.9E+07)	(0.01687)
	[1.03385]	[0.62549]	[0.29771]	[0.27636]	[-7.39058]
D(BREAK(-1))	32228350	-11530306	4206813.	-7.69E+10	0.361615
	(1.3E+07)	(4456947)	(1227069)	(1.0E+10)	(5.89104)
	[2.50223]	[-2.58704]	[3.42834]	[-7.50590]	[0.06138]
D(BREAK(-2))	2341101.	1394060.	890027.9	-6.97E+09	-2.180729
	(1.3E+07)	(4415341)	(1215615)	(1.0E+10)	(5.83604)
	[0.18348]	[0.31573]	[0.73216]	[-0.68697]	[-0.37367]
D(BREAK(-3))	25841060	6700083.	1511825.	-8.34E+09	1.184236
	(1.3E+07)	(4412859)	(1214931)	(1.0E+10)	(5.83276)
	[2.02636]	[1.51831]	[1.24437]	[-0.82173]	[0.20303]
C	2938801.	1111909.	147147.8	5.89E+09	1.800601
	(1201742)	(415851.)	(114490.)	(9.6E+08)	(0.54966)
	[2.44545]	[2.67382]	[1.28524]	[6.15870]	[3.27586]
R-squared	0.807583	0.608112	0.775849	0.772057	0.674769
Adj. R-squared	0.806548	0.606004	0.774643	0.770831	0.673019
Sum sq. resids	1.53E+19	1.83E+18	1.39E+17	9.69E+24	3201855.
S.E. equation	65827928	22779089	6271451.	5.24E+10	30.10860
F-statistic	780.2094	288.4621	643.4342	629.6387	385.6829
Log likelihood	-68975.12	-65205.73	-60624.23	-92699.77	-17123.93
Akaike AIC	38.84860	36.72620	34.14653	52.20708	9.653113
Schwarz SC	38.88337	36.76097	34.18130	52.24185	9.687884
Mean dependent	38648861	4922613.	2164353.	1.56E+10	9.565282
S.D. dependent	1.50E+08	36290288	13210915	1.09E+11	52.65378
Determinant resid covariance (dof		1.53E+66			

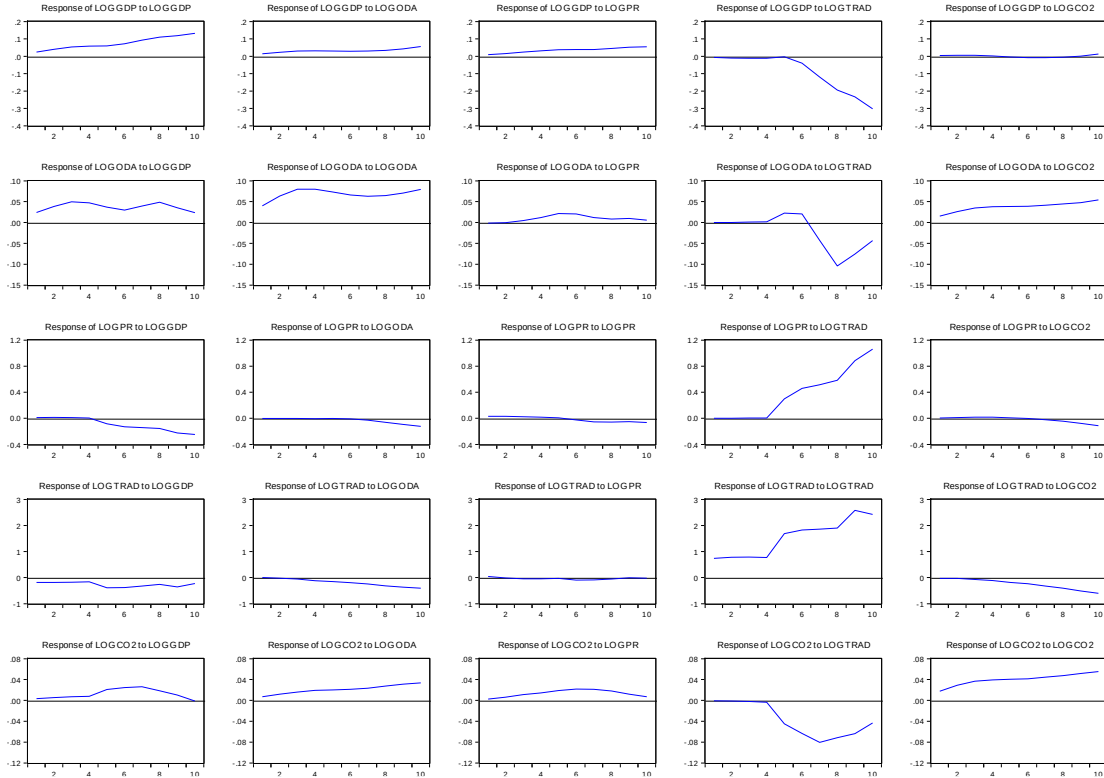
adj.)				
Determinant resid covariance	1.48E+66			
Log likelihood	-300834.3			
Akaike information criterion	169.4596			
Schwarz criterion	169.6787			

Complete Impulse Response Functions in Case of Low Income Countries

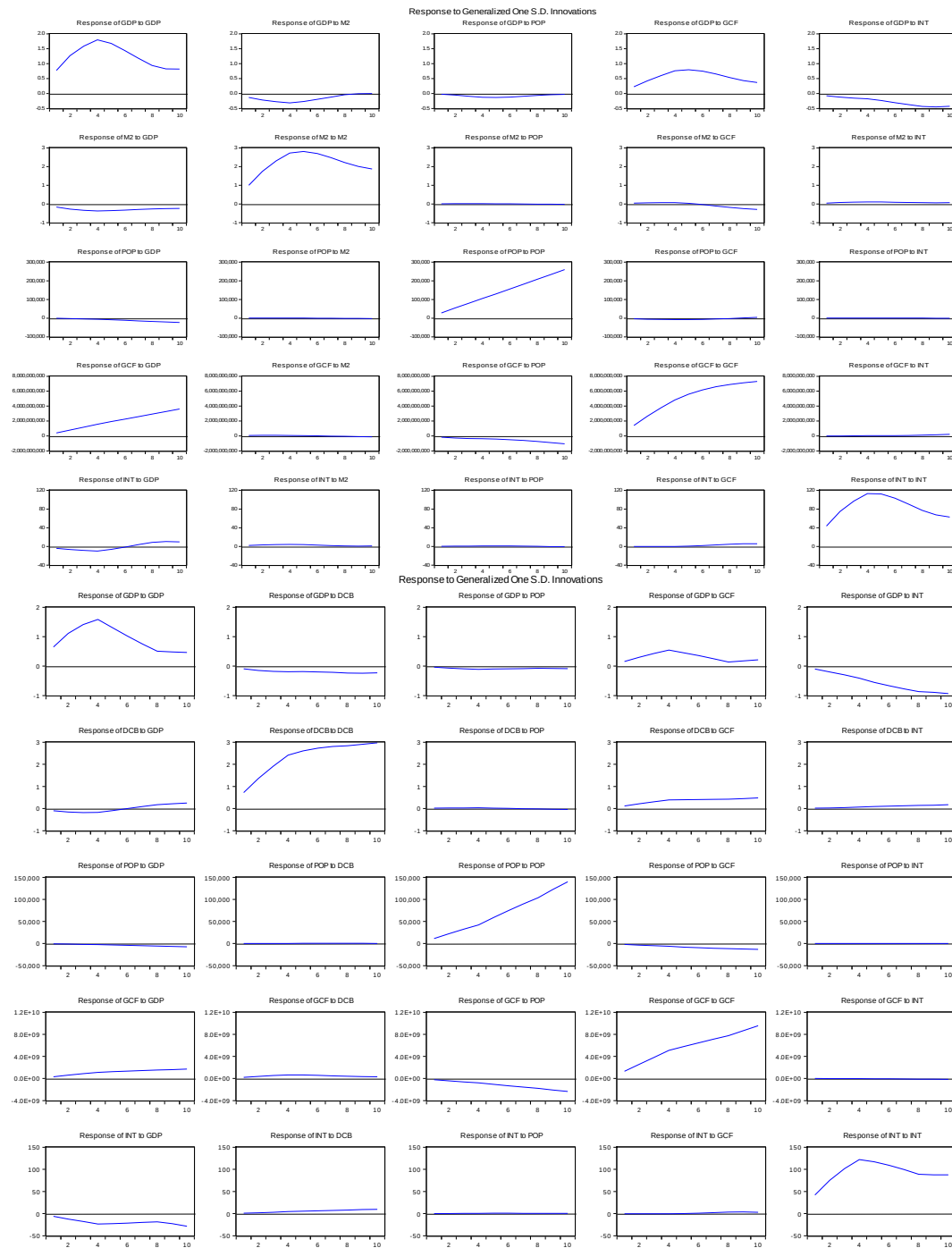


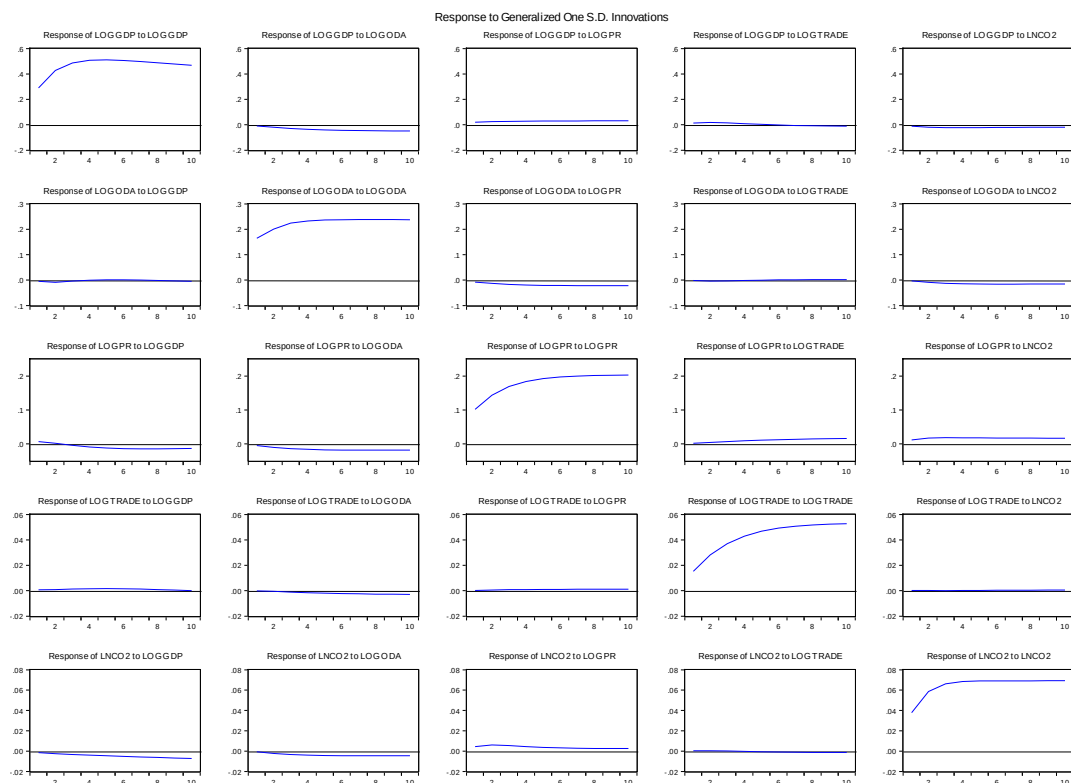
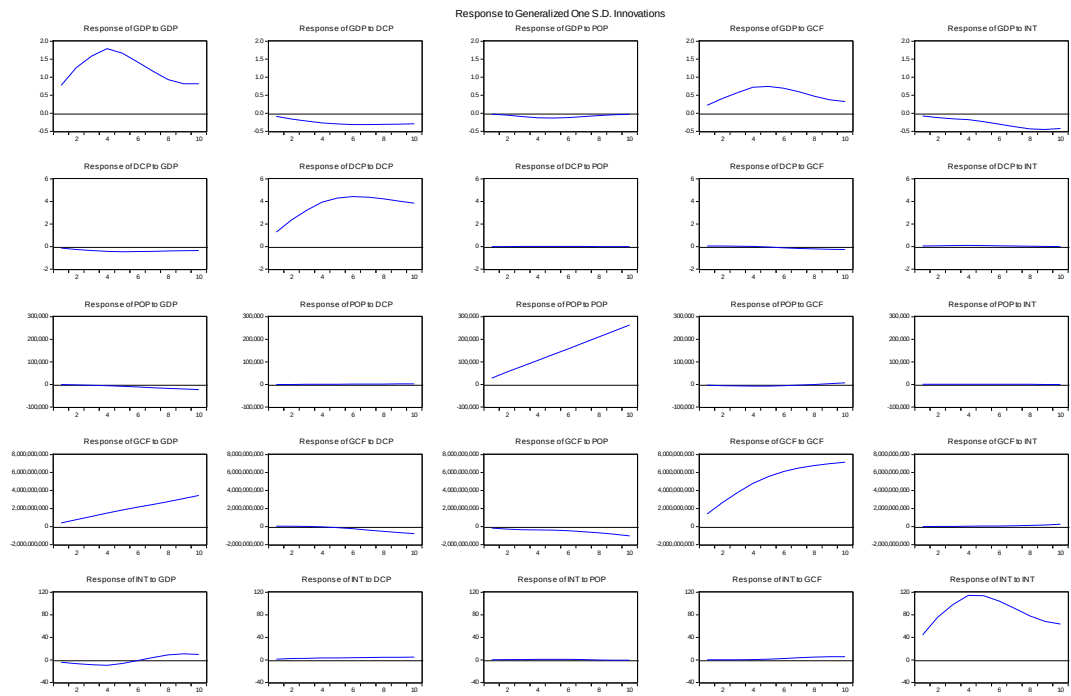


Response to Generalized One S.D. Innovations

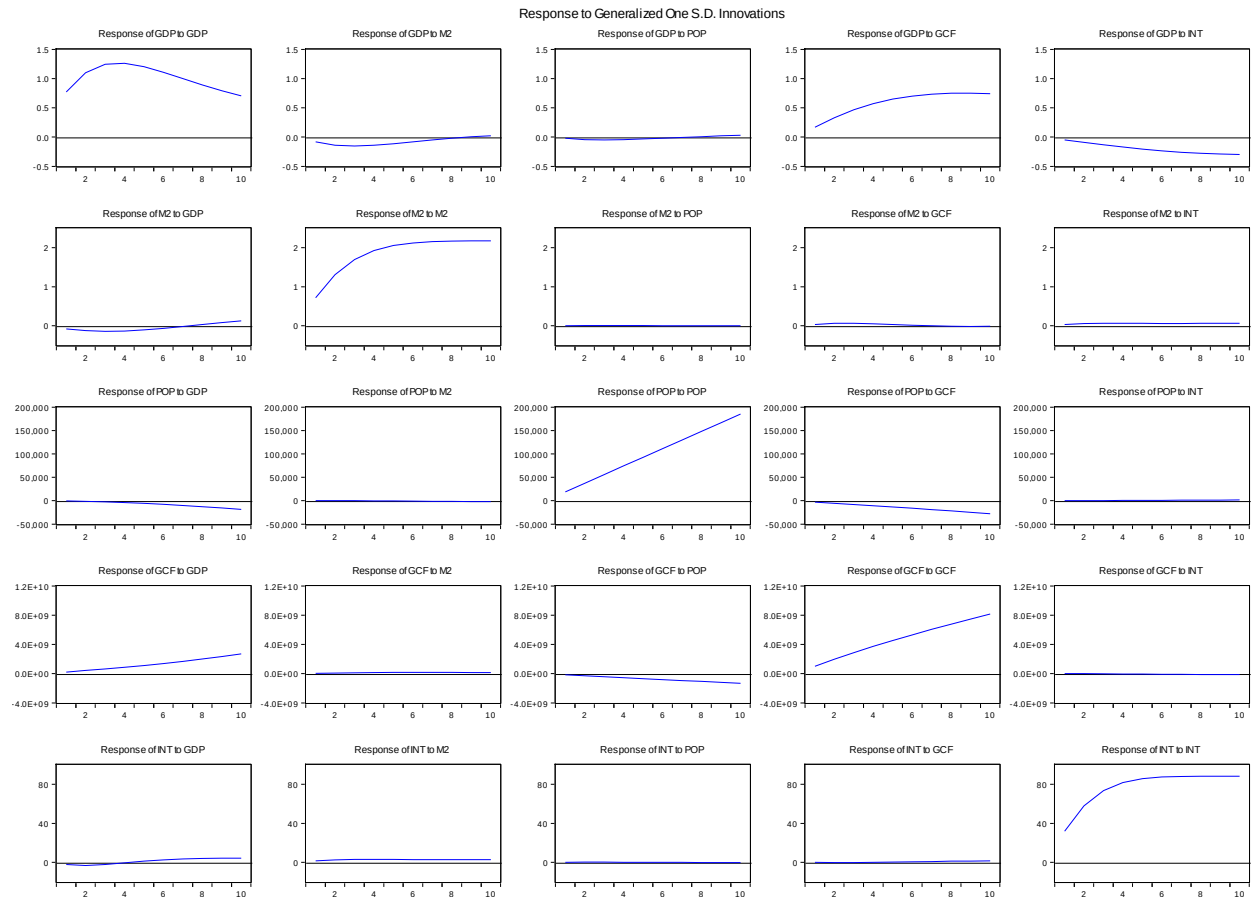


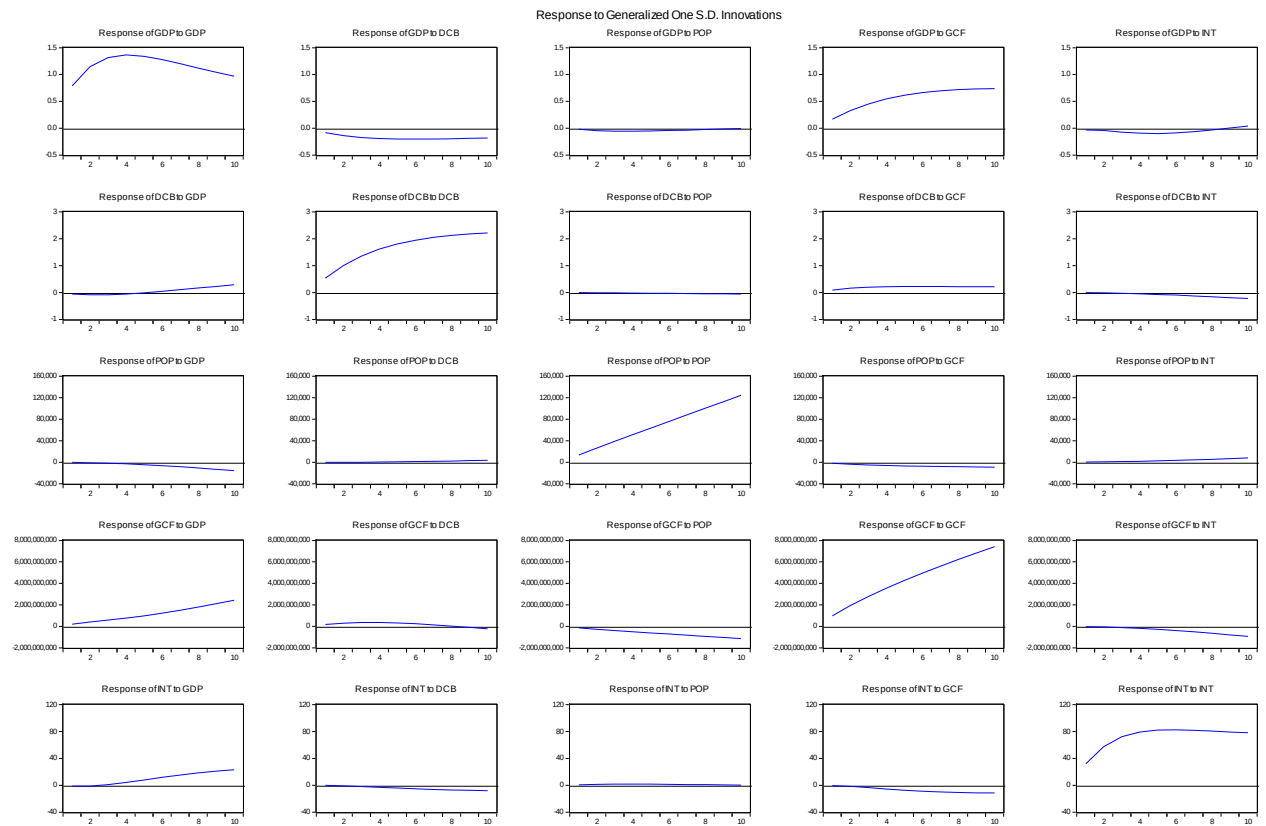
Complete Impulse Response Functions in Case Of Upper Middle Income Countries



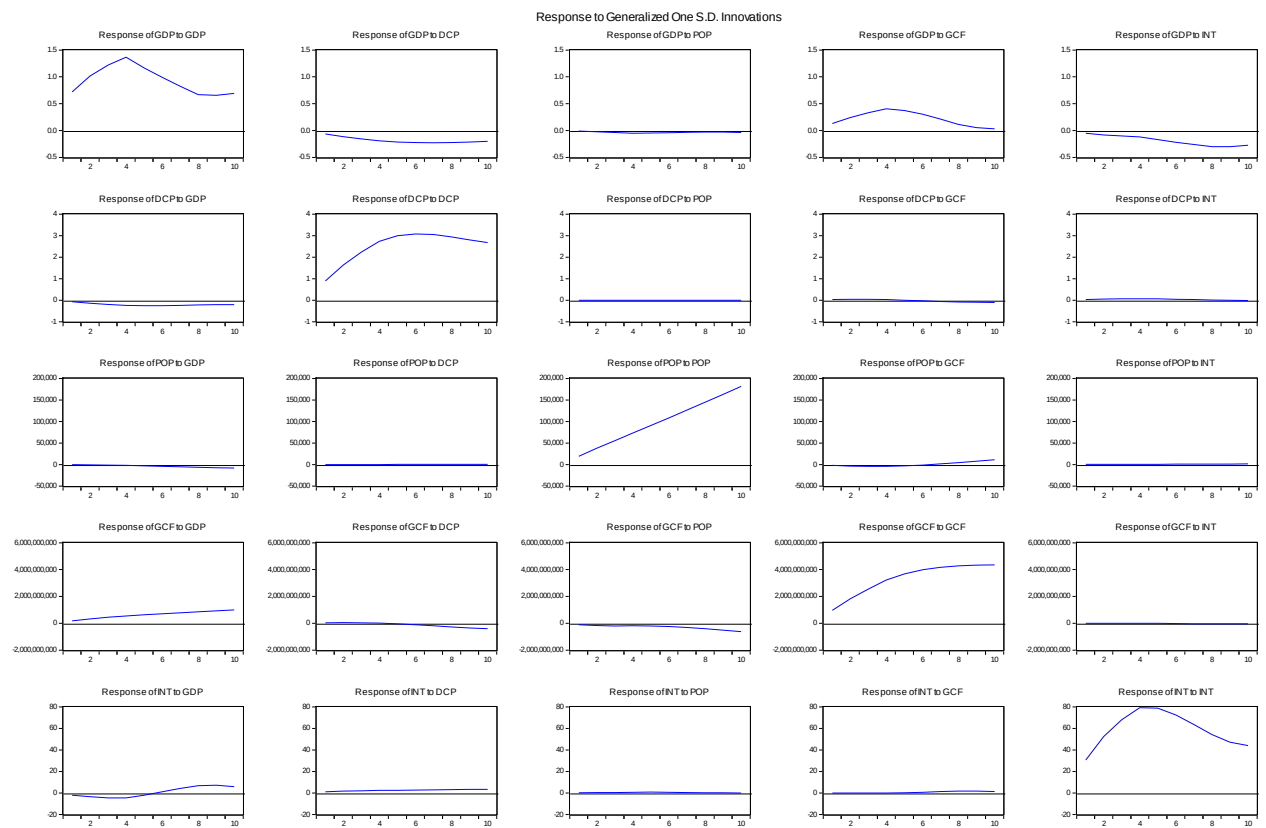


Complete Analysis of Impulse Response Functions for Full Sample (Model 1, 2, 3 & 4)





Impulse Response Functions for Full Sample (Model 4)



Complete Analysis of Variance Decomposition in Case of Low Income Countries

Table 9 Model 1

Variance Decomposition of LNM2:						
Period	S.E.	GDP	LNM2	LNPOP	LNSAV	LNINT
1	0.056556	0.105740	99.89426	0.000000	0.000000	0.000000
2	0.101212	0.033017	99.91395	0.001882	0.001491	0.049662
3	0.142469	0.063700	99.74285	0.008956	0.005272	0.179219
4	0.176860	0.127715	99.48336	0.012949	0.012070	0.363909
5	0.205998	0.372537	99.01855	0.014681	0.017473	0.576764
6	0.231342	0.833105	98.33550	0.014668	0.021283	0.795439
7	0.254188	1.485872	97.47179	0.013606	0.023539	1.005197
8	0.275312	2.262821	96.49910	0.012284	0.024447	1.201350
9	0.295123	3.054762	95.52613	0.011068	0.024533	1.383507
10	0.313823	3.777891	94.63527	0.010088	0.024186	1.552562
Variance Decomposition of LNPOP:						
Period	S.E.	GDP	LNM2	LNPOP	LNSAV	LNINT
1	0.000500	0.013526	0.576284	99.41019	0.000000	0.000000
2	0.001114	0.024904	0.611614	99.34017	0.021253	0.002055
3	0.001858	0.036959	0.650985	99.25026	0.055210	0.006586
4	0.002718	0.049503	0.731619	99.11031	0.094354	0.014214
5	0.003679	0.066535	0.822093	98.95725	0.129868	0.024249
6	0.004735	0.086259	0.909435	98.80810	0.160386	0.035816
7	0.005877	0.107066	0.987208	98.67139	0.186318	0.048015
8	0.007099	0.127349	1.054144	98.54997	0.208407	0.060130
9	0.008398	0.145830	1.110972	98.44418	0.227323	0.071697
10	0.009768	0.161846	1.159174	98.35287	0.243631	0.082478
Variance Decomposition of LNSAV:						
Period	S.E.	GDP	LNM2	LNPOP	LNSAV	LNINT
1	0.088119	0.003568	0.071529	0.000706	99.92420	0.000000
2	0.130309	0.008216	0.102258	0.000374	99.88852	0.000636
3	0.164648	0.017559	0.129643	0.005953	99.84423	0.002617
4	0.193671	0.045581	0.158533	0.006774	99.78535	0.003760
5	0.219017	0.044411	0.178887	0.006064	99.76621	0.004424
6	0.241759	0.036852	0.193175	0.005017	99.76036	0.004597
7	0.262547	0.033107	0.202141	0.004477	99.75578	0.004490
8	0.281796	0.038978	0.206947	0.004972	99.74492	0.004181
9	0.299806	0.053444	0.208986	0.006737	99.72705	0.003783

10	0.316786	0.072972	0.209268	0.009833	99.70453	0.003396
Variance Decomposition of LNINT:						
Period	S.E.	GDP	LNLM2	LNPOP	LNSAV	LNINT
1	0.025905	0.000946	0.581970	0.033133	2.04E-05	99.38393
2	0.053606	0.000486	0.564621	0.025311	0.000125	99.40946
3	0.083795	0.002477	0.541932	0.018359	0.000375	99.43686
4	0.113337	0.004904	0.476720	0.014399	0.000837	99.50314
5	0.141153	0.007084	0.408675	0.011975	0.001299	99.57097
6	0.166822	0.008454	0.348787	0.010430	0.001700	99.63063
7	0.190364	0.008922	0.300919	0.009382	0.002009	99.67877
8	0.211972	0.008576	0.263943	0.008625	0.002241	99.71661
9	0.231894	0.007727	0.235675	0.008041	0.002415	99.74614
10	0.250377	0.006739	0.213968	0.007563	0.002552	99.76918
Cholesky Ordering: GDP LNM2 LNPOP LNSAV LNINT						

Table 10 Model 2

Variance Decomposition of LNDCB:						
Period	S.E.	GDP	LNDCB	LNPOP	LNSAV	LNINT
1	0.034839	0.539321	99.46068	0.000000	0.000000	0.000000
2	0.071414	0.625150	99.30618	0.005396	0.002056	0.061221
3	0.110886	0.688804	99.07775	0.022193	0.004496	0.206760
4	0.149004	0.787791	98.64528	0.036461	0.006764	0.523709
5	0.184483	0.893651	98.04747	0.046458	0.008642	1.003783
6	0.216908	0.998048	97.32520	0.052033	0.010084	1.614634
7	0.246404	1.095303	96.54351	0.054102	0.011119	2.295963
8	0.273272	1.179747	95.76443	0.053684	0.011799	2.990338
9	0.297858	1.248938	95.03409	0.051664	0.012200	3.653106
10	0.320499	1.302620	94.37932	0.048713	0.012395	4.256950
Variance Decomposition of LNPOP:						
Period	S.E.	GDP	LNDCB	LNPOP	LNSAV	LNINT
1	0.000504	0.019069	0.000588	99.98034	0.000000	0.000000
2	0.001122	0.035713	0.003724	99.93258	0.024170	0.003809
3	0.001872	0.053873	0.014720	99.85548	0.063787	0.012139
4	0.002738	0.073534	0.030574	99.75690	0.110457	0.028539
5	0.003707	0.100107	0.048868	99.64727	0.153235	0.050522
6	0.004770	0.131473	0.067832	99.53544	0.190217	0.075039
7	0.005921	0.165376	0.086540	99.42687	0.221757	0.099452
8	0.007153	0.199975	0.104529	99.32467	0.248723	0.122103

9	0.008462	0.233532	0.121577	99.23077	0.271904	0.142215
10	0.009845	0.264890	0.137585	99.14595	0.291963	0.159614
Variance Decomposition of LNSAV:						
Period	S.E.	GDP	LNDCB	LNPOP	LNSAV	LNINT
1	0.088890	0.001937	0.186469	2.69E-05	99.81157	0.000000
2	0.131437	0.004954	0.265034	0.001655	99.72687	0.001487
3	0.166076	0.012121	0.342487	0.012754	99.62714	0.005496
4	0.195354	0.037501	0.410177	0.014916	99.52843	0.008972
5	0.220915	0.035272	0.467245	0.014073	99.47187	0.011538
6	0.243843	0.028957	0.512179	0.012185	99.43400	0.012680
7	0.264792	0.028213	0.545974	0.010341	99.40269	0.012779
8	0.284183	0.038290	0.571278	0.009226	99.36907	0.012136
9	0.302320	0.057023	0.590228	0.009139	99.33248	0.011133
10	0.319417	0.080300	0.604749	0.010189	99.29469	0.010071
Variance Decomposition of LNINT:						
Period	S.E.	GDP	LNDCB	LNPOP	LNSAV	LNINT
1	0.025733	0.001036	4.463693	0.022321	0.004446	95.50850
2	0.053099	0.005714	4.227239	0.017882	0.002576	95.74659
3	0.082776	0.011799	4.136039	0.013926	0.001575	95.83666
4	0.111743	0.017682	3.796486	0.011782	0.000882	96.17317
5	0.138964	0.022674	3.374587	0.010474	0.000613	96.59165
6	0.164052	0.026299	2.944534	0.009524	0.000614	97.01903
7	0.187018	0.028363	2.556979	0.008792	0.000760	97.40511
8	0.208030	0.029039	2.229064	0.008224	0.000973	97.73270
9	0.227312	0.028646	1.960789	0.007806	0.001206	98.00155
10	0.245099	0.027556	1.744250	0.007529	0.001435	98.21923
Cholesky Ordering: GDP LNDCB LNPOP LNSAV LNINT						

Table 11 Model 3

Variance Decomposition of LNDPC:						
Period	S.E.	GDP	LNDPC	LNPOP	LNSAV	LNINT
1	0.051050	0.849723	99.15028	0.000000	0.000000	0.000000
2	0.098016	0.932314	99.04583	1.15E-05	0.000688	0.021158
3	0.145611	0.995437	98.91688	1.13E-05	0.001198	0.086473
4	0.193090	1.036419	98.74189	1.08E-05	0.000701	0.220984
5	0.233371	1.006338	98.52865	0.000252	0.022239	0.442523
6	0.266860	1.010450	98.19178	0.001599	0.058278	0.737894
7	0.294574	1.052697	97.76383	0.004956	0.096526	1.081992

8	0.317382	1.132566	97.28934	0.011295	0.129153	1.437642
9	0.336887	1.283179	96.78415	0.022367	0.143718	1.766589
10	0.354251	1.483524	96.29023	0.039592	0.142981	2.043674
Variance Decomposition of LNPOP:						
Period	S.E.	GDP	LNDGP	LNPOP	LNSAV	LNINT
1	0.000503	0.005486	0.037154	99.95736	0.000000	0.000000
2	0.001121	0.001160	0.025748	99.93902	0.031825	0.002244
3	0.001872	0.002000	0.018858	99.88811	0.083796	0.007239
4	0.002734	0.006506	0.014908	99.82083	0.143321	0.014433
5	0.003698	0.008673	0.009585	99.72938	0.227200	0.025167
6	0.004755	0.012328	0.005805	99.62337	0.319603	0.038893
7	0.005899	0.018237	0.004381	99.50895	0.413846	0.054585
8	0.007125	0.026593	0.005139	99.39049	0.506482	0.071294
9	0.008428	0.038658	0.007354	99.27028	0.595611	0.088097
10	0.009804	0.052992	0.010254	99.15125	0.681256	0.104243
Variance Decomposition of LNSAV:						
Period	S.E.	GDP	LNDGP	LNPOP	LNSAV	LNINT
1	0.088844	0.056487	0.007755	0.003131	99.93263	0.000000
2	0.130269	0.146053	0.009063	0.013136	99.83155	0.000202
3	0.163441	0.252905	0.010362	0.045568	99.69081	0.000356
4	0.191210	0.325070	0.012008	0.162356	99.50018	0.000386
5	0.213388	0.597798	0.015603	0.222553	99.16328	0.000761
6	0.232544	1.098862	0.021234	0.249822	98.62684	0.003247
7	0.249592	1.829864	0.029067	0.255453	97.87625	0.009367
8	0.265252	2.816343	0.039243	0.246718	96.87617	0.021528
9	0.279583	3.818356	0.051186	0.232324	95.85864	0.039494
10	0.292787	4.784701	0.064398	0.216262	94.87251	0.062129
Variance Decomposition of LNINT:						
Period	S.E.	GDP	LNDGP	LNPOP	LNSAV	LNINT
1	0.025983	0.059406	1.071385	0.009510	0.003353	98.85635
2	0.053366	0.049765	1.195995	0.004495	0.005602	98.74414
3	0.082933	0.041525	1.372872	0.001870	0.007386	98.57635
4	0.113581	0.033395	1.667866	0.002438	0.008896	98.28740
5	0.142313	0.041391	1.807874	0.005081	0.011473	98.13418
6	0.168266	0.057886	1.841867	0.008773	0.014887	98.07659
7	0.191269	0.081414	1.805441	0.012903	0.019338	98.08090
8	0.211397	0.112639	1.711883	0.016976	0.025168	98.13333
9	0.229051	0.140554	1.597063	0.020753	0.031559	98.21007
10	0.244698	0.164235	1.482173	0.024131	0.037842	98.29162
Cholesky Ordering: GDP LNDGP LNPOP LNSAV LNINT						

--	--	--	--	--	--	--

Complete Analysis of Variance Decomposition in Case of Upper Middle Income Countries

Table 12 Model 1

Variance Decomposition of M2:						
Period	S.E.	GDP	M2	POP	SAV	INT
1	0.996437	2.927447	97.07255	0.000000	0.000000	0.000000
2	2.008398	2.628874	97.36559	1.29E-07	0.005429	0.000109
3	3.057121	2.380326	97.60176	7.34E-06	0.017668	0.000234
4	4.096304	2.166305	97.79843	4.14E-05	0.034935	0.000288
5	4.968048	1.999821	97.91637	0.000147	0.083111	0.000554
6	5.655496	1.879426	97.94248	0.000399	0.176728	0.000966
7	6.180940	1.798502	97.87241	0.000899	0.326799	0.001394
8	6.575775	1.750031	97.70522	0.001779	0.541226	0.001739
9	6.885363	1.725662	97.46488	0.003045	0.804611	0.001799
10	7.146899	1.716979	97.18893	0.004566	1.087853	0.001672
Variance Decomposition of POP:						
Period	S.E.	GDP	M2	POP	SAV	INT
1	27341.79	0.081466	0.000115	99.91842	0.000000	0.000000
2	60410.96	0.141048	0.000242	99.82482	0.033786	0.000100
3	99991.75	0.205084	0.001148	99.68223	0.111066	0.000468
4	144883.0	0.272157	0.002604	99.50320	0.220840	0.001202
5	194968.3	0.349277	0.005828	99.24591	0.396720	0.002264
6	250025.2	0.426890	0.010781	98.92674	0.631877	0.003707
7	309827.9	0.498876	0.016966	98.56843	0.910167	0.005559
8	374162.1	0.562806	0.023806	98.19072	1.214856	0.007807
9	442803.6	0.615965	0.030598	97.81290	1.530203	0.010330
10	515538.1	0.658758	0.036832	97.44729	1.844104	0.013015
Variance Decomposition of SAV:						
Period	S.E.	GDP	M2	POP	SAV	INT
1	1.40E+09	8.410916	0.804074	1.295473	89.48954	0.000000
2	3.00E+09	8.812810	0.707928	1.060402	89.41834	0.000518
3	4.83E+09	9.346732	0.632942	0.849604	89.16795	0.002773
4	6.83E+09	9.992403	0.572627	0.661937	88.76513	0.007900
5	8.84E+09	10.70594	0.526826	0.569607	88.18558	0.012049
6	1.08E+10	11.55656	0.494005	0.543022	87.38912	0.017287
7	1.27E+10	12.56859	0.472188	0.566619	86.36678	0.025829
8	1.45E+10	13.74154	0.459557	0.636176	85.12285	0.039870
9	1.62E+10	15.07180	0.454129	0.749754	83.66059	0.063728

10	1.78E+10	16.53520	0.454151	0.905968	82.00323	0.101449
Variance Decomposition of INT:						
Period	S.E.	GDP	M2	POP	SAV	INT
1	43.56213	0.905753	0.080828	1.79E-05	0.068919	98.94448
2	86.44620	0.863044	0.074148	0.000377	0.066181	98.99625
3	129.8451	0.828417	0.068638	0.001112	0.064266	99.03757
4	171.9725	0.799443	0.063992	0.002221	0.062966	99.07138
5	205.2953	0.662203	0.061481	0.003278	0.059541	99.21350
6	229.8090	0.533065	0.060709	0.003917	0.056846	99.34546
7	247.2219	0.482393	0.061352	0.004008	0.055944	99.39630
8	259.3877	0.543681	0.063195	0.003729	0.057230	99.33216
9	268.5059	0.657800	0.066491	0.003500	0.061011	99.21120
10	276.1525	0.740954	0.071536	0.003474	0.066790	99.11725
Cholesky Ordering: GDP M2 POP SAV INT						

Table 13 Model 2

Variance Decomposition of DCB:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	0.723080	1.915309	98.08469	0.000000	0.000000	0.000000
2	1.540183	1.488248	98.50625	7.22E-05	0.003436	0.001993
3	2.462692	1.131537	98.84684	0.000235	0.012346	0.009042
4	3.451545	0.838259	99.11178	0.000464	0.026552	0.022949
5	4.335989	0.571916	99.29601	0.001950	0.076304	0.053824
6	5.143947	0.406393	99.35639	0.004157	0.141514	0.091543
7	5.884857	0.334364	99.31550	0.006744	0.209292	0.134101
8	6.563575	0.339145	99.19797	0.009560	0.271534	0.181794
9	7.212019	0.369098	99.08464	0.013132	0.307620	0.225509
10	7.835058	0.415040	98.96793	0.017023	0.325965	0.274039
Variance Decomposition of POP:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	11483.04	0.302529	0.013008	99.68446	0.000000	0.000000
2	25057.46	0.301420	0.005917	99.68781	0.004842	6.50E-06
3	40966.57	0.300308	0.002361	99.67985	0.017468	1.51E-05
4	58627.29	0.299151	0.001630	99.66130	0.037904	2.02E-05
5	82967.46	0.292638	0.000814	99.64701	0.059514	2.71E-05
6	111544.8	0.289107	0.000450	99.61730	0.093119	2.60E-05
7	143039.9	0.287721	0.000345	99.57021	0.141701	1.97E-05
8	176689.1	0.287106	0.000585	99.50596	0.206337	1.31E-05

9	214971.5	0.286273	0.000871	99.43385	0.278996	1.09E-05
10	256682.5	0.284779	0.001435	99.34950	0.364273	1.51E-05
Variance Decomposition of SAV:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	1.30E+09	6.000610	3.901115	2.273357	87.82492	0.000000
2	2.89E+09	5.586217	3.493328	2.248057	88.67205	0.000349
3	4.81E+09	5.223025	3.140663	2.222692	89.41224	0.001383
4	7.01E+09	4.898314	2.827614	2.196904	90.07401	0.003158
5	9.10E+09	4.742118	2.457384	2.537810	90.25689	0.005795
6	1.12E+10	4.597798	2.091952	2.944401	90.35681	0.009041
7	1.33E+10	4.442422	1.755045	3.341155	90.44836	0.013018
8	1.54E+10	4.276294	1.456743	3.702698	90.54638	0.017885
9	1.78E+10	4.055978	1.204303	4.061673	90.65356	0.024482
10	2.02E+10	3.826824	0.997980	4.387580	90.75526	0.032353
Variance Decomposition of INT:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	41.90718	2.349523	0.000401	0.007764	0.109202	97.53311
2	86.15809	2.586426	0.000343	0.006472	0.126837	97.27992
3	133.2412	2.905569	0.002028	0.005509	0.148058	96.93884
4	180.8465	3.306524	0.005316	0.004777	0.173136	96.51025
5	215.5336	3.462363	0.015103	0.004101	0.186091	96.33234
6	241.7165	3.540515	0.032076	0.003721	0.205050	96.21864
7	261.5126	3.602102	0.057100	0.003619	0.234281	96.10290
8	276.3207	3.675198	0.090995	0.003807	0.276016	95.95398
9	290.1562	3.949922	0.122856	0.004391	0.333718	95.58911
10	303.6106	4.499763	0.148585	0.005345	0.395164	94.95114
Cholesky Ordering: GDP DCB POP SAV INT						

Table 14 Model 3

Variance Decomposition of DCP:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	1.288129	1.264718	98.73528	0.000000	0.000000	0.000000
2	2.677810	1.246320	98.74413	0.000298	0.008952	0.000295
3	4.187846	1.228206	98.73969	0.000959	0.030342	0.000808
4	5.748866	1.210561	98.72410	0.001860	0.062124	0.001356
5	7.185332	1.180015	98.70184	0.002402	0.112273	0.003469
6	8.444958	1.143691	98.66688	0.002553	0.179527	0.007348
7	9.519939	1.106197	98.61856	0.002414	0.260157	0.012676
8	10.42095	1.069873	98.55951	0.002131	0.349480	0.019010

9	11.17972	1.038626	98.49433	0.001857	0.440186	0.025004
10	11.83089	1.014063	98.42913	0.001674	0.525536	0.029594
Variance Decomposition of POP:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	27739.74	0.080247	0.003103	99.91665	0.000000	0.000000
2	61287.84	0.139083	0.002324	99.82380	0.034664	0.000130
3	101439.6	0.202158	0.001757	99.68172	0.113790	0.000579
4	146975.7	0.268037	0.001338	99.50323	0.225947	0.001450
5	197780.4	0.343255	0.000977	99.24606	0.407007	0.002698
6	253629.4	0.418533	0.000702	98.92657	0.649814	0.004378
7	314294.6	0.487994	0.000509	98.56778	0.937210	0.006510
8	379558.4	0.549346	0.000381	98.18979	1.251416	0.009065
9	449192.5	0.600213	0.000301	97.81232	1.575250	0.011919
10	522976.5	0.641148	0.000261	97.44809	1.895546	0.014950
Variance Decomposition of SAV:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	1.41E+09	7.898146	0.379810	1.263476	90.45857	0.000000
2	3.01E+09	8.200952	0.280780	1.025136	90.49244	0.000690
3	4.84E+09	8.646765	0.206325	0.812165	90.33126	0.003487
4	6.83E+09	9.210270	0.149574	0.623847	90.00670	0.009606
5	8.82E+09	9.840963	0.099481	0.530996	89.51380	0.014755
6	1.08E+10	10.61138	0.066989	0.503351	88.79698	0.021294
7	1.26E+10	11.54680	0.056202	0.525563	87.83968	0.031756
8	1.43E+10	12.64671	0.066681	0.593986	86.64401	0.048611
9	1.60E+10	13.90939	0.093457	0.707325	85.21301	0.076824
10	1.76E+10	15.31078	0.129756	0.864710	83.57378	0.120970
Variance Decomposition of INT:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	44.18884	0.896346	0.042698	3.28E-05	0.078627	98.98230
2	87.66535	0.845500	0.041506	0.000430	0.077808	99.03476
3	131.6454	0.804672	0.040321	0.001197	0.077789	99.07602
4	174.3221	0.770755	0.039153	0.002334	0.078394	99.10936
5	208.0728	0.632505	0.046625	0.003403	0.076263	99.24120
6	232.9074	0.507590	0.062596	0.004037	0.074335	99.35144
7	250.5645	0.464100	0.087586	0.004111	0.073775	99.37043
8	262.9237	0.531993	0.122321	0.003817	0.074916	99.26695
9	272.1962	0.647749	0.161239	0.003586	0.077780	99.10965
10	279.9652	0.728076	0.197348	0.003575	0.081628	98.98937
Cholesky Ordering: GDP DCP POP SAV INT						

Complete Analysis of Variance Decomposition in Case of LICs (External Sources of Fluctuations)

Table 15 Model 4

Variance Decomposition of LOGGDP:						
Period	S.E.	LOGGDP	LOGODA	LOGPR	LOGTRAD	LOGCO2
1	0.015439	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.029680	98.56692	0.852112	0.014636	0.167721	0.257921
3	0.044509	94.70141	1.448537	0.044745	0.618264	2.003881
4	0.060390	90.39529	1.311572	0.069510	1.605607	4.043308
5	0.311599	8.320177	2.490905	30.55819	57.99986	0.380761
6	0.395227	5.333269	2.047544	31.17032	60.94557	0.294065
7	0.426414	5.138507	1.759357	31.32962	61.33691	0.254394
8	0.436504	6.817157	2.260390	30.82615	59.67683	0.243236
9	1.375277	15.88699	5.008100	27.54945	51.51169	0.024702
10	1.944631	13.10016	4.838890	27.86813	54.09747	0.073911
Variance Decomposition of LOGODA:						
Period	S.E.	LOGGDP	LOGODA	LOGPR	LOGTRAD	LOGCO2
1	0.021170	5.660327	94.33967	0.000000	0.000000	0.000000
2	0.035708	4.068545	93.54302	0.385396	0.679863	0.515453
3	0.051804	2.798405	84.10266	0.755422	1.801313	5.406253
4	0.069876	2.371842	74.25659	0.856809	3.282063	10.11296
5	0.864015	11.75629	5.527644	27.73196	54.73246	0.123291
6	1.286191	9.223395	4.838216	28.36439	57.44988	0.055931
7	1.586728	7.406581	4.214128	29.22338	59.04755	0.059948
8	1.808678	6.273634	3.538412	30.37276	59.66502	0.088601
9	3.132331	14.97917	5.116965	27.50719	52.30780	0.048001
10	4.740878	13.26452	5.259107	27.34298	54.06894	0.045721
Variance Decomposition of LOGPR:						
Period	S.E.	LOGGDP	LOGODA	LOGPR	LOGTRAD	LOGCO2
1	0.021051	96.39359	1.703472	1.902941	0.000000	0.000000
2	0.038661	96.84951	0.505590	1.537126	0.005712	0.691254
3	0.058322	85.21436	0.236726	1.592360	0.010378	7.989399
4	0.080678	72.45291	0.149426	1.718499	0.122249	15.55029
5	0.516588	17.37187	2.693286	30.07383	48.39157	0.879103
6	0.780576	12.61382	2.358370	31.40593	52.28681	0.816100
7	1.022610	9.500265	1.899189	32.68568	54.48657	0.870351
8	1.247040	7.450768	1.409251	34.06914	55.58212	0.886136
9	1.752498	15.42749	5.065169	28.16131	50.29468	0.606008
10	2.640245	14.63116	6.249623	26.38689	52.25618	0.267035
Variance Decomposition of LOGTRAD:						
Period	S.E.	LOGGDP	LOGODA	LOGPR	LOGTRAD	LOGCO2

1	0.881194	11.04631	2.796836	31.02511	55.13175	0.000000
2	1.271184	7.967970	2.331915	31.80160	57.86752	0.022595
3	1.561670	5.919738	1.821318	32.83326	59.28282	0.090451
4	1.794314	4.648559	1.388785	34.08914	59.61627	0.145753
5	3.084080	16.14238	5.538667	27.27377	50.89706	0.074268
6	4.688762	14.74037	6.141213	26.37054	52.65802	0.057776
7	6.374606	12.16792	5.653144	27.10698	54.88849	0.139539
8	7.955956	10.27477	4.781471	28.45600	56.18012	0.221747
9	8.756967	13.98140	5.496022	27.13187	52.86346	0.354141
10	12.27082	14.96421	6.395507	26.01480	52.34197	0.181352
Variance Decomposition of LOGCO2:						
Period	S.E.	LOGGDP	LOGODA	LOGPR	LOGTRAD	LOGCO2
1	0.017326	0.021078	66.18338	24.37190	3.049580	6.374064
2	0.031418	1.558506	67.64644	24.75697	1.921394	3.919110
3	0.045750	3.935169	66.67741	25.08375	1.218860	1.938018
4	0.060361	5.974178	65.13736	25.13546	0.789929	1.113715
5	0.112307	20.00307	34.98134	13.47783	30.17319	0.369104
6	0.207737	18.64550	18.21851	17.42808	45.24282	0.108566
7	0.313900	15.50076	12.34036	20.89789	50.98315	0.120902
8	0.425857	12.99199	9.099033	23.75583	53.81266	0.218129
9	0.455310	11.59790	8.258771	24.39539	55.03188	0.488873
10	0.481375	14.14128	8.431891	23.76845	52.68400	0.647235
Cholesky Ordering: GDP ODA PR TRADE CO2						

Complete Analysis of Variance Decomposition in Case of UMICs (External Sources of Fluctuations)

Table 16 Model 4

Variance Decomposition of ODA:						
Period	S.E.	GDP	ODA	PR	TRADE	CO2
1	35937240	0.004769	99.99523	0.000000	0.000000	0.000000
2	75137422	0.001175	99.99866	9.94E-05	2.09E-08	6.35E-05
3	1.13E+08	0.002874	99.99527	0.000222	0.001572	6.61E-05
4	1.48E+08	0.008765	99.98309	0.000323	0.007781	4.19E-05
5	1.79E+08	0.021065	99.95962	0.000396	0.018884	3.35E-05
6	2.06E+08	0.042063	99.92407	0.000442	0.033377	4.82E-05
7	2.31E+08	0.072695	99.87729	0.000464	0.049473	7.70E-05
8	2.54E+08	0.112028	99.82160	0.000465	0.065798	0.000110
9	2.75E+08	0.157555	99.76035	0.000451	0.081504	0.000140
10	2.94E+08	0.205973	99.69728	0.000426	0.096156	0.000166
11	3.12E+08	0.254015	99.63583	0.000396	0.109574	0.000187

12	3.30E+08	0.299042	99.57866	0.000364	0.121726	0.000205
Variance Decomposition of PR:						
Period	S.E.	GDP	ODA	PR	TRADE	CO2
1	65323014	0.084515	0.002041	99.91344	0.000000	0.000000
2	1.42E+08	0.069238	0.002454	99.92817	1.69E-05	0.000122
3	2.26E+08	0.074749	0.003674	99.92080	0.000115	0.000664
4	3.15E+08	0.079920	0.005291	99.91295	0.000277	0.001558
5	4.05E+08	0.078239	0.006961	99.91173	0.000473	0.002602
6	4.95E+08	0.069676	0.008497	99.91752	0.000669	0.003640
7	5.84E+08	0.057286	0.009844	99.92744	0.000839	0.004588
8	6.70E+08	0.044841	0.011023	99.93776	0.000963	0.005417
9	7.55E+08	0.035402	0.012078	99.94536	0.001032	0.006124
10	8.37E+08	0.030722	0.013052	99.94846	0.001048	0.006722
11	9.16E+08	0.031239	0.013979	99.94654	0.001020	0.007226
12	9.93E+08	0.036407	0.014876	99.94010	0.000962	0.007651
Variance Decomposition of TRADE:						
Period	S.E.	GDP	ODA	PR	TRADE	CO2
1	1.104472	0.195031	0.049177	0.071479	99.68431	0.000000
2	2.328721	0.151938	0.048553	0.071760	99.72774	8.99E-06
3	3.568464	0.091991	0.059289	0.075850	99.77262	0.000250
4	4.747327	0.053443	0.076373	0.081801	99.78749	0.000892
5	5.842028	0.036853	0.096770	0.088803	99.77575	0.001820
6	6.850858	0.032513	0.118184	0.096385	99.75008	0.002843
7	7.780347	0.031827	0.138998	0.104207	99.72115	0.003819
8	8.639648	0.030396	0.158203	0.112003	99.69472	0.004680
9	9.438135	0.027377	0.175267	0.119566	99.67239	0.005405
10	10.18441	0.023764	0.190008	0.126739	99.65349	0.006002
11	10.88593	0.020921	0.202468	0.133422	99.63670	0.006488
12	11.54897	0.019757	0.212831	0.139559	99.62097	0.006884
Variance Decomposition of CO2:						
Period	S.E.	GDP	ODA	PR	TRADE	CO2
1	0.008770	0.132297	0.025821	0.025357	0.008595	99.80793
2	0.017980	0.112845	0.028997	0.025564	0.009133	99.82346
3	0.026531	0.103392	0.043776	0.025157	0.007289	99.82039
4	0.033969	0.094158	0.066931	0.024500	0.005156	99.80925
5	0.040384	0.083104	0.094086	0.023749	0.003662	99.79540
6	0.045993	0.071090	0.121011	0.022974	0.002976	99.78195
7	0.050997	0.059789	0.145106	0.022205	0.002947	99.76995
8	0.055545	0.050531	0.165461	0.021452	0.003367	99.75919
9	0.059741	0.043878	0.182220	0.020723	0.004061	99.74912
10	0.063658	0.039693	0.195956	0.020019	0.004907	99.73943

11	0.067347	0.037425	0.207304	0.019346	0.005822	99.73010
12	0.070844	0.036405	0.216803	0.018707	0.006754	99.72133
Cholesky Ordering: GDP ODA PR TRADE CO2						

Complete Analysis of Variance Decomposition for Full Sample

Variance Decomposition of DCB:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	0.530536	1.121562	98.87844	0.000000	0.000000	0.000000
2	1.128592	0.802964	99.17104	0.001868	0.016011	0.008114
3	1.761079	0.549973	99.35350	0.002634	0.072697	0.021200
4	2.391898	0.354774	99.43449	0.002662	0.168665	0.039408
5	3.004917	0.226760	99.41136	0.002327	0.294369	0.065187
6	3.593444	0.172016	99.28730	0.001872	0.438163	0.100649
7	4.155388	0.189554	99.07317	0.001445	0.588952	0.146874
8	4.690883	0.272351	98.78529	0.001135	0.737458	0.203761
9	5.201073	0.409662	98.44244	0.000985	0.876718	0.270194
10	5.687506	0.589272	98.06325	0.001007	1.002088	0.344380
Variance Decomposition of POP:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	13627.31	0.062019	0.039311	99.89867	0.000000	0.000000
2	29485.62	0.130467	0.028189	99.83054	0.006872	0.003930
3	48641.80	0.199620	0.017007	99.73469	0.038180	0.010501
4	70607.26	0.286224	0.009352	99.59088	0.093895	0.019650
5	95061.64	0.392819	0.005162	99.40199	0.168307	0.031721
6	121772.3	0.517795	0.003685	99.17652	0.255100	0.046897
7	150559.0	0.657627	0.004152	98.92435	0.348782	0.065090
8	181274.7	0.808106	0.005943	98.65494	0.445033	0.085978
9	213794.5	0.965066	0.008591	98.37659	0.540675	0.109082
10	248009.5	1.124796	0.011763	98.09609	0.633502	0.133851
Variance Decomposition of SAV:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	9.83E+08	4.472877	3.728657	2.021826	89.77664	0.000000
2	2.16E+09	4.598448	3.193882	1.794109	90.40272	0.010839
3	3.52E+09	4.537709	2.580056	1.751016	91.09297	0.038246
4	5.01E+09	4.625828	2.025338	1.756009	91.51099	0.081839
5	6.61E+09	4.878950	1.560891	1.779392	91.64038	0.140382
6	8.29E+09	5.276879	1.187170	1.809428	91.51330	0.213227
7	1.01E+10	5.792838	0.894752	1.840533	91.17205	0.299831

8	1.19E+10	6.399450	0.671655	1.869758	90.65988	0.399252
9	1.38E+10	7.070547	0.506048	1.895524	90.01793	0.509946
10	1.58E+10	7.782323	0.387249	1.917054	89.28352	0.629855
Variance Decomposition of INT:						
Period	S.E.	GDP	DCB	POP	SAV	INT
1	31.82084	0.182356	0.006223	0.017340	0.007157	99.78692
2	65.49696	0.075384	0.020067	0.036131	0.035103	99.83332
3	97.48804	0.042884	0.041218	0.043483	0.131917	99.74050
4	125.9780	0.135512	0.068532	0.045080	0.306362	99.44451
5	150.9579	0.370875	0.099736	0.043760	0.544501	98.94113
6	172.9652	0.742080	0.132546	0.041043	0.822128	98.26220
7	192.5950	1.224902	0.165163	0.037784	1.114510	97.45764
8	210.3497	1.786832	0.196405	0.034451	1.401555	96.58076
9	226.6173	2.394835	0.225628	0.031288	1.669436	95.67881
10	241.6881	3.020233	0.252584	0.028405	1.910168	94.78861
Cholesky Ordering: GDP DCB POP SAV INT						

Model 3

Variance Decomposition of DCP:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	0.891320	0.766429	99.23357	0.000000	0.000000	0.000000
2	1.853965	0.768833	99.22490	0.000115	0.005666	0.000490
3	2.900895	0.769912	99.20902	0.000353	0.019241	0.001479
4	3.984019	0.767776	99.18922	0.000649	0.039636	0.002716
5	4.981732	0.752140	99.17143	0.000800	0.069511	0.006123
6	5.857396	0.732284	99.14781	0.000817	0.107114	0.011974
7	6.605182	0.711650	99.11774	0.000751	0.149869	0.019994
8	7.232169	0.692168	99.08250	0.000656	0.194909	0.029770
9	7.760160	0.677294	99.04354	0.000572	0.238788	0.039811
10	8.213132	0.667645	99.00443	0.000511	0.278758	0.048652
Variance Decomposition of POP:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	19137.07	0.027108	0.002723	99.97017	0.000000	0.000000
2	42242.00	0.041075	0.001923	99.92020	0.036788	1.82E-05
3	69852.32	0.056156	0.001408	99.81969	0.122700	4.55E-05
4	101120.7	0.074654	0.001085	99.67603	0.248164	6.34E-05
5	136003.4	0.100620	0.000770	99.44232	0.456246	4.34E-05
6	174369.1	0.126356	0.000522	99.13303	0.740064	2.66E-05

7	216080.7	0.148779	0.000356	98.76968	1.081159	2.65E-05
8	261003.6	0.166482	0.000250	98.37374	1.459493	3.80E-05
9	308993.1	0.177931	0.000187	97.96711	1.854731	4.25E-05
10	359908.0	0.184300	0.000164	97.56508	2.250417	3.69E-05
Variance Decomposition of SAV:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	9.63E+08	3.375536	0.247545	1.248416	95.12850	0.000000
2	2.05E+09	3.184339	0.175411	0.978412	95.66180	3.31E-05
3	3.28E+09	3.065458	0.122420	0.743110	96.06892	8.87E-05
4	4.59E+09	2.995537	0.083453	0.541677	96.37919	0.000144
5	5.89E+09	2.966153	0.052127	0.443566	96.53768	0.000479
6	7.12E+09	3.001324	0.039457	0.414345	96.54386	0.001010
7	8.26E+09	3.100734	0.049950	0.439596	96.40819	0.001533
8	9.31E+09	3.260439	0.083754	0.519903	96.13401	0.001895
9	1.03E+10	3.477393	0.135319	0.659452	95.72590	0.001932
10	1.12E+10	3.739969	0.196801	0.863390	95.19810	0.001735
Variance Decomposition of INT:						
Period	S.E.	GDP	DCP	POP	SAV	INT
1	30.55379	0.470681	0.063663	0.000422	0.013194	99.45204
2	60.65500	0.471161	0.060811	0.001186	0.013228	99.45362
3	91.13272	0.457970	0.058710	0.002316	0.012845	99.46816
4	120.7331	0.412195	0.057966	0.003782	0.011280	99.51478
5	144.1776	0.310384	0.066240	0.005010	0.009408	99.60896
6	161.4481	0.252006	0.082065	0.005738	0.008122	99.65207
7	173.7232	0.276336	0.105332	0.005922	0.007324	99.60509
8	182.2628	0.385589	0.135910	0.005718	0.006885	99.46590
9	188.5945	0.500416	0.169059	0.005400	0.006575	99.31855
10	193.8659	0.564711	0.199965	0.005111	0.006226	99.22399
Cholesky Ordering: GDP DCP POP SAV INT						

Model 4 Variance Decomposition for Full Sample

Variance Decomposition of GDP:						
Period	S.E.	GDP	PR	ODA	CO2	TRAD
1	65426186	100.0000	0.000000	0.000000	0.000000	0.000000
2	1.43E+08	99.96389	0.000733	0.000157	0.002321	0.004026
3	2.33E+08	99.89431	0.004355	0.001482	0.015754	0.034400
4	3.30E+08	99.78722	0.010532	0.004442	0.042865	0.096168
5	4.32E+08	99.65022	0.018407	0.008681	0.081588	0.179794
6	5.37E+08	99.49530	0.027288	0.013629	0.128652	0.274424
7	6.43E+08	99.33265	0.036679	0.018820	0.180972	0.372157
8	7.51E+08	99.16934	0.046239	0.023947	0.236042	0.468222

9	8.59E+08	99.00974	0.055738	0.028841	0.291970	0.560117
10	9.67E+08	98.85634	0.065023	0.033420	0.347394	0.646777
Variance Decomposition of PR:						
Period	S.E.	GDP	PR	ODA	CO2	TRAD
1	6239108.	1.422575	98.57742	0.000000	0.000000	0.000000
2	13674663	1.362994	98.57240	0.001868	0.003727	0.003483
3	22131847	1.329275	98.50651	0.013874	0.015011	0.024887
4	31216023	1.308084	98.41059	0.038470	0.033371	0.066138
5	40683954	1.294378	98.29250	0.073220	0.057341	0.120863
6	50371715	1.285564	98.16075	0.114516	0.085237	0.182230
7	60163707	1.280148	98.02284	0.159194	0.115562	0.245293
8	69976439	1.277189	97.88426	0.204917	0.147117	0.307020
9	79748884	1.276052	97.74864	0.250102	0.178993	0.365768
10	89436287	1.276285	97.61818	0.293750	0.210523	0.420787
Variance Decomposition of ODA:						
Period	S.E.	GDP	PR	ODA	CO2	TRAD
1	23007410	0.209125	0.030663	99.76021	0.000000	0.000000
2	49523512	0.226772	0.021357	99.70724	0.000309	0.000626
3	77613875	0.248928	0.011863	99.65975	0.002880	0.008216
4	1.06E+08	0.272687	0.006433	99.60235	0.008417	0.026669
5	1.32E+08	0.297668	0.005595	99.53116	0.016702	0.054396
6	1.58E+08	0.323635	0.009277	99.44880	0.027197	0.087964
7	1.82E+08	0.350322	0.017133	99.35895	0.039293	0.124243
8	2.05E+08	0.377455	0.028669	99.26479	0.052427	0.161028
9	2.27E+08	0.404768	0.043327	99.16867	0.066124	0.196985
10	2.47E+08	0.432024	0.060541	99.07226	0.080011	0.231415
Variance Decomposition of CO2:						
Period	S.E.	GDP	PR	ODA	CO2	TRAD
1	30.04089	0.030303	0.000962	0.009721	99.95901	0.000000
2	64.42477	0.049746	0.001002	0.007247	99.94172	0.000265
3	101.1157	0.077854	0.017356	0.004667	99.89839	0.001274
4	137.9744	0.113423	0.060392	0.002729	99.81909	0.003494
5	174.0013	0.155087	0.131340	0.001771	99.70321	0.007501
6	208.7472	0.201572	0.227722	0.001907	99.55375	0.013876
7	242.0414	0.251697	0.345674	0.003141	99.37520	0.023110
8	273.8576	0.304381	0.480939	0.005412	99.17254	0.035568
9	304.2434	0.358650	0.629333	0.008623	98.95077	0.051490
10	333.2816	0.413650	0.786996	0.012658	98.71459	0.071010
Variance Decomposition of TRAD:						
Period	S.E.	GDP	PR	ODA	CO2	TRAD

d						
1	5.31E+10	0.291685	0.115857	0.004574	0.229253	99.35863
2	1.13E+11	0.254775	0.152718	0.002705	0.220933	99.05207
3	1.74E+11	0.233975	0.198514	0.004649	0.207010	98.73442
4	2.32E+11	0.222606	0.241905	0.009994	0.194258	98.50841
5	2.87E+11	0.217033	0.280011	0.017861	0.183187	98.34930
6	3.38E+11	0.215255	0.312309	0.026567	0.173356	98.23421
7	3.86E+11	0.216183	0.338823	0.034551	0.164380	98.14922
8	4.33E+11	0.219203	0.359773	0.040819	0.156017	98.08587
9	4.77E+11	0.223950	0.375491	0.044966	0.148123	98.03863
10	5.20E+11	0.230197	0.386381	0.047011	0.140615	98.00364
Variance Decomposition of BREAK:						
Perio d	S.E.	GDP	PR	ODA	CO2	TRAD
1	0.085507	0.503762	0.001295	0.271497	0.001049	0.005824
2	0.119852	0.829222	0.036546	0.274827	0.047402	0.020463
3	0.145605	1.319724	0.032170	0.304451	0.065062	0.045189
4	0.167798	1.899607	0.024374	0.339961	0.068344	0.075425
5	0.187719	2.531032	0.020575	0.375553	0.065756	0.110211
6	0.206018	3.191401	0.021253	0.409679	0.060615	0.149054
7	0.223095	3.864225	0.025701	0.441804	0.054600	0.191317
8	0.239207	4.537293	0.033018	0.471768	0.048642	0.236353
9	0.254529	5.201655	0.042381	0.499591	0.043249	0.283587
10	0.269185	5.850851	0.053112	0.525381	0.038674	0.332546
Cholesky Ordering: GDP PR ODA CO2 TRAD BREAK						

List of Country Names Included into the Sample

LICS	UMICs
Benin	Brazil
Burkina Faso	China
Burundi	Colombia
Central African Republic	Costa Rica
Comoros	Dominican Republic
Gambia, The	Ecuador
Guinea	Fiji
Guinea-Bissau	Gabon
Haiti	Iran, Islamic Rep.
Korea, Dem. People's Rep.	Jamaica
Liberia	Malaysia
Madagascar	Mexico
Malawi	Peru
Mali	Paraguay
Mozambique	South Africa

Nepal	Thailand
Niger	Turkey
Rwanda	
Senegal	
Sierra Leone	
Somalia	
South Sudan	
Togo	
Uganda	
Zimbabwe	

Description of Variables

Variable	Definition & Unit of Measurement	Data source
Business Cycle	GDP per capita (constant US \$)	World development Indicators (WDI) /IFS/OECD data account
Financial Development (M2)	Money and quasi money (M2) as % of GDP	IMF/International Financial Statistics (IFS)
Financial Development (DCB)	Domestic credit to private sector by banks (% of GDP)	IMF/IFS/OECD GDP estimates
Financial Development (DCP)	Domestic credit provided by financial sector (% of GDP)	IMF/IFS/OECD GDP estimates
Population	Population, total	WDI
Saving	Gross domestic household saving (constant 2005 US\$)	World Bank/OECD data accounts
Interest Rate	Lending interest rate (%)	WDI/IFS
Official Development Assistance	Net ODA received (% of gross NI)	WDI
Trade openness	Imports of goods and services nominal+ Exports of goods and services nominal	WDI/IFS/OECD accounts
Personal Remittances	PR, received (current US\$)	IMF estimates
Environment	CO ₂ emissions (kg per 2005 US\$ of GDP)	WDI