



DEPARTMENT OF ECONOMICS
MAHATMA GANDHI SCHOOL OF ECONOMICS AND COMMERCE
ASSAM UNIVERSITY, SILCHAR
(A Central University Constituted under Act XIII of 1989)
Silahar-788011, Assam India

DECLARATION

I, Sanjib Debnath, bearing Registration No. Ph.D. /1647/2011, dated 21/09/2011, hereby declare that the subject matter of the thesis entitled “A Study of Growth, Inflation and Monetary Expansion in India during 1960-2010”, is the record of work done by me and that the contents of this thesis did not form the basis for award of any degree to me or to anybody else to the best of my knowledge. The thesis has not been submitted in any other University/Institute.

Place: Silchar

(Sanjib Debnath)

Date:

ACKNOWLEDGEMENTS

I would like to express my deep gratitude and deepest regards to my esteemed supervisor, Dr. Ritwik Mazumder, Assistant Professor in Economics, Assam University, Silchar, for his generous cooperation, amicable behavior, valuable time, suggestions, constant encouragement and showing hope at every moment during the course of present work. It was all due to his kindness and support that the present work could be taken up and completed successfully. I will remain ever indebted to him.

I wish to express my sincere gratitude to Prof. Niranjan Roy, HOD, Department of Economics and Dean, Mahatma Gandhi School of Economics and Commerce, Prof. Sumanash Dutta, Department of Economics, Prof. M. A. Ansari, Department of Economics, Prof. Alok Sen, Department of Economics, Assam University and all other teachers of the Department of Economics, Assam University, Silchar, for their valuable advice and suggestions till the accomplishment of the goal.

Over the last five years I have come into direct contact with numerous academic personalities in the field of economics and econometrics and have had the chance to discuss my research problem and study area in detail. In this department I have academically benefitted from all my teachers. I have learned immensely from the seminars that I have attended in the department. Issues like methodology, choice of research problem, hypothesis framing and analysis of data, are few things I have learnt and developed. The IPP course – work was of special significance to me as it created an academic platform for discussion, debate and learning.

I have benefitted greatly from the class lectures of Dr. Subhrabaran Das, Prof. Maniklal Adhikary (University of Burdwan), and Prof. Ajitava Raychoudhuri (Jadavpur University) during the Workshops on Research Methodology that were organised by the Department during the last five years. It is primarily due to teachings of Dr. Das and Prof. Adhikary that I was motivated to take up the present

study on the Indian Economy using few basic tools of time-series econometrics. I still remember Prof. Adhikary's remark during his lecture here:

“If you have defined and specified a research problem correctly and have asked appropriate research questions, it means that you have already travelled a long way along the *correct path* in your research endeavour.”

I am grateful to Dr. Mahuya Sen Gupta, Assistant Prof., Department of Biotechnology, Assam University, for her encouragement in my research work. I would like to thank my well wishers, my friends namely Dipangshu Dev Chowdhury and Victoria Haobijam and many others because of their encouragement and help in various stages of my work. They have directly and indirectly helped me in my research endeavor. I also grateful to my family members especially my loving mother Sumati Debnath, my sister Sangita Debnath and my brothers namely Sanjoy Debnath and Subir Debnath, of their relentless encouragement and support in my research work. They have been eagerly waiting for the conclusion of my research work.

The present work is the fruit of inspirational support of a large number of individuals, specially, respondents and institutions. I am equally grateful to all the editors, publishers and copyright holders of different sources cited here from where I have drawn materials. I am also grateful to Mr. Surya Kanta Das, Raj Printing Centre Department of Economics & Commerce for doing proper editing and printing of this thesis with enormous care.

Last but not least I convey my gratitude to all the well wishers of my locality in Silchar those who have actively supported me. I am thankful to my father Late Sudhir Chandra Debnath and God Almighty for all the blessings showered on me.

Sanjib Debnath

Preface

India is a poor nation by per capita incomes, levels of resources enjoyed by the people, or even by the levels of development achieved across states and regions. Even after almost 70 years of independence people suffer due to lack of sufficient purchasing power. In such a situation India needed and still needs rapid income growth along with price stability and distributive justice. Specifically, on the macroeconomic front both supply capabilities and aggregate demand in the Indian economy must rise not only at a brisk pace but also in tandem over long periods of time. This balanced long run growth between demand and actual output could ensure movement of the price level along some long run path, as sticky prices are unrealistic and inconsistent with long run growth. An excess of demand growth over supply growth would lead to inflation in the short run and perhaps also in the long run. But what are the sources of sudden and erratic increases in demand? Although there could be several other reasons, the growth of demand heavily depends on expansionary fiscal and monetary policies undertaken by the government and the central bank respectively from time to time. Both expansionary fiscal and monetary policies are vital for both short run as well as long run growth prospects of countries like India where growth traditionally depended on the government sector enterprises, as the economy was primarily of a socialistic planned type with basic and heavy industries acting as the only effective engine of growth. Weaknesses existed on the agricultural front as well as on the foreign trade front with limited export capabilities. India remained heavily import dependent and this was even for food items as well during severe droughts. More over consumer durables industries were discouraged till the early 1980s. Thus government's purchase of goods and services was one vital channel of growth. Plan expenditure played a vital part here. Expenditure by the

fiscal authorities meant greater purchases of goods and services, the bulk of which were government enterprise produced. Unfortunately there was a negative fallout of this strategy. Poor growth of personal incomes and purchasing powers meant meagre growth of direct and indirect tax revenues which necessitated fiscal imbalances or in other words deficit budgets over the years. But the question is how were these deficit budgets financed? Unfortunately till the early 1980s the fiscal authorities has to resort to persistent and heavy borrowings from the Reserve Bank of India resulting in liquidity injections into the economy. It was a more like a case of sudden and erratic boosts in demand without much adjustments in supply. In other words too much money chased too little goods. Furthermore oil price shocks created even bigger problems for the nation during late 1970s and early 1980s. The government found it difficult to match up to the ever rising spending especially under non-plan expenditure. In a nut shell government expenditure, fiscal deficits and the money supply all started a spiral upward movement and price hikes resulted as demand growth could not be matched by supply growth due to its primitive and inflexible nature. The nation slowly started to realise the mistake of neglecting agriculture, consumer goods industries and export competitiveness. This study is undertaken in this backdrop with the goal of measuring, testing and quantifying this cycle on the one hand, and providing some useful insights about corrective policy measures on the other. It is hoped that this research document will act as a guideline for new studies on deficit – money – GDP – inflation causality not only in India but in other developing nations as well in the coming days.

CONTENTS

	Page No.
Declaration	i
Certificate	ii
Acknowledgement	iii-iv
Preface	v-vi
List of Tables	ix-xiii
CHAPTER-1 INTRODUCTION	1-42
1.1 Introduction	
1.2 The Shift in Monetary Policy during Post 1991 Era	
1.3 Statement of the Problem	
1.4 Rationale of the Study	
1.5 Theoretical and Conceptual Framework	
1.6 Objectives and Hypotheses	
1.7 Monetary Policy in India since the Beginning of the Five Year Plans	
1.8 Fiscal Policy in India since the Onset of Planning	
CHAPTER -2 REVIEW OF LITERATURE	43-73
2.1 Empirical Studies on Growth, Inflation, Fiscal Deficit and Money Supply	
2.2 Literature Gap- Identifying Neglected Areas	
CHAPTER -3 MODELS, METHODOLOGY AND DATA	74-95
3.1 Monetary Aggregates in India	
3.2 Data	
3.3 Exponential Detrending	

3.4	Testing Stationarity in the Presence of Structural Breaks	
3.5	Toda- Yamamoto Modified Granger Causality under VAR Environment	
3.6	Vector Auto-regression (VAR)	
3.7	Causality in Time Series Econometrics – Granger and Sims	
	CHAPTER -4 EMPIRICAL RESULTS AND DISCUSSION	96-158
4.1	Analysis of Growth and Structural Breaks	
4.2	Detrending and Identifying Structural Breaks	
4.3	Stationarity Testing of all Variables	
4.4	Causality between Money Supply and Inflation	
4.5	Causality between Real GDP and Money Supply	
4.6	Causality between Real GDP and Government Expenditure	
4.7	Causality between Fiscal Deficit and Money Supply	
4.8	Causality between Money Supply and Index of Industrial Production	
	CHAPTER -5 SUMMARY AND CONCLUSIONS	159-169
5.1	Highlights of the Study	
5.2	Summary of the Study	
5.3	Macroeconomic Policy Suggestions	
5.4	Possible Extensions	
	BIBLIOGRAPHY	170-189
	PUBLICATIONS	190-221

LIST OF TABLES

Table No.	Title of the Table	Page No.
3.1	Variable-wise time periods of Annual Time Series Data for the Study	78
4.1.1	Average Annual Growth Rates (%) of Real GDP, Narrow Money and Broad Money in India during 1961-2013 (original series or non-detrended series)	96
4.1.2	Average Annual Growth Rates (%) of Nominal GDP, WPIAC And CPIIW in India during 1961-2013 (original series or non-detrended series)	97
4.1.3	Average Annual Growth Rates (%) of Revenue Deficit, Revenue Expenditure and Capital Expenditure in India during 1961-2013 (for the original or non-detrended series)	97
4.1.4	Average Annual Growth Rates (%) of Government Expenditure and Gross Fiscal Deficit in India during 1961-2013 (for the original or non-detrended series)	98
4.2.1	Comparing Goodness of Fit Statistics of Parabolic Trend Fitting vis-s-vis Exponential Trend Fitting for each Time Series Variable for the period 1961-2010	102
4.2.2	Bai-Perron Test for Unknown Multiple Structural Break Points of Original <i>vis-a-vis</i> De-trended Annual Time Series of Selected Variables	103
4.3.1	Stationarity Tests of Detrended Time Series Data Ignoring any Structural Break in the Series	104
4.3.2	Structural Break Point Unit Root Test of De-trended Time Series	105
4.3.3	Stationarity Tests of all Detrended Variables till Break Date	106
4.3.4	Stationarity Test Results of all De-trended Variables for Post Break Period	107

4.3.5	Stationarity Tests of Original Time Series (non-detrended) Ignoring Structural Breaks in the Series	108
4.4.1	Bai-Perron Test for Unknown Multiple Structural Break Points of Original <i>vis-a-vis</i> De-trended Annual Time Series	109
4.4.2	Structural Break Point Unit Root Test of De-trended Series	110
4.4.3	Stationarity Tests of Original Time Series (non-detrended) Ignoring Structural Breaks in the Series	111
4.4.4	The Residual Serial Correlation LM Tests For the WPI – Broad money supply VAR	114
4.4.5	The WPI–Broad Money Supply VAR Model: Normality Test of Residuals	115
4.4.6	Wald Tests for Granger Causality between M3 and WPI	115
4.4.7	Johansen Co-integration Test between M3 and WPI	116
4.4.A1	Comparing Goodness of Fit Statistics of Parabolic Trend Fitting <i>vis-s-vis</i> Exponential Trend Fitting for each Time Series Variable for the period 1961-2010	117
4.4.A2	Optimum Lag Length Selection in the M3–WPI VAR Model	117
4.4.A3	Estimated VAR between M3 and WPI	118
4.5.1	Bai-Perron Test for Unknown Multiple Structural Break Points of Original <i>vis-a-vis</i> De-trended Annual Time Series of Selected Variables	120
4.5.2	Structural Break Point Unit Root Test of De-trended Time Series	121
4.5.3	Stationarity Tests of Original Time Series (non-detrended) Ignoring Structural Breaks in the Series	122
4.5.4	The Residual Serial Correlation LM Tests For the GDP- Broad Money VAR	123

4.5.5	The Real GDP – Broad Money VAR Model: Normality Tests of Residuals	125
4.5.6	Wald Tests for Granger Causality between GDP and M3	125
4.5.7	The Residual Serial Correlation LM Tests For the GDP-Narrow Money VAR	126
4.5.8	The Real GDP–M1 VAR Model: Normality Test of Residuals)	127
4.5.9	Wald Tests for Granger Causality between GDP and M1	127
4.5.10	Johansen Co-integration Test between GDP and Broad Money	128
4.5.11	Johansen Co-integration Test between GDP and Narrow Money	129
4.5.A1	Comparing Goodness of Fit Statistics of Parabolic Trend Fitting vis-s-vis Exponential Trend Fitting for each Time Series Variable for the period 1961-2010	129
4.5.A2	Optimum Lag Length Selection in VAR for the GDP and M3 Model	130
4.5.A3	VAR Model Estimates between GDP and Broad Money Supply (detrended) for India during 1961-2010	131
4.5.A4	Optimum Lag Length Selection in VAR for the GDP and M1 Model	132
4.5.A5	VAR Model Estimates between GDP and Narrow Money Supply in India during 1961-2010	133
4.6.1	Bai-Perron Test for Unknown Multiple Structural Break Points of Original <i>vis-a-vis</i> De-trended Annual Time Series	134
4.6.2	Structural Break Point Unit Root Test of De-trended Series	135
4.6.3	Stationarity Tests of Original Time Series (non-detrended) Ignoring Structural Breaks in the Series	136

4.6.4	The Residual Serial Correlation LM Tests For the GDP – Government Expenditure VAR	139
4.6.5	The Real GDP–Government Expenditure VAR Model: Normality Test of Residuals	140
4.6.6	Wald Tests for Granger Causality between GDP and G	140
4.6.7	Johansen Co-integration Test between GDP and G	141
4.6.A1	Comparing Goodness of Fit Statistics of Parabolic Trend Fitting vis-s-vis Exponential Trend Fitting for each Time Series Variable for the period 1961-2010	141
4.6.A2	Optimum Lag Length Selection in VAR for the GDP and G Model	142
4.6.A3	VAR Model Estimates between GDP and Government Expenditure (detrended) for India during 1961-2010	143
4.7.1	Bai-Perron Test for Unknown Multiple Structural Break Points of Original <i>vis-a-vis</i> De-trended Annual Time Series	144
4.7.2	Structural Break Point Unit Root Test of De-trended Time Series	145
4.7.3	Stationarity Tests of Original Time Series (non-detrended) Ignoring Structural Breaks in the Series	146
4.7.4	The Residual Serial Correlation LM Tests For the Broad Money Supply – Fiscal Deficit VAR	149
4.7.5	The Fiscal Deficit – Broad Money Supply VAR Model: Normality Test of Residuals	150
4.7.6	Wald Tests for Granger Causality between Fiscal Deficit and Broad Money Supply	150
4.7.7	Johansen Co-integration Test between Fiscal Deficit and M3	151

4.7.A1	Comparing Goodness of Fit Statistics of Parabolic Trend Fitting vis-s-vis Exponential Trend Fitting for each Time Series Variable for the period 1970-2010	152
4.7.A2	Optimum Lag Length Selection in the Fiscal Deficit–Broad Money VAR Model	152
4.7.A3	Estimated VAR Model between Fiscal Deficit and Broad Money Supply in India	153
4.8.1	Bai-Perron Test for Unknown Multiple Structural Break Points of Original <i>vis-a-vis</i> De-trended Annual Time Series	154
4.8.2	Structural Break Point Unit Root Test of De-trended Time Series	154
4.8.3	The Residual Serial Correlation LM Tests For the IIP-Broad Money-Bank Rate VAR	155
4.8.4	IIP – M3 – BR VAR Model: Normality Tests of Residuals	155
4.8.5	Pair-wise Granger Causality Tests between IIP, M3 and BR	156
4.8.A1	Comparing Goodness of Fit Statistics of Parabolic Trend Fitting vis-s-vis Exponential Trend Fitting for each Time Series Variable for the period 1961-2010	156
4.8.A2	Optimum Lag Length Selection in VAR between IIP – BR – M3	156
4.8.A3	Estimates of VAR Model between IIP, M3 and BR for India (1960-2010)	157