



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

EVALUATING THE INFLATION TARGETING REGIME OF SOUTH AFRICA

by

JOSINE UWILINGIYE

A thesis

Submitted in Fulfilment of the

Requirements for the Degree of

Doctor of Philosophy

In the faculty of Economic and Management Sciences

UNIVERSITY OF PRETORIA

2010



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Copyright
by
Josine Uwilingiye



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

2010

Doctor of Philosophy Thesis

**EVALUATING THE INFLATION TARGETING REGIME OF
SOUTH AFRICA**

by

Josine Uwilingiye

Major Advisor: Prof. Rangan Gupta

Associate Advisor: Dr. Ruthira Naraidoo

University of Pretoria

2010

EVALUATING THE INFLATION TARGETING REGIME OF SOUTH AFRICA

Josine Uwilingiye, Ph.D
University of Pretoria, 2010

Abstract

The South African Reserve Bank (SARB) moved to an official inflation targeting regime in the February of 2000, with the sole aim of maintaining the CPIX inflation between a target-band of three to six percent.

Against this backdrop, this thesis, over seven independent chapters with a common theme, evaluates the inflation targeting regime in terms of welfare cost estimates and mean and volatility of inflation in the post-targeting period.

Chapters 2 and 3 use the partial equilibrium money demand approach based on cointegration and long-horizon estimation techniques, to derive the welfare cost estimates. Given the sensitivity of the results to the estimation techniques, chapter 4 carries out a robustness check for the two estimation methods based on data aggregation. The chapter 4 finds the long-horizon method to be more robust, and shows that the welfare cost estimate lies between 0.15 percent to 0.41 percent of GDP across the width of the target band.

Realizing that partial equilibrium approaches are merely one-dimensional, in the sense that it fails to account for the fact that inflation, operating in conjunction with the tax system, has further distortionary effects, we re-evaluate the welfare costs in chapter 5 using a more general micro-level approach. The welfare cost estimates are found to increase by nearly one and half times when compared to the partial equilibrium approaches. This estimate increases by more than twice, when we adopt a dynamic general equilibrium endogenous growth model to calculate the welfare cost of inflation in chapter 6. In chapters 7 and 8 we carry out counterfactual experiments based on a model of dynamic time inconsistency and cosine-squared cepstrum. Specifically, we ask the question: If the mean and volatility of inflation would have been higher

or lower had the SARB continued to pursue its pre-targeting monetary policy approach. We find the evidence that the mean and volatility in the post-targeting era is higher than it would have been had the SARB continued to stick to its pre-targeting monetary policy framework.

Based on our results, we conclude that there can be large gains by considering a narrower (and possibly lower) target band.

ACKNOWLEDGEMENTS

Thanks to the Lord, with whom all things are possible. Without His blessings I wouldn't have made it this far.

I would like to thank all people who have helped and inspired me during my Phd study.

Foremost, I would like to express my sincere gratitude and appreciation to my supervisor Prof. Rangan Gupta for the continuous support of my Phd study and research, for his guidance, motivation, enthusiasm, and immense knowledge. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better supervisor and mentor for my Phd study. I would also like to thank my co-supervisor Dr Ruthira Naraidoo for going through my work.

I would like to thank my colleagues at the Department of Economics who have helped in numerous ways, especially my appreciation goes out to Mrs Louise Cromhout for her kindness, support and assistance.

Thanks to the University of Pretoria for providing me with necessary materials while doing this study.

I take this opportunity to express my profound gratitude to my relatives, especially my uncle Jules Kabahizi and his family (Beatha Mukandoli, Fabriz Kwizera and Casey Ishimwe), my late uncle Jean Bosco Karangwa and my siblings Gustave Udahemuka, Rosine Ingabire, Auguste Hategekimana (late) and Octave Hakizimana for their support and love, without them nothing would have been possible.

Finally, I thank my friends (Kasai, Hiywot, Vania, Sindi, Temesgen, Chris and Funke) with their encouragement and support.

I would like to dedicate this thesis to my late father Apollinaire Rugaravu and late mother Consolée Mukasine for her encouragement in pursuit of my studies in Economics.

Table of Contents

1	Introduction.....	1
1.1	Introduction	1
2	Measuring the welfare cost of inflation in South Africa*	4
2.1	Introduction	4
2.2	The theoretical foundations	5
2.3	Data	7
2.4	Empirical results	7
2.5	Conclusion	15
3	Measuring the welfare cost of inflation in South Africa: A reconsideration*.....	16
3.1	Introduction	16
3.2	The theoretical foundations	19
3.3	Data	23
3.4	Empirical methodology and results	24
3.5	Conclusion	27
4	Time aggregation, long-run money Demand and the welfare cost of inflation*	29
4.1	Introduction	29
4.2	The theoretical foundations	32
4.3	Data and Results	34
4.4	Conclusions	43
5	Some Benefits of Reducing Inflation in South Africa*	44
5.1	Introduction	44
5.2	Theoretical Background.....	45
5.3	Inflation and the Inter-Temporal Allocation of Consumption.	47
5.3.1	Distortions to Saving Behavior	47
5.3.2	The Saving Rate and the Saving Behavior.....	51
5.3.3	Indirect Revenue Effects	52
5.4	The Gain from Reducing Distortion in Housing Demand.....	53
5.4.1	Indirect Revenue Effects	56
5.5	Seigniorage and Distortion of Money Demand	57
5.5.1	Money Demand.....	57
5.5.2	The Revenue Effects of Reduced Money Demand.....	58
5.6	Debt Service and the Government Budget Constraint.....	59
5.7	The Net Effect of Lower Inflation on Economic Welfare	60
5.8	Conclusion	62
6	Evaluating the Welfare Cost of Inflation in a Monetary Endogenous Growth General Equilibrium Model: The Case of South Africa*.....	63
6.1	Introduction	63
6.2	The General Equilibrium Model	65
6.2.1	Economic Environment.....	66
6.2.2	Household and Trading.....	66
6.2.3	The representative intermediary's problem	69
6.2.4	The representative goods-producing firm's problem	69
6.3	Competitive equilibrium	70



6.4	General Equilibrium effects of inflation tax	70
6.5	Model calibration	72
6.6	The quantitative effects of inflation in the general equilibrium model.....	73
6.7	Conclusion	75
7	Dynamic time inconsistency and the SARB*	77
7.1	Introduction	77
7.2	The Modified Barro-Gordon (1983) Model	78
7.3	Data and Results	82
7.3.1	Testing the Long-Run Restrictions.....	82
7.3.2	Testing the Short-Run Restrictions	87
7.3.3	Evaluating the Inflation-Targeting Regime (2000:01-2008:02).....	89
7.4	Conclusions	91
8	Comparing South African Inflation Volatility across Monetary Policy Regimes: An Application of Saphe Cracking*	93
8.1	Introduction	93
8.2	Application to Inflation Volatility.....	96
8.3	Conclusions	99
9	Conclusion.....	104
	Bibliography	105



List of Tables

Table 2-1: Unit Root Tests.	8
Table 2-2: Estimation and Determination of Rank (Log-Log).....	10
Table 2-3: Estimation and Determination of Rank (Semi-Log).....	10
Table 2-4: Welfare Costs of Inflation.	13
Table 3-1: Summarizing the Literature.	18
Table 3-2: Welfare cost estimates.....	26
Table 4-1: Unit Root Tests (Systematic Sampling).	36
Table 4-2: Estimation and Determination of Rank (Log-Log).....	37
Table 4-3: Estimation and Determination of Rank (Semi-Log).....	38
Table 4-4: Welfare cost estimates (Systematic Sampling).....	42
Table 4-5: Welfare cost estimates (Temporal aggregation).	42
Table 4-6: Percentage Change in Welfare Cost Estimate Under Temporal Aggregation and Systematic Sampling.	42
Table 5-1: Overall welfare Gain of Moving from 2 percent Inflation to Price Stability.	61
Table 6-1: The welfare cost of inflation.	74
Table 7-1: Unit Root Tests.	85
Table 7-2: Phillips-Ouliaris (1990) Cointegration Test (1960:01-1999:04).	86
Table 7-3: Estimation and Determination of Cointegrating Rank.	87
Table 7-4: Maximum Likelihood Estimates.....	88
Table 8-1: Unit Root Tests (1996:Q1-2008:Q3).....	97



List of Figures

Figure 2-1: Cointegrating relationship of the Log-Log Specification.	12
Figure 2-2: Cointegrating relationship of the Semi-Log Specification.	12
Figure 2-3: Inverse Money Demand Function of South Africa, 1965:02-2007:01.	14
Figure 3-1: Welfare Cost Calculation Using Bailey's Consumer Surplus Approach.	20
Figure 3-2: Welfare Cost calculation Using the Compensating Variation Approach. ...	22
Figure 5-1: Demand for Retirement Consumption.	47
Figure 5-2: Distortion in Housing Demand	53
Figure 5-3: Money Market Distortion.	57
Figure 7-1: Linear trend of CPI inflation (2000=100).	82
Figure 7-2: Linear trend of LogRealGDP (2000=100).	83
Figure 7-3: 10-year-centered Moving Average of CPI inflation (2000=100).	83
Figure 7-4: 10-year-centered Moving Average of LogRealGDP (2000=100).	84
Figure 7-5: Differences between Actual and Forecasted Inflation.	89
Figure 8-1: Shows the first 25 lags of the cosine-squared cepstrum for first-differenced CPI inflation.	98