UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

ANALYSIS OF MONETARY POLICY RULES FOR SOUTH AFRICA

by

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Doctor of Philosophy Thesis

ANALYSIS OF MONETARY POLICY RULES FOR SOUTH AFRICA

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Declaration

"I declare that the Thesis, which I hereby submit for the degree PhD Economics at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at another university."

DEDICATION

This thesis is dedicated to

my beloved wife, Niyonsaba Cécile,

my daughter Teta Kasai and

my sons Caleb Kasai and Béni Kasai.

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ABSTRACT

Besides the introduction and conclusion, this thesis is comprised of six independent chapters. In this thesis we provide an in-sample and out-of-sample assessment of how the South African Reserve Bank (SARB) sets its policy rate, post 2000 inflation targeting regime, in the context of both linear and nonlinear Taylor-type rule models of monetary policy.

Chapter 2 provides the theoretical foundations and the case study discussion. The literature has shown that the Taylor (1993) rule has gone through many modifications since the last decade of the 20th century. The modifications of the Taylor rule include interest rate smoothing, backward and forward looking versions, and nonlinear approximations. Furthermore, there has been increasing debate on whether central banks should respond to asset prices and financial variables. Despite some disagreements, economists seem to agree on the role of the financial market in determining inflation and economic performance. As far as South Africa is concerned, a stable financial system is one of the mandates of the central bank.

Chapter 3 discusses the research methods used in the thesis. First, the chapter provides an overview on the Hodrick-Prescott Filter used to detrend some series. Second, more

focus is oriented on a class of estimators, used in this thesis, called Generalized Method of Moments (GMM) estimators. GMM is important in that it can be applied to several estimation contexts besides the linear model. In fact, GMM can provide a simple alternative to other estimators, especially when it is difficult to write down the maximum likelihood estimator.

Chapter 4 is aimed to provide the source of data, to show the transformation made to some of them and to explore the data for preliminary results. The Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), GLS transformed Dickey-Fuller (DFGLS) and Kwiatkowski, *et. al.* (KPSS) tests suggest that all the series follow a stationary process. The chapter also reveals that the financial conditions index measured as an equal weight average of its components yields a smallest AIC than other alternative suggested herein. Furthermore, the chapter shows that the models that consider coincident business cycle indicator, rather than industrial production, perform better in terms of goodness of fit.

Given the controversial debate on whether central banks should target asset prices for economic stability, chapter 5 investigates whether the SARB pays close attention to asset and financial markets in their policy decisions. The main findings are that the SARB policy-makers pay close attention to the financial conditions index when setting interest rate. In the same chapter, it is also found that nonlinear Taylor rule improves its performance with the advent of the financial crisis, providing the best description of in-sample SARB interest rate setting behaviour. The 2007-2009 financial crisis witnesses an overall increased reaction to inflation and financial conditions. In addition, the financial

crisis saw a shift from output stabilisation to inflation targeting and a shift, from a symmetric policy response to financial conditions, to a more asymmetric response depending on the state of the economy. Although one could have expected that the SARB's response of monetary policy to output during the crisis to increase, the response has dropped significantly. These results show the concern over the high level of inflation observed during the second semester of 2008.

In chapter 6, we test the concept of Opportunistic Approach to monetary policy. The findings support the two features of the opportunistic approach. First, we find that the models that include an intermediate target that reflects the recent history of inflation rather than a simple inflation target improve the fit of the models. Second, the data supports the view that the South African Reserve Bank (SARB) behaves with some degree of non-responsiveness when inflation is within the zone of discretion but react aggressively otherwis**e.** Recursive estimates from the preferred model reveal that overall there has been a subdued reaction to inflation, output and financial conditions amidst the increased economic uncertainty of the 2007-2009 financial crisis.

Chapter 7 compares forecast performance of linear and nonlinear monetary policy rules estimated in the two previous chapters but rewritten in their backward looking versions. Recursive forecasts values are computed for 1- to 12-step ahead for the out-of-sample period 2006:01 to 2010:12. For the nonlinear models we use bootstrap method for multi-step ahead forecasts as opposed to point forecasts approach used for linear models. The aim is to evaluate the performance of three competing models in an out-

of-sample forecasting exercise. Overall ranking reveals the superiority of the nonlinear model that distinguishes between downward and upward movements in the business cycles in closely matching the historical record. As such, forecasting performance tests reveal that the SARB pays particular attention to business cycles movements when setting its policy rate.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AIC : Akaike information criterion.

AR : Autoregressive.

CPI : Consumer price index.

CS : Credit spread.

CW-t : Clark and West Test.

DFGLS : Dickey-Fuller Test with Generalized least squares (GLS) Detrending

DM-t : Diebold and Mariano Test.

ECB : European central bank.

EHS : Eichenbaum, Hansen and Singleton.

ENC-t : Encompassing Test.

ERSA : Economic Research Southern Africa

F : Future interest spread.

FCI : Financial conditions index.

FCI_{EW} : Financial conditions index measured as an equal weight average of its components.

FCI_{KAL} : Financial conditions index for which the Kalman Filter algorithm is used to determine the time varying weights of its components.

FCI_{OLS} : Financial conditions index for which the OLS estimation of the output gap is used to determine the weights of its components.

GDP : Gross domestic product.

GMM : Generalised method of moments.

HP : Hodrick-Prescott.

KPSS : Kwiatkowski, Phillips, Schmidt, and Shin Test.

LSTAR : Logistic Smooth Transition Autoregression.

MedSPE : Median squared prediction error.

MOM : Method of moments.

MPC : Monetary policy committee.

MSC : Moment selection criteria.

MSPE : Mean squared prediction error.

OAD : Opportunistic approach to disinflation.

OAMP : Opportunistic approach to monetary policy.

OLS : Ordinary least squares

PC : Phillips curve

PP : Phillips-Perron

REER : Real effective exchange rate.

RH : Real house price.

RS : Real stock price.

S.E : Standard error.

SA : South Africa.

SARB : South African reserve bank.

SIC : Schwarz information criterion

STAR : Smooth Transition Autoregression

UK : United Kingdom.

2SLS : Two-stage least squares.