

Three Applications of Time-Varying Parameter Models to Macroeconomics

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This dissertation is submitted for the degree of
Doctor of Philosophy

Declaration

I would like to dedicate this thesis to my loving parents.

Bowen Fu

December 2019

Certificate of Original Authorship

I, Bowen Fu, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Economics Discipline Group, Business School, at the University of Technology Sydney. This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

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Date: July 2019

Acknowledgements

I would like to thank my Chair supervisor Joshua Chan for all the help he has given me during my PhD candidacy. Through his direction and guidance I was able to learn and understand what it takes to become a professional researcher. I am also grateful to Joshua in regards to teaching me the fundamentals in regards to Bayesian econometrics and Matlab programming. I would also like to thank my Panel supervisor and coauthor, Mengheng Li who gave me good constructive feedback and contribute to estimating the models of my Chapter 4 paper.

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List of Abbreviations

AUROC	Area under the receiver operating characteristic
CC-SV	Constant coefficient model with stochastic volatility
CPI	Consumer price index
EU	European Union
GDP	Gross domestic product
HPD	Highest Posterior Density
LASSO	Least absolute shrinkage and selection operator
MCMC	Markov Chain Monte Carlo
NFE	Non-financial enterprise
SPF	Survey of Professional Forecasters
TVC	Time-varying coefficient model with constant volatility
TVP	Time-varying parameter
TVC-SV	Time-varying coefficient model with stochastic volatility
UIP	Uncovered interest parity
UK	United Kingdom
US	United States
VAR	Vector autoregression

Abstract

This thesis includes chapters that examine the application of time-varying parameter models to three macroeconomic topics: the Phillips curve, early warning system models, and uncovered interest rate parity.

Chapter 2 formally tests for time variation in the slope of the Phillips curve using a variety of measures of inflation expectations and real economic slack. We find that time variation in the slope of the Phillips curve depends on the measure of inflation expectations rather than the measure of real economic slack. We find strong evidence supporting the time-varying slopes of the Phillips curve with different measures of inflation expectations. Thus, we conclude that the slope of the Phillips curve is time varying.

In Chapter 3, we both narrowly and widely replicates the results of Anundsen et al. (2016). Further, we find that allowing for time-varying parameters of early warning system models can considerably improve the in-sample model fit and out-of-sample forecasting performance based on an expanding window forecasting exercise.

In Chapter 4, we consider a time-varying coefficient model with stochastic volatility for the uncovered interest parity regression. We show that jointly estimating time-varying coefficients and stochastic volatility can provide relatively reliable time-varying parameters. Using posterior samples from Bayesian estimation, we determine which United States macroeconomic variables explain the variation in time-varying coefficients and volatility based on least squares with shrinkage. Our empirical study shows that the null hypothesis of uncovered interest parity cannot be unconditionally rejected in the cases of several de-

veloped economies. Further, we show that local breaches of uncovered interest parity are mainly associated with variables from the labour market variables and the output variables in the United States, among other variables.