UNIVERSIDADE DE LISBOA
ISEG – Lisbon School of Economics and Management

PhD in Economics

Essays on Monetary Policy and Financial Stability

Zoë Venter

Orientador: Prof. Doutor António Manuel Pedro Afonso

Tese elaborada para obtenção do grau de Doutor em Economia

2021

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2021

Declaration

I certify that the thesis I have presented for examination for the PhD degree of Instituto Superior de Economia e Gestão / Lisbon School of Economics & Management is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

I declare that my thesis consists of approximately 47 200 words (including footnotes and reference lists).

Lisbon, July 2021

Zoë Venter

Statement of Work

I confirm that an earlier version of Chapter 2, "The Interaction Between Conventional Monetary Policy and Financial Stability: Chile, Colombia, Japan, Portugal and the UK", was initially published as REM Working Paper No. 096-2019, and finally as Venter, Z. (2020). "The Interaction Between Conventional Monetary Policy and Financial Stability: Chile, Colombia, Japan, Portugal and the UK", *Comparative Economic Studies* (2020) 62:521–554.

I confirm that an earlier version of Chapter 3, "The Role of Central Banks and the Political Environment in Financial Stability: A Literature Review**:** Chile, Colombia, Japan, Portugal and the UK", was published as REM Working Paper No. 089-2019.

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Abstract

By focusing on the relationship between financial stability and monetary policy for the cases of Chile, Colombia, Japan, Portugal and the UK, this thesis aims to add to the existing literature on the fundamental issue of the relationship between financial stability and monetary policy, a traditional topic that gained importance in the aftermath of the GFC as Central Banks lowered policy rates in an effort to rescue their economies. As the zero-lower bound loomed and the reach of traditional monetary policy narrowed, policy makers realised that alternative frameworks were needed and hence, macroprudential policy measures aimed at targeting the financial system as a whole were introduced.

The second chapter looks at the relationship between monetary policy and financial stability, which has gained importance in recent years as Central Bank policy rates neared the zero-lower bound. We use an SVAR model to study the impact of monetary policy shocks on three proxies for financial stability as well as a proxy for economic growth. Monetary policy is represented by policy rates for the EMEs and shadow rates for the AEs in our chapter. Our main results show that monetary policy may be used to correct asset mispricing, to control fluctuations in the real business cycle and also to tame credit cycles in the majority of cases. Our results also show that for the majority of cases, in line with theory, local currencies appreciate following a positive monetary policy shock. Monetary policy intervention may indeed be successful in contributing to or achieving financial stability. However, the results show that monetary policy may not have the ability to maintain or re-establish financial stability in all cases. Alternative policy choices such as macroprudential policy tool frameworks which are aimed at targeting the financial system as a whole may be implemented as a means of fortifying the economy.

The third chapter looks at the institutional setting of the countries in question, the independence of the Central Bank, the political environment and the impact of these factors on financial

stability. I substantiate the literature review discussion with a brief empirical analysis of the effect of Central Bank Independence on credit growth using an existing database created by Romelli (2018). The empirical results show that there is a positive relationship between credit growth and the level of Central Bank Independence (CBI) due to the positive and statistically significant coefficient on the interaction term between growth in domestic credit to the private sector and the level of CBI. When considering domestic credit by deposit money banks and other financial institutions, the interaction term is positive and statistically significant for the case of the UK for the third regression equation. A number of robustness checks show that the coefficient is positive and statistically significant for a number of cases when implementing a variety of estimation methods. Fluctuations in credit growth are larger for higher levels of CBI and hence, in periods of financial instability or ultimately financial crises, CBI would be reined back in an effort to re-establish financial stability. Based on the empirical results, and in an effort to slow down surging credit supply and to maintain financial stability, policy makers and governmental authorities should attempt to decrease the level of CBI when the economy shows signs of overheating and credit supply continues to increase.

The fourth chapter looks at the interaction between macroprudential policy and financial stability. The unexpected interconnectedness of the global economy and the economic blight that occurred as a result of this, recapitulated the need to implement an alternative policy framework aimed at targeting the financial system as a whole and hence, targeting the maintenance of financial stability. In this chapter, an index of domestic macroprudential policy tools is constructed and the effectiveness of these tools in controlling credit growth, managing GDP growth and stabilising inflation growth is studied using a dynamic panel data model for the period between 2000 and 2017. The empirical analysis includes two panels namely an EU panel of 27 countries and a Latin American panel of 7 countries, the chapter also looks at a case study of Japan, Portugal and the UK. Our main results find that a tighter macroprudential policy tool stance leads to a decrease in both credit growth and GDP growth while, a tighter macroprudential policy tool stance results in higher inflation in the majority of cases. Further, we find that capital openness plays a more important role in the case of Latin America, this may be due to the region's dependence on foreign capital flows and exchange rate movements. Lastly, we find that, in times of higher perceived market volatility, GDP growth tends to be higher and inflation growth tends to be lower in the EU. In the other cases, higher levels of perceived market volatility result in higher inflation, higher credit growth and lower GDP

growth. This is in line with expectations as an increase in perceived market volatility is met with an increased flow of assets into safer markets such as the EU.

This thesis establishes a relationship between financial stability and monetary policy by studying the response of Chile, Colombia, Japan, Portugal and the UK in the aftermath of the GFC as Central Banks lowered policy rates in an effort to rescue their economies. In short, the results of the work conducted in this thesis may be summarised as follows. Our results show that monetary policy contributes to the achievement of financial stability. Still, monetary policy alone is not sufficient and should be reinforced by less traditional policy choices such as macroprudential policy tools. Secondly, we find that the level of CBI should be reined in in times of surging credit supply in an effort to maintain financial stability. Finally, we conclude that macroprudential policy tools play an important role in the achievement of financial stability. These tools should complement traditional monetary policy frameworks and should be adapted for each region.

JEL Classification: E52, E58, F42, F55, G01
Keywords: Central Bank Independence, Financial Stability, Monetary Policy, Macroprudential Policy, Systematic Risk

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Index of Abbreviations

ADF	Augmented Dickey-Fuller
AEs	Advanced Economies
AIC	Akaike Information Criterion
BCCH	*Banco Central de Chile*
BdP	Banco de Portugal
BIS	Bank of International Settlements
BoE	Bank of England
BoJ	Bank of Japan
BVAR	Bayesian Vector Autoregressive Model
CB	Central Bank
CBI	Central Bank Independence
CCR	Central Credit Register
CDOs	Collateralised Debt Obligations
CDSs	Credit Default Swaps
CPI	Consumer Price Index
CWN	Cukierman et al. (1992) Central Bank Independence Index
DSGE	Dynamic stochastic general equilibrium
DSTI	Debt-service-to-income
EC	European Commission
ECB	European Central Bank
ECBI	Extended Central Bank Independence
EFTA	European Free Trade Agreement
EMEs	Emerging Market Economies
ERM	European Exchange Rate Mechanism

ESCB	European System of Central Banks
ESM	European Stability Mechanism
EU	European Union
FARC	*Fuerzas Armadas Revolucionarias de Colombia*
FPE	Final Prediction Error
GATT	The General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GMT	Grilli et al. (1991) Central Bank Independence Index
HQIC	Hannan-Quinn Information Criterion
IMF	International Monetary Fund
IPI	Industrial Production Index
LDP	Liberal Democratic Party
LSDV	Least Squares Dummy Variable
LTV	Loan-to-value
MoF	Ministry of Finance
MPC	Monetary Policy Committee
PRA	Prudential Regulation Authority
SBIC	Schwarz Bayesian Information Criterion
SVAR	Structural Vector Autoregressive Model
UK	United Kingdom
UP	*Unión Patriótica*
US	United States
VAR	Vector Autoregressive Model
VIX	CBOE Volatility Index
y-o-y	year-on-year

Chapter 1

Introduction

On 14 September 2008, the GFC reached an exigent point when Lehman Brothers, the fourth largest investment bank in the US at the time, filed for bankruptcy. The GFC followed a period of considerable deregulation in the US with a notable policy change being the replacement of The Glass-Steagall Act (Banking Act of 1993) by the Gramm-Leach-Bliley Act (Financial Services Modernization Act of 1999)[1]. The 'Shadow Banking' system, banks and financial institutions played a pivotal role in the collapse of the economy during the GFC as the majority of financial institutions believed in the 'too big to fail' notion and subsequently continued to increase leverage, risk and the percentage of assets lent. 'Shadow Banks' increased the availability of credit in circulation and the inability of regulators to provide adequate regulation to control the 'Shadow Banking' system ultimately resulted in both the collapse of the economy as well as a breakdown of trust in the financial sector.

The damage caused by the financial crisis was not contained in the US and instead the financial and economic contagion spread like wildfire through global economies. Debt levels in many European countries burgeoned and countries relying on commodity exportation or the exportation of manufactured products namely, Latin American countries and Japan respectively, were impacted by the weaker US dollar and the drop in external demand. It became evident to policy makers and national governments that an improved policy framework was needed and that a larger, more defined focus on financial stability and system wide

[1] The convergence of corporate bank activities and investment bank activities blurred the lines between the two branches and made regulation of these entities more challenging.

weaknesses needed to be included in this new framework. Central Banks play a vital role in the functioning and success of the global economy as well as in the achievement of financial stability. The political environment determines, to some extent, the policy frameworks that are implemented and also determines the attitude with which the public accepts proposed policy changes and hence, their willingness to adapt. The political environment also determines, in many cases, the level of CBI, as history has shown in the cases of both the UK and Portugal. The independence of Central Banks and the stability and openness of the political system, in turn, determines the independence of monetary policy decisions and hence, has an effect on the policy frameworks in place, both unconventional and conventional. The study of these factors and the effect on financial stability is of paramount importance as we move forward into a more interconnected world where boundaries, both economic and geographic, become obsolete.

This thesis discusses the relationship between financial stability and monetary policy and aims to analyse the ability of monetary policy to achieve financial stability and the role of Central Banks and the political environment in achieving financial stability. Finally, this thesis analyses the ability of unconventional monetary policy tools namely, macroprudential policy tools, to achieve financial stability. This thesis focuses on five country cases namely, Chile, Colombia, Japan, Portugal and the UK. The countries chosen are by no means assumed to be a representative group and instead, the countries are analysed on a case by case basis throughout the thesis. The five countries chosen for analysis all have autonomous, inflation targeting Central Banks, which provides the opportunity for more independent monetary policy decisions, this also places the countries in question on equal footing when considering the methodology used to analyse the cases.

Both Colombia and Chile adopted inflation targeting frameworks at the turn of the century which subsequently resulted in a heightened interest in the monetary policy mechanism in these countries. A lack of empirical studies due to limited data availability, the implementation of a series of structural reforms, improved economic openness as well as a long history of political instability presents an interesting opportunity for a case study. The decreased demand as well as plummeting prices of copper and oil in the midst of the global COVID-19 pandemic poses a significant risk to these two EMEs and hence, they are included in the analysis. The “three arrows” of the new Japanese economic policy (known as Abenomics) was implemented in 2012, the reception of which has been mixed. Although this economic framework seems to

have been somewhat successful, the Japanese economy is still toiling against deflation and sluggish growth, which combined with the COVID-19 crisis, resulted in Japan entering a recession in May 2020. The world's third largest economy continues to be plagued by both economic and social risks and hence, the studying the financial stability of this economy as well as the comprising elements is fundamental.

Although Portuguese monetary policy is determined by the objectives of the ECB, studying the financial stability of the country as well as the implementation and success of monetary policy tools is of importance when considering Portugal's noteworthy economic recovery following a bailout from the EU in the aftermath of the European Sovereign Debt Crisis. Portugal's position as an EU periphery country, the slightly removed geographical position as well as the influx of foreign investment and expat arrivals over the past few years makes a compelling case in favour of the study of the case of Portugal. Lastly, the UK dilemma in the midst of political uncertainty in the face of unending Brexit negotiations and the economic uncertainty related to this as the UK welcomes their third Prime Minister since 2016 and their second attempt at a Brexit deal justifies the study of the UK. The uncommonly restricted economic activity during the COVID-19 pandemic, the unbridled pressure on financial resources and the excessive strain on governmental infrastructure will no doubt have a disastrously significant impact on the global economy and in particular, on both the Portuguese and the UK economies.

The second chapter of this thesis studies the relationship between financial stability and monetary policy. A number of studies using an SVAR model have been conducted on the US, the UK, Japan and the EU. However, due to a lack of data availability as well as a series of structural reforms having taken place in Latin American economies, SVAR methodology has not been used frequently to perform econometric studies focusing on this region. Similarly to Cocriş and Nucu (2013), the second chapter employs an SVAR model to study the impact of monetary policy, short term policy rates in the case of EMEs and shadow rates in the case of AEs, on three proxies for financial stability namely, credit growth (Cocriş and Nucu (2013) focuses on loan-to-deposit ratios), stock prices and the exchange rate. The impact of short term policy rates on economic growth is also studied with industrial production being included as a proxy for the real sector.

The main results show that monetary policy may be used to correct asset mispricing due to the inverse relationship between the level of the stock market index and the monetary policy rate when considering the cases of Colombia, Japan, Portugal and the UK. In line with theory, the results show that the local currency appreciates in both the short run and the long run following a monetary policy rate shock when considering the cases of Chile, Portugal and Japan while, the local currency depreciates when considering the cases of Colombia and the UK. Theory would suggest that a positive monetary policy shock would result in a local currency appreciation in countries with a floating exchange rate regime in place as foreign investors chase a higher interest rate for their asset investments. Colombia's reliance on commodity exportation may be the reasoning behind the currency depreciation following a positive policy rate shock while, the currency depreciation in the case of the UK is in line with earlier literature including, Caglayan et al. (2011) and is attributed to uncertainty in the local market.

The inverse relationship between credit supply and monetary policy when considering the cases of Chile and the UK and the inverse relationship between the level of the industrial production index and monetary policy shocks when considering the cases of Colombia, Japan and Portugal shows that monetary policy may be used to tame credit cycles and control fluctuations in the real business cycle. A number of robustness checks are included in an effort to validate our main findings. The results of these robustness checks show that, in line with the main results, monetary policy may indeed be used to correct asset mispricing and to control fluctuations in credit supply and hence, monetary policy may effectively contribute to the maintenance of or achievement of financial stability. In spite of this, the results show that monetary policy may not have the ability to maintain or re-establish financial stability in all cases hence, alternative policy choices such as macroprudential policy tool frameworks may need to be implemented to complement more traditional policy frameworks.

The third chapter of this thesis looks at the role of Central Banks and the political environment in achieving financial stability. The chapter first describes the institutional structure and institutional environment in two Latin American countries namely, Chile and Colombia, two EU members namely, the UK and Portugal, and one Asian country namely, Japan. I then look at the structure, functioning and the history of the Central Banks in these countries as well as the political environment and go on to look at the financial stability of these countries from a

literature point of view. Lastly, I conduct an empirical analysis to study the effect of CBI on credit growth using a database created by Romelli (2018).

The positive and statistically significant coefficient on the interaction term between the growth in domestic credit to the private sector and the level of the ECBI index, for the cases of the UK and Portugal for the second regression indicates that there is a positive relationship between the growth in domestic credit to the private sector and CBI. The positive and statistically significant coefficient on the interaction term between the growth in domestic credit by deposit banks and other financial institutions and the level of Central Bank Independence when considering the cases of Chile, Portugal and the UK for the second regression and the case of the UK for the third regression equation confirms that, in a few cases, there is a positive relationship between domestic credit growth and the level of Central Bank Independence. A number of robustness checks are included in Appendices, these robustness checks confirm that the coefficient on the interaction term between credit growth and the level of CBI is indeed positive and statistically significant in a number of cases when implementing a variety of estimation methods as well as in the cases where domestic credit is replaced by private credit measures. The results indicate that a positive relationship between credit growth and the level of CBI exists in a number of cases, most noticeably and consistently for the cases of the two EU countries.

In the cases where there is a positive and statistically significant coefficient on the interaction term between credit growth and the level of CBI, fluctuations in credit growth are larger for higher levels of CBI. The results therefore show that in periods of financial instability, CBI would be reined back in an effort to re-establish financial stability. In light of these results, policy makers and governmental authorities (particularly those in the UK and Portugal) should decrease the level of CBI in times of surging credit supply and an overheating economy in an effort to mitigate credit supply surges and ultimately, to re-establish financial stability.

The fourth chapter looks at the interaction between macroprudential policy and financial stability in times of uncertainty. The study looks at the impact of macroprudential policy tool implementation on three veins of financial stability for both a panel of 27 EU countries and a panel of 7 Latin American countries. Three case studies are also included looking at the cases of Japan, Portugal and the UK. A monthly index of domestic macroprudential policy tools

constructed by Alam et al. (2019), the iMaPP database, is used as a starting point for the index used in the fourth chapter. The iMaPP database is coded through 2016:Q4, I then cross checked this index with the Cerutti et al. (2017) index and went on to extend this cross checked version of the index using the 2017 IMF Macroprudential Survey and the IMF Data Query report. The monthly index is cumulated to create the final quarterly database used in this chapter as the majority of variables available for the analysis, in particular the level of credit, are available quarterly.

The main results of the fourth chapter show that, a tighter macroprudential policy tool stance would lead to a decrease in credit growth as well as lower GDP growth while, a tighter stance would lead to higher inflation in the majority of cases. Additionally, capital openness plays a more important role in the case of Latin America, this may be due to the region's dependence on foreign capital flows and exchange rate movements. Finally, our results show that, in times of higher perceived market volatility, GDP growth tends to be higher and inflation growth tends to be lower in the EU. In the other cases, higher levels of perceived market volatility result in higher inflation, higher credit growth and lower GDP growth. This is in line with expectations as an increase in perceived market volatility is met with an increased flow of assets into safer markets such as the EU.

This thesis aims to add to the existing literature on the fundamental issue of the relationship between financial stability and monetary policy, a traditional topic that gained importance in the aftermath of the GFC as Central Banks lowered policy rates in an effort to rescue their economies. As the zero-lower bound loomed and the reach of traditional monetary policy frameworks narrowed, policy makers realised that alternative policy frameworks were needed and hence, macroprudential policy tools aimed at targeting the financial system as a whole were introduced. This thesis looks at a number of components that are thought to contribute to financial stability and analyses the relationship between both the more conventional policy frameworks implemented prior to the GFC as well as the unconventional policy frameworks implemented in the period after the GFC namely, macroprudential policy tools, and financial stability. In short, the results of the work conducted in this thesis may be summarised as follows. Firstly, although monetary policy contributes to the achievement of financial stability, it may not have the ability to fully maintain financial stability and alternative, less traditional policy choices such as macroprudential policy tools may need to be implemented in an effort

to fully achieve or maintain financial stability. Secondly, the level of CBI should be reined in in times of surging credit supply in an effort to re-establish financial stability. Finally, macroprudential policy frameworks may indeed be the solution to the problem at hand and although targeted macroprudential prudential policy tools should be implemented based on the region, these tools may be successful in achieving financial stability when used in a complementary setting with monetary policy.

Chapter 2

The Interaction Between Monetary Policy and Financial Stability

Chile, Colombia, Japan, Portugal and the UK[2]

2.1. Introduction

The relationship between monetary policy and financial stability became an important topic in the aftermath of the 2008-2009 GFC as Central Banks lowered their policy rates in an effort to revive the economy and the zero-lower bound loomed[3]. Traditionally, price stability has been the main objective of Central Banks and therefore, of monetary policy. However, the crisis emphasized the need to implement alternative measures and to expand the scope of monetary policy to include a focus on the maintenance of financial stability while maintaining the primary objective of achieving price stability. Kryvstov et al. (2015) discuss the relationship between financial and macroeconomic conditions. They note that financial stability conditions are an important part of monetary policy implementation as financial stability is a precondition for a well-functioning financial system.

The purpose of this chapter is to study the impact of monetary policy shocks on financial stability for the cases of Chile, Colombia, Japan, Portugal and the UK. Monetary policy

[2] Published: Venter, Z. (2020). "The Interaction Between Monetary Policy and Financial Stability: Chile, Colombia, Japan, Portugal and the UK", *Comparative Economic Studies* (2020) 62:521–554.

[3] Advanced economies had limited options to further reduce policy rates and hence, employed unconventional monetary policy tools such as quantitative easing.

influences the amount of money in circulation in the economy as well as the borrowing cost of money. The countries chosen have autonomous, inflation targeting Central Banks, which provides the opportunity for more independent monetary policy decisions. In the case of Colombia and Chile, this combined with a lack of empirical studies due to limited data availability makes for an interesting case study. The UK dilemma following a tumultuous period of Brexit negotiations and uncertainty topped off by growing economic and social uncertainty and loss in the midst of the current COVID-19 pandemic and Japan's unending battle with deflation and sluggish growth justifies the study of the UK and Japan. Lastly, although Portuguese monetary policy is determined by the objectives of the European Central Bank, the effect on credit growth in Portugal is noteworthy considering Portugal's recent economic recovery following a bailout from the troika formed by the EC, ECB and the IMF. The potential impact of the current global pandemic on the newly recovered Portuguese economy solidifies the need to study the case of Portugal. The five countries are looked at on a case by case basis with the impact of monetary policy shocks on financial stability being studied for each individual country case.

A decade after the GFC, financial stability and the effective implementation of monetary policy remains a priority for many Central Banks. Studying the relationship between monetary policy and financial stability, in particular, the effect on different areas of potential vulnerability, may play an important role in future targeted policy decisions. A number of SVAR analyses have been conducted on the US Economy as well as other advanced economies. However, due to shorter time series caused by limited data availability as well as structural reforms in Latin American countries, SVARs have not been used frequently in econometric studies. SVAR models based on the VAR approach suggested by Sims (1980) have been used frequently in Japan, Portugal and the UK with four available examples being Nakahira (2009), Afonso and Sousa (2011, 2012) and Elbourne (2008) respectively. In this chapter, an SVAR is employed and impulse response functions are used in an effort to test the impact of monetary policy on financial stability. As in Cocriş and Nucu (2013), the impact of short term interest rates on three proxies for financial stability namely, credit growth, stock prices and the exchange rate is studied. Industrial production is included as a proxy for the real sector and hence, for economic growth. In line with Cocriş and Nucu (2013), policy rates are used to represent monetary policy

choices in emerging economies. Shadow rates are used to represent monetary policy intervention in advanced economies.

Our main results show that monetary policy may be used to correct asset mispricing due to the inverse relationship between monetary policy intervention and the stock market index for four of the five cases namely, the cases of Colombia, Japan, Portugal and the UK. Conventional wisdom[4] suggests that contractionary monetary policy would result in a currency appreciation in countries with a floating exchange rate regime as foreign investment is attracted. The results show that the exchange rate appreciates following a monetary policy shock for the cases of Chile, Japan and Portugal while the currency depreciates for the cases of Colombia and the UK. The currency depreciation in the case of Colombia could be attributed to the country's reliance on exports as Colombia relies heavily on commodity exportation while, in the case of the UK, this depreciation is attributed to uncertainty in the local market.

The results also show that monetary policy may be used to limit fluctuations in the real business cycle as can be seen by the inverse relationship between the industrial production index and monetary policy intervention in the majority of cases namely, for the cases of Colombia, Japan and Portugal. Credit growth also has an inverse relationship with monetary policy intervention in the cases of Chile and the UK. Ergo, monetary policy may be used to tame credit cycles. In the cases of Colombia, Japan and Portugal, credit moves in the same direction as monetary policy intervention. Thus, positive monetary policy shock results in an increase in credit. The results show that monetary policy intervention as represented by policy rates and shadow rates may indeed be able to contribute to financial stability. The results show that monetary policy may not have the ability to maintain or re-establish financial stability in all cases. Alternative policy choices such as macroprudential policy tools aimed at targeting the financial system as a whole may be useful to reinforce the monetary policy framework.

The rest of the chapter is as follows: Section 2 surveys existing literature; Section 3 discusses the methodology and the data used; Section 4 discusses the empirical results; and Section 5 concludes.

[4] See Inoue and Rossi (2019), Clarida and Galí (1994), Eichenbaum and Evans (1995) and Faust and Rogers (2003).

2.2. Literature Review

Financial instability is defined as a situation in which the economic performance of an economy is potentially affected by price fluctuations of financial assets (Crockett, 1997). In this chapter, three proxies for financial stability are included, the first being credit growth which is looked at in existing literature. For example, Jiménez et al. (2012) look at the impact of monetary policy on the supply of credit. They show that tighter monetary policy and weaker economic conditions substantially reduce loan granting, in particular loan granting by banks with lower capital or liquidity ratios. In this chapter, we find that tighter monetary policy results in reduced credit growth in Chile and the UK and increased credit growth in Colombia, Japan and Portugal. Jiménez et al. (2012) also note that the GFC showed that the use of monetary policy rates as a means of supporting credit growth seems advisable. Further, Allen and Gale (2007), Schularick and Taylor (2012), Gourinchas and Obstfeld (2012) and Borio (2014) find that credit growth fluctuations are a common forerunner of financial crises[5]. Also, Jorda et al. (2013) show that excess credit growth in the period prior to a peak is usually associated with a more severe recession and Bernanke and Lown (1991) and Calvo and Reinhart (2000) note that crises are often accompanied by bank credit crunches and halting foreign capital flows. Given the importance of credit growth as a harbinger of crises as well as an indicator of the magnitude of crises, the study of the relationship between credit growth and monetary policy intervention as represented by policy rates for emerging economies and shadow rates for advanced economies is of importance.

Our second proxy for financial stability is the exchange rate, the inclusion of which is substantiated by existing literature. For example, exchange rate depreciation is used as a proxy for financial vulnerability in both Eichengreen and Gupta (2015) as well as Park et al. (2016). Further, Eichenbaum and Evans (1995) make use of a VAR analysis to investigate the effect of shocks (in monetary policy) on exchange rates in the US and find that contractionary monetary policy results in a long-lasting appreciation in the exchange rate. Our results show that tighter monetary policy results in an appreciation of the local currency in Chile, Japan and Portugal. However, the local currency in the UK and Colombia depreciates. Dhrymes and Dimitros (1997) look at more economically compatible SVAR models, they find that foreign interest

[5] These results are in line with Jorda et al. (2011), Drehmann et al. (2011) and Schularick and Taylor (2012).

rates and the real exchange rate are determinants of real output. Lastly, Cavallari (2001) finds that monetary shocks have no effect on real variables in the long run when considering a SVAR. In contrast, Lee and Chinn (2002) extended this model to include exchange rate data and found that monetary policy does indeed influence exchange rates.

Our final proxy for financial stability is the growth in the stock market which is looked at in earlier literature. Granville and Mallick (2009) use stock prices, exchange rates and loan-to-deposit ratios as proxies for financial stability and define financial stability in terms of changes in stock prices[6]. Asiriyan et al. (2019) consider monetary policy in a bubbly world where low interest rates result in frequent booms and busts in asset prices. Both monetary policy and bubbles have expansionary effects on the economy with bubbles having both an overhang effect as well as a wealth effect[7]. In line with Asiriyan et al. (2019), we find that tighter monetary policy results in lower stock prices except in the case of Chile. Both Granville and Mallick (2009) and Cocriş and Nucu (2013) define financial stability in terms of the change in the share price, the exchange rate as the units of local currency per unit of Euro and the loan-to-deposit ratio. Cocriş and Nucu (2013) find that in countries with inflation targeting schemes, the interest rate instrument facilitates financial stability while, in countries with fixed exchange rates, monetary policy does not encourage financial stability except in the case of Bulgaria. Lastly, we include industrial production as a proxy for the real business cycle in line with Cocriş and Nucu (2013), Grilli and Roubini (1996), Kim (2001) and Kim and Roubini (2000).

Today, the Chilean Central Bank maintains one of the highest levels of Central Bank independence globally and maintains a successful inflation targeting framework. Colombia is currently Latin America's second largest economy, has a stable currency, an abundance of natural resources, a somewhat stable political system and is seen as one of the greatest success stories globally over the past three decades. Chile is the largest producer of copper globally and Colombia's biggest export is oil; the currently decreased demand as well as plummeting prices in the midst of the COVID-19 pandemic poses a significant risk to both economies. These two countries have been overlooked in empirical research, much like other Latin

[6] Ouhibi and Hammami (2015) define financial stability in the same way.
[7] The overhang effect refers to resources being moved away from investment and the wealth effect refers to bubbles reducing the cost of intermediation.

American countries, for a multitude of reasons including the lack of data availability. However, the adoption of inflation-targeting regimes in the late 1990s has sparked an interest in the monetary policy mechanism. SVAR models have been used to study both monetary policy (Catão and Pagan (2011), Parrado (2001)) and fiscal policy (Restrepo and Rincon (2006)) in Chile and Colombia. However, the number of papers implementing this methodology and focusing on the relationship between monetary policy and financial stability is still somewhat limited. Japan, the world's third largest economy, is still toiling against lifelong employment, declining exports, strict immigration policies and stagflation all of which has been further amplified by the current global pandemic; this recently resulted in the country slipping into a recession. Earlier literature studying Japanese monetary policy using an SVAR model includes Nakahira (2009), Schenkelberg and Watzka (2013) and Yano and Yoshino (2008).

The Portuguese recovery in the aftermath of the Sovereign Debt Crisis is arguably the greatest success story in Southern Europe to date. Economically, Brexit has worsened investor confidence, resulted in weakened economic growth, higher debt levels and lower living standards. Politically, the UK has had three prime ministers in as many years which has resulted in stop-and-start Brexit negotiations and political disquietude. The uncommonly restricted economic activity in the midst of the current COVID-19 pandemic, the unbridled pressure on financial resources and the excessive strain on governmental infrastructure will no doubt have a disastrously significant impact on the global economy and in particular, on both the Portuguese and the UK economies. SVAR models have been used to study monetary policy in earlier research focusing on the UK (Elbourne (2008) and Caglayan et al. (2011)) and both monetary policy and fiscal policy in Portugal (Sousa (2014), Afonso and Silva (2019) and Afonso and Sousa (2011)).

2.3. Methodology and Data

Hurwicz (1962) explains that a structural model is one in which the impact of 'interventions'[8] is predicted. This chapter makes use of a SVAR model to identify the impact of interest rate policy on financial stability. I apply this methodology to the cases of Chile, Colombia, Japan, Portugal and the UK.

[8] "Deliberate policy actions, or changes in the economy or in the nature of known types." (Sims, 2002)

2.3.1. Methodology

Our starting point for the analysis is an SVAR model of order p (SVAR(p)).

The SVAR model is as follows:

$$B_0 X_t = c + B_1 X_{t-1} + B_2 X_{t-2} + \ldots + B_p X_{t-p} + U_t \quad (1)$$

U_t is a multivariate white noise process with variance/covariance matrix D and represents the structural innovations, B_i and D are (K x K) matrices, c contains K elements where K is the number of variables with i = 0, …, p. There are K(K-1)/2 restrictions on B_0 and in the case where B_0 is being lower triangular, there are K(K+1)/2 unknowns in the matrix.

When B_0 is invertible, equation (1) is equivalent to equation (2) which represents a reduced form VAR(p):

$$X_t = \phi_0 + \sum_{l=1}^{p} \Phi_l X_{t-l} + \varepsilon_t \quad (2)$$

where X_t is a (K x 1) vector of endogenous variables, ϕ_0 is a (K x 1) vector of intercepts, Φ_l are (K x K) coefficient matrices and $\varepsilon_t = (\varepsilon_{1t}, \varepsilon_{2t}, \ldots, \varepsilon_{Kt})'$ is an unobservable error term representing the reduced form innovations with the following properties:

$$E[\varepsilon_t] = 0 \quad (3)$$

$$E[\varepsilon_t \varepsilon_s'] = 0 \; \forall \; t \neq s \quad (4)$$

and where, equation (5) represents the relationship between the reduced-form shocks and structural shocks where ε_t spans the space of the structural shocks U_t,

$$\varepsilon_t = {B_0}^{-1} U_t. \quad (5)$$

An SVAR model allows for contemporaneous relationships between the variables and also allows us to study the effect of a shock to one equation whilst other shocks remain constant. This makes the SVAR model more appropriate than a reduced-form VAR model in which error terms are correlated and hence, error terms cannot be decomposed into mutually orthogonal shocks (Schenck, 2016). This follows since,

$$\begin{pmatrix} u_{ip} \\ u_{ir} \\ u_{cg} \\ u_{sp} \\ u_{er} \end{pmatrix} = \begin{pmatrix} b_{11} & 0 & 0 & 0 & 0 \\ b_{21} & b_{22} & 0 & 0 & 0 \\ b_{31} & b_{32} & b_{33} & 0 & 0 \\ b_{41} & b_{42} & b_{43} & b_{44} & 0 \\ b_{51} & b_{52} & b_{53} & b_{54} & b_{55} \end{pmatrix} * \begin{pmatrix} \varepsilon_{ip} \\ \varepsilon_{ir} \\ \varepsilon_{cg} \\ \varepsilon_{sp} \\ \varepsilon_{er} \end{pmatrix} \begin{matrix} industrial\ production\ innovation \\ short\ term\ policy\ rates\ innovation \\ credit\ growth\ innovation \\ stock\ price\ innovation \\ exchange\ rate\ innovation \end{matrix} \quad .(6)$$

Following that B_0 is lower triangular, the Cholesky decomposition is used to construct the impulse responses to orthogonal/structural form shocks. These impulse response functions are generated in EViews and confidence intervals of 2 standard deviations based on 1000 replications are included in each generated impulse response function. The significance of shocks is interpreted at a 5% level of significance as each impulse response function includes a 95% confidence interval. Shocks are statistically significant when the confidence interval does not contain zero.[9] The order of the variables may be switched in multiple ways but existing literature justifies the ordering of the variables used in this chapter. The ordering of the variables is in line with the ordering used by Cocriş and Nucu (2013) with the authors assuming that a recursive transmission scheme exists under the assumptions that firstly, industrial production is not immediately affected by monetary policy shocks and secondly, loan-to-deposit ratios (credit growth in this chapter), stock indices and the exchange rate may be affected immediately by monetary policy shocks. The variables are ordered as above due to the assumption that industrial production affects all other variables contemporaneously. Geske and Roll (1983) find that changes in real activity, in our case growth in industrial production, lead to changes in money supply, in our case interest rate changes, and in turn, changes in the stock market.[10]

The ordering of our variables assumes that the exchange rate is affected contemporaneously by industrial production, interest rates, credit growth and the stock market which is in line with Hacker et al. (2012) who find evidence that the exchange rate is granger caused by the nominal interest rate differential. Robinson (1952) argues that financial development follows economic growth. In our case, growth in industrial production has a contemporaneous effect on credit growth. Bartov and Bodnar (1994) show that changes in the dollar affect current abnormal firm

[9] I also conclude statistical significance in the cases where the confidence interval does not contain zero for the majority of periods included and also where a single band of the confidence interval is only marginally above or below zero.

[10] Kim (2003) also finds that stock price movements are driven, to some extent, by interest rate movements. Fama (1981) and Najand and Noronha (1998) show that industrial production is affected by both interest rates and inflation at a lag and hence, not contemporaneously.

returns with a lag, this is in line with Angelos (2010) who finds that the volatility of the exchange rate in the US, the UK and Japan is largely determined by the volatility of home stock returns.[11] The order of the variables is switched in two robustness checks to confirm the ordering of the primary matrix. The impulse response functions are not affected by the relevant changes in the ordering of the variables in any cases.

Three unit root analyses are conducted namely, the Augmented Dickey-Fuller (ADF) test, the Phillips-Perron (PP) unit root test and the Hylleberg, Engle, Granger and Yoo (HEGY). Both the PP test and the ADF test shows that the year-on-year growth rates of all but two cases have an order of integration of I(0) and hence, the growth rates are stationary. The third unit root test, the HEGY test, is included to account for the seasonally unadjusted data as well as the annual differencing used. When looking at the test statistics for frequency 0, we fail to reject the null hypothesis of the presence of a unit root for the case of the stock market in Colombia, credit in Portugal and the exchange rate in Portugal. When considering the semi-annual frequency, annual frequency as well as the joint significance of the full set of unit roots (seasonal and non-seasonal frequencies), the null hypothesis is rejected in all cases and therefore, no unit roots are present. In the case of the Colombian stock market and the Portuguese exchange rate, the presence of the unit root may be a small sample effect. However, the joint significance of the full set of unit roots is rejected. Therefore, the presence of unit roots should not be an issue in our sample.

2.3.2. Data

The GFC emphasized the need to focus on both financial stability as well as price stability as the primary objective of Central Banks prior to the GFC had been the maintenance of price stability. Three proxies for financial stability together with IPI to account for economic growth are included in the analysis with each proxy representing a sector of the economy which could potentially conceal financial stability risks (Cocriş and Nucu, 2013). Monetary policy is represented by the short-term interest rate and the shadow rate in this chapter, short term interest rates are available from the IFS (for Chile) and the FRED (Colombia). In the case of the

[11] Yang and Doong (2004) note that empirical evidence shows that changes in stock prices affect exchange rate movements. However, the impact of changes in the exchange rate on stock market prices is less significant. It is thought that stock markets have a more noticeable effect on exchange rates due to the deregulation of financial markets which has decreased the difficulty of and stimulated capital flows across borders.

advanced economies, the shadow rate (Krippner (2013) and Krippner (2015) shadow/lower bound framework) is used as a measure of monetary policy intervention. The shadow rate is used in the case of the advanced economies due to the inability of policy rates to fully capture the extent of monetary policy intervention in the presence of quantitative easing and other unconventional monetary policy tools. The use of the shadow rate allows one to see the effect of monetary policy tools on factors such as the unemployment rate and industrial production without the limitation of the zero-lower bound on policy rates.

The relevant variables are as follows:

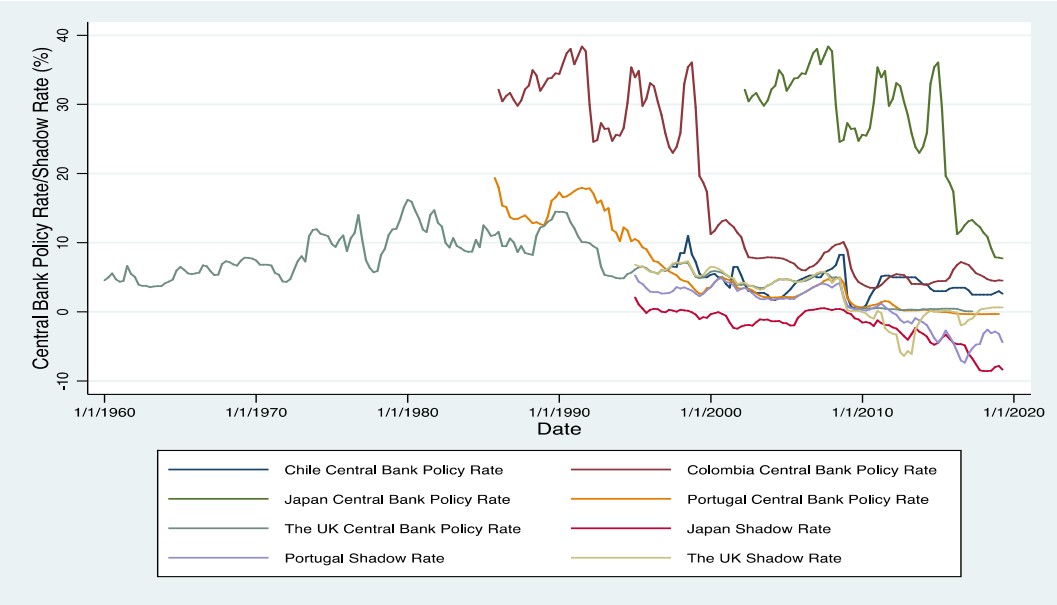
- Credit growth as a proxy for the banking system (BIS total credit statistics);
- Stock index as a proxy for the capital market (Federal Reserve Economic Data);
- The Exchange rate measured as local currency units per unit of US dollar as a proxy for the foreign exchange market (Federal Reserve Economic Data), exchange rates quoted as US dollar units per unit of local currency are converted;
- Industrial production as a proxy for economic growth (Federal Reserve Economic Data).

Ivanov and Kilian (2001) suggest that the Akaike Information Criterion (AIC) is appropriate when considering monthly data, the Hannan-Quinn Information Criterion (HQIC) is appropriate when considering quarterly data with a sample size larger than 120 observations and the Schwarz Bayesian Information Criterion (SBIC) is appropriate when considering quarterly data with any sample size. The SBIC suggests that 2 lags be used for the case of Chile while 1 lag is suggested for the case of Portugal. All three information criteria suggest that 2 lags be used for the case of Colombia while 1 lag is suggested for the case of Japan. Lastly, the HQIC and the SBIC suggest 1 lag for the case of the UK.

The dataset created contains data for Chile between 2004Q3 and 2018Q4, Colombia between 2003Q1 and 2016Q1, Japan between 1996Q2 and 2018Q2, Portugal between 2000Q2 and 2018Q2 and the UK between 1996Q2 and 2018Q2. Breaks exist in the dataset, the number of observations quoted below is based on a balanced SVAR estimation with the suggested number of lags. The SVAR and the resulting impulse response functions therefore have the following number of observations. Chile has 58 observations, Colombia has 53 observations, Japan has

82 observations, Portugal has 75 observations and the UK has 91 observations. To assess the extent to which the differing sample periods may affect the results, a robustness check, the results of which are not statistically significantly different, limiting the sample period to the period between 2004:Q3 and 2016:Q1 is conducted. Figure 1 plots the quarterly Central Bank policy rate for the five countries as well as the shadow rates for Japan, Portugal and the UK over the period between 1960 and 2019.

Figure 1 - Quarterly Central Bank Policy Rates and Shadow Rates for Chile, Colombia, Japan, Portugal and the UK



Data Source: IFS, FRED, Krippner (2013) and Krippner (2015).

2.4. Empirical Results

2.4.1 Main Results

Table 1 summarises the responses of the individual variables to shocks in the Central Bank policy rate (Chile and Colombia) and the shadow rate (Japan, Portugal and the UK). In three of the five cases (Colombia, Japan and Portugal), industrial production declines following a monetary policy shock while, for Chile and the UK, industrial production increases. This result is statistically significant for the case of Chile. Similarly, the former three cases experience an increase in credit growth following a monetary policy shock while the latter experience a decline. These results are statistically significant in the case of Colombia in the short run and the cases of Chile, Colombia and Portugal in the long run. The level of the stock market index declines in four of the five cases with the level decreasing in the case of Chile. These results are statistically significant for Chile and Colombia in both the short run and the long run. Finally, the exchange rate declines in three of the cases (Chile, Japan and Portugal) and increases for the cases of Colombia and the UK. This corresponds to an appreciation of the local currencies for the first three cases following a monetary policy shock which is in line with conventional wisdom while, for the cases of Colombia and the UK, the currency depreciates. These results are statistically significant for the case of Colombia in the short run and Colombia and Portugal in the long run.

Table 1 - Summary of Responses of Variables to a Central Bank Policy Shock (Quarterly Data)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+*	-	-	-	+
Credit	-	+*	+	+	-
Stock Market Index	+*	-*	-	-	-
Exchange Rate	-	+*	-	-	+
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+*	-*	-	-	+
Credit	-*	+*	+	+*	-
Stock Market Index	+*	-*	-	-	-
Exchange Rate	-	+*	-	-*	+

Note: - negative response, + positive response, * statistically significant response at 5% level.

2.4.2 Robustness Checks

A number of robustness checks are conducted in an effort to validate the results. A robustness check using monthly data (Table 2) is included as the accuracy of an SVAR model increases as the number of observations increases. The results show that there is a sign change for the case of industrial production for Chile with the sign being positive and statistically significant when considering quarterly data and the sign becoming negative without statistical significance when considering monthly data. Both industrial production and the stock market have a sign change for the case of Japan, credit has a sign change for the case of Portugal and both the exchange rate and credit have a sign change for the UK. Neither the results for these cases in the original sample nor the results for these cases in the monthly dataset are statistically significant. Lastly, there is a sign change for credit in Japan with the sign changing from positive to statistically significant and negative.

Table 2 - Summary of Responses of Variables to a Central Bank Policy Shock (Monthly Data)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	-	-*	+	-	+
Credit	-*	+	-*	-	+
Stock Market Index	+*	-*	+	-	-
Exchange Rate	-	+*	-	-	-
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	-	-	+	-	+
Credit	-*	+*	-*	-	+
Stock Market Index	+*	-*	+*	-	-
Exchange Rate	-	+*	-	-	-

Note: - negative response, + positive response, * statistically significant response at 5% level.

A second robustness check (Table 3) using monthly log data shows that the exchange rate depreciated after an interest rate shock in the case of Chile and Colombia while the exchange rate appreciates in the case of Japan, Portugal and the UK in line with conventional wisdom.

Table 3 - Summary of Responses of Variables to a Central Bank Policy Shock (Monthly Log Data)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-	-	-	+
Credit	+	-	+	+	-
Stock Market Index	-	-*	+	-	-
Exchange Rate	+	+*	-	-	-
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	+	-	+	+*
Credit	+*	-*	+*	+*	+
Stock Market Index	-*	-*	+	-	-
Exchange Rate	+	+*	-	-	-

Note: - negative response, + positive response, * statistically significant response at 5% level.

A third robustness check (Table 4) using quarterly data with an adjusted start date and end date of the data to ensure that the period studied remains constant for all cases is included. This robustness check studies the period between 2004:Q3 and 2016:Q1. The results show that there is a sign change for the UK for industrial production when limiting the time period and there is no sign change for credit growth in any of the cases. The results also show that there is a sign change for Japan for the stock market as well as a sign change for Japan and the UK for the exchange rate. Similarly to the first robustness check, neither the results for these cases in the original sample nor the results for these cases in the limited sample are statistically significant. One may therefore conclude that the difference in sample periods across countries does not affect the results in a statistically significant way.

Table 4 - Summary of Responses of Variables to a Central Bank Policy Shock (Quarterly with Adjusted Starting Date)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-	-	-	-
Credit	-*	+	+	+	-
Stock Market Index	+*	-*	+	-	-
Exchange Rate	-*	+*	+	-	+
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+*	-*	-	-*	-
Credit	-*	+*	+	+	-
Stock Market Index	+*	-*	+	-	-
Exchange Rate	-*	+*	+	-*	-

Note: - negative response, + positive response, * statistically significant response at 5% level.

Further, two robustness checks (Table 5 and Table 6) using a different ordering of variables and quarterly data are included to check whether a change in the ordering of the variables leads to a change in the results. Table 5 presents the results of the case where the position of the short term policy rates innovation and the industrial production innovation are switched while, Table 6 presents the results of the case where the position of the stock price innovation and the exchange rate innovation are switched. There are no sign changes resulting from the change in variable ordering.

Table 5 - Summary of Responses of Variables to a Central Bank Policy Shock (Quarterly with Adjusted Order)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-	-	-	+
Credit	-*	+*	+	+	-
Stock Market Index	+*	-*	-	-	-
Exchange Rate	-	+*	-	-	+
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-*	-	-	+
Credit	-*	+*	+	+*	-
Stock Market Index	+*	-*	-	-	-
Exchange Rate	-*	+*	-	-*	+

Note: - negative response, + positive response, * statistically significant response at 5% level.

Table 6 - Summary of Responses of Variables to a Central Bank Policy Shock (Quarterly with Adjusted Order)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-	-	-	+
Credit	-	+*	+	+	-
Stock Market Index	+*	-*	-	-	-
Exchange Rate	-	+*	-	-*	+
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+*	-*	-	-	+
Credit	-*	+*	+	+	-
Stock Market Index	+*	-*	-	-	-
Exchange Rate	-*	+*	-	-*	+

Note: - negative response, + positive response, * statistically significant response at 5% level.

Finally, to add to the robustness of the results, a sixth robustness check (Table 7) using quarterly data and a BVAR model is employed. The BVAR model is used as a robustness check to address the concern arising from the small sample size as BVAR models have a shrinkage estimator, which adjusts coefficients to match the data observed and permits the optimisation of the dataset. A distinct advantage of the BVAR model is the lack of a requirement to limit the number of coefficients to be estimated as this model makes use of a prior, in this case, the Minessota prior introduced in Litterman (1979) is used. The use of the Minessota prior and hence, a random walk prior is appropriate in this analysis (Litterman, 1979). This is due to the random behaviour of macroeconomic time series as well as the flexibility of the restrictions imposed. The results are similar to those of the main results of this chapter, with the sign of the change staying the same for the majority of cases with the exception of industrial production for Japan and the UK and the exchange rate for the UK. In the remaining cases, the magnitude of the effect of the shock becomes slightly smaller.

Table 7 - Summary of Responses of Variables to a Central Bank Policy Shock (Quarterly BVAR)

Summary of Responses of variables to a Central Bank policy shock					
Variables					
Short Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-	+	-	-
Credit	-	+	+	+	-
Stock Market Index	+	-	-	-	-
Exchange Rate	-	+	-	-	-
Long Run Response					
	Chile	Colombia	Japan	Portugal	The UK
Industrial Production Index	+	-	+	-	-
Credit	-	+	+	+	-
Stock Market Index	+	-	-	-	-
Exchange Rate	-	+	-	-	-

Note: - negative response, + positive response.

2.5. Conclusion

The financial turmoil caused by the GFC highlighted the importance of financial stability and resulted in the relationship between financial stability and monetary policy becoming an important element when policy mandates were updated in the period after the crisis. In this chapter, the impact of monetary policy shocks on financial stability for the cases of Chile, Colombia, Japan, Portugal and the UK is analysed. The five countries chosen have autonomous, inflation targeting Central Banks with floating exchange rate regimes in place, which allows us to analyse the impact of monetary policy shocks on five countries with similar policy mandates. The set of countries presents an interesting case with Colombia and Chile being categorized as emerging economies with a history of limited availability of data, the UK and Japan facing political uncertainty and economic uncertainty respectively and finally, Portugal which experienced the most profound economic growth in the group of countries that received an injection of European funding.

An SVAR model is employed and impulse response functions are used in an effort to test the impact of monetary policy on financial stability. Credit growth, the stock market index growth and the exchange rate growth are included as proxies for financial stability while industrial production growth is included as a proxy for the business cycle. As in Cocriş and Nucu (2013), the impact of short term interest rates and shadow rates on three proxies for financial stability namely, credit growth, stock prices and the exchange rate is studied. Industrial production is

included as a proxy for the real sector and hence, for economic growth. In line with Cocriş and Nucu (2013), policy rates are used to represent monetary policy choices in emerging economies. Shadow rates are used to represent monetary policy intervention in advanced economies.

Our main results show that monetary policy may be used to correct asset mispricing due to the inverse relationship between the policy rate and the stock market index for the majority of cases namely, Colombia, Japan, Portugal and the UK. Conventional wisdom suggests that a positive monetary policy shock would result in a currency appreciation in countries with a floating exchange rate regime as foreign investment is attracted. The results show that the exchange rate appreciates in both the short run and the long run following a monetary policy shock for three of the five cases namely, the cases of Chile, Japan and Portugal while the currency depreciates for the cases of Colombia and the UK. The currency depreciation in the case of Colombia could be attributed to Colombia's reliance on commodity exports. The currency depreciation in the case of the UK is in line with earlier literature including, Caglayan et al. (2011) and is attributed to uncertainty in the local market.

The results also show that monetary policy may be used to control fluctuations in the real business cycle as can be seen by the inverse relationship between the industrial production index and monetary policy shocks for the cases of Colombia, Japan, and Portugal. Credit growth also has an inverse relationship with monetary policy shocks for the cases of Chile and the UK. Consequently, monetary policy may be used to tame credit cycles in some cases. However, in the majority of cases namely, Colombia, Japan and Portugal, there is a positive relationship between credit and monetary policy shocks. Monetary policy intervention, as represented by policy rates in the cases of emerging market economies and shadow rates in the cases of advanced economies, may indeed be successful at contributing to or achieving financial stability. However, our results show that monetary policy may not have the ability to maintain or re-establish financial stability in all cases. Alternative policy choices such as macroprudential policy tool frameworks which are aimed at targeting the financial system as a whole may be implemented to buttress the economy.

2.6. Appendix A

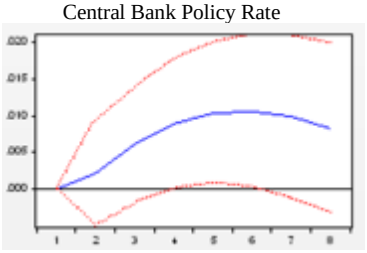
A.1. Structural Impulse Response Functions: Short Run Impact (Quarterly)

Chile

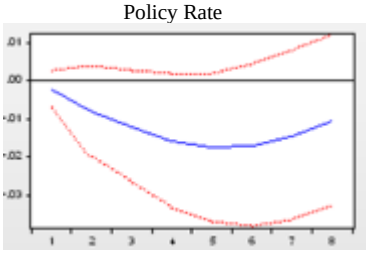
Figure A1.1 - Short Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

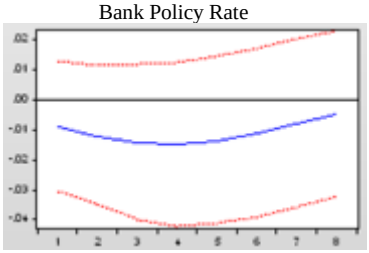
Response of Industrial Production to Central Bank Policy Rate



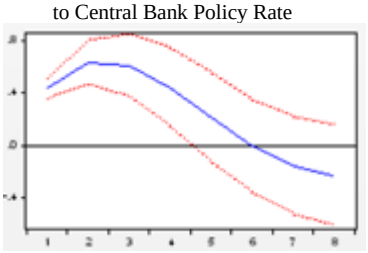
Response of Credit to Central Bank Policy Rate



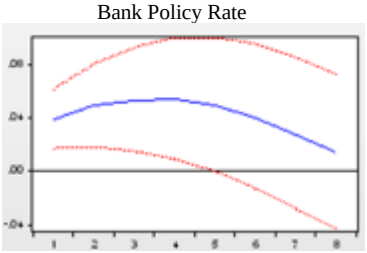
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

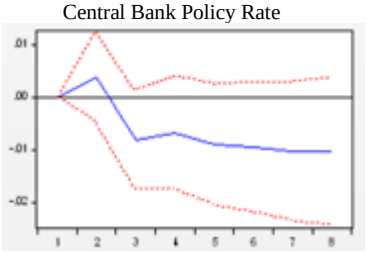


Colombia

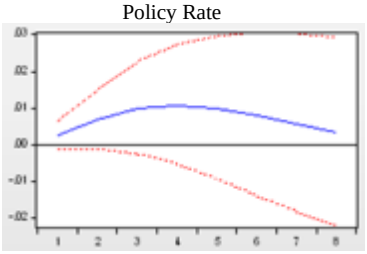
Figure A1.2 - Short Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

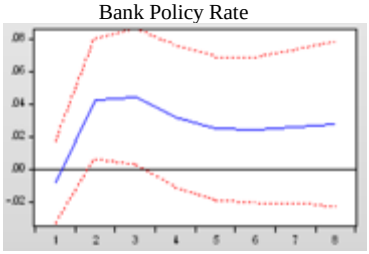
Response of Industrial Production to Central Bank Policy Rate



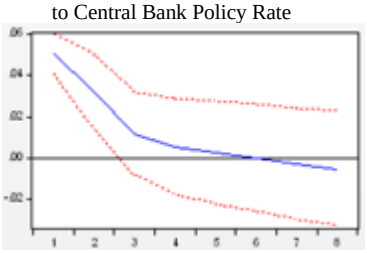
Response of Credit to Central Bank Policy Rate



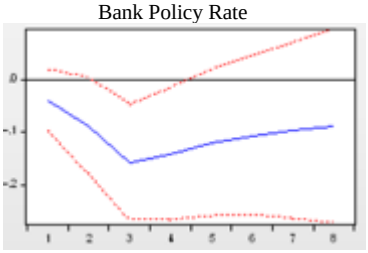
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

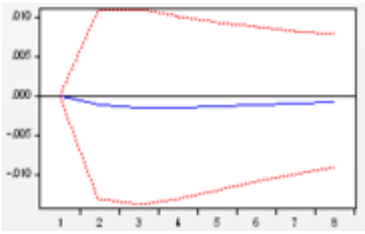


Japan

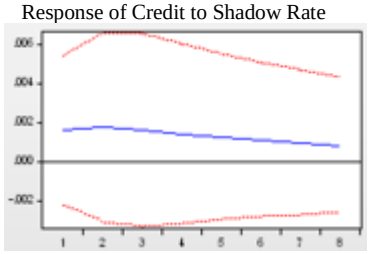
Figure A1.3 - Short Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

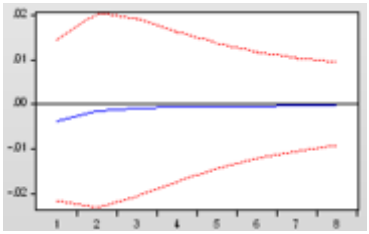
Response of Industrial Production to Shadow Rate



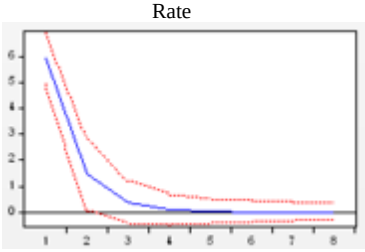
Response of Credit to Shadow Rate



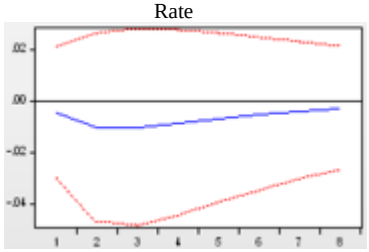
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

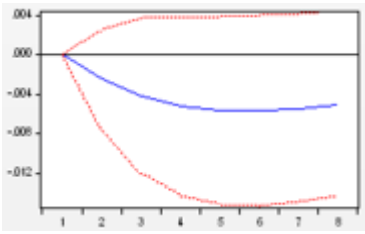


Portugal

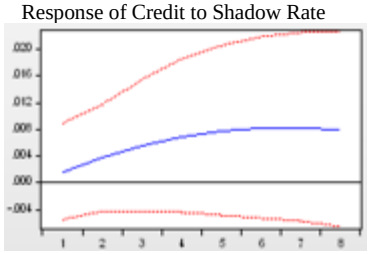
Figure A1.4 - Short Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

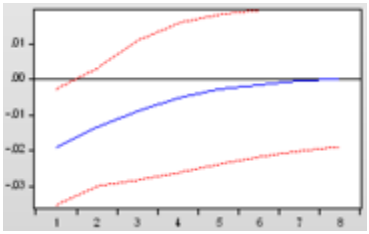
Response of Industrial Production to Shadow Rate



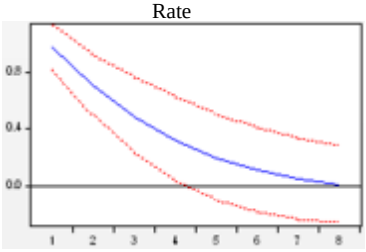
Response of Credit to Shadow Rate



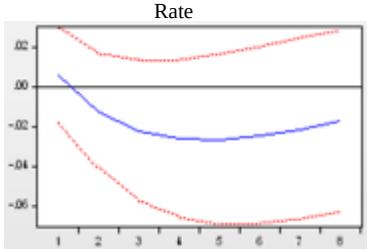
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

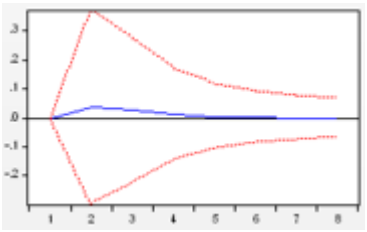


The UK

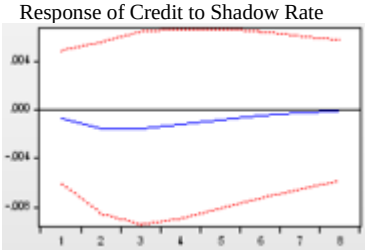
Figure A1.5 - Short Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

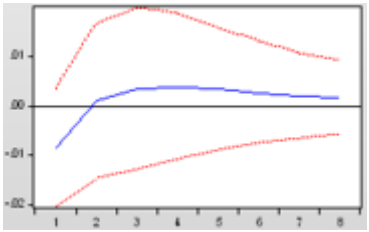
Response of Industrial Production to Shadow Rate



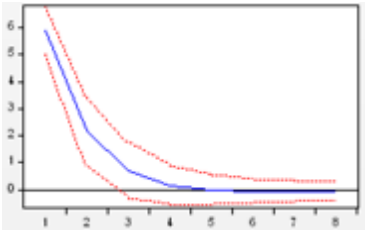
Response of Credit to Shadow Rate



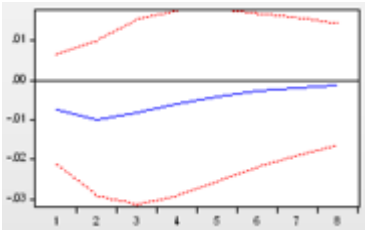
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



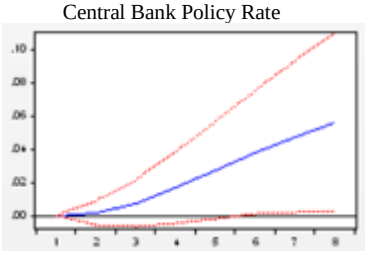
A.2. Cumulative Structural Impulse Response Functions: Long Run Impact (Quarterly)

Chile

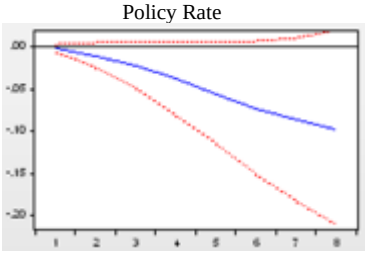
Figure A2.1 - Long Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

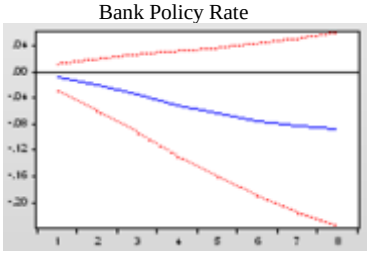
Response of Industrial Production to Central Bank Policy Rate



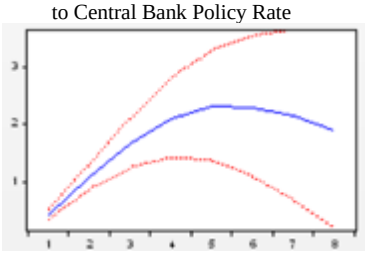
Response of Credit to Central Bank Policy Rate



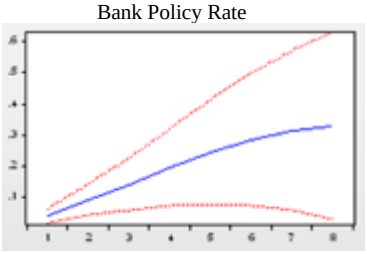
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

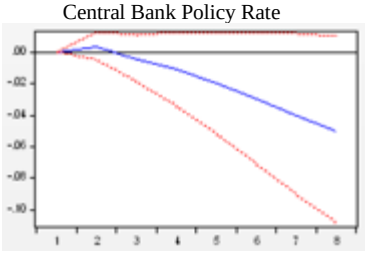


Colombia

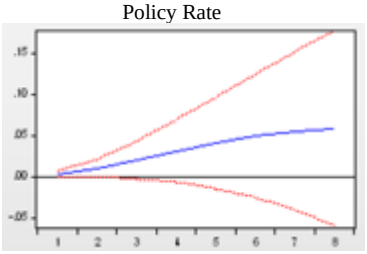
Figure A2.2 - Long Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

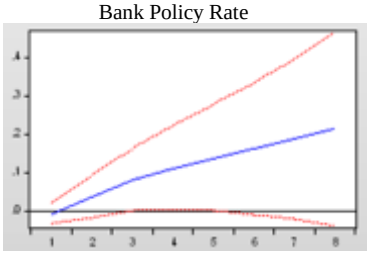
Response of Industrial Production to Central Bank Policy Rate



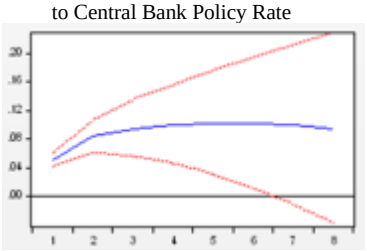
Response of Credit to Central Bank Policy Rate



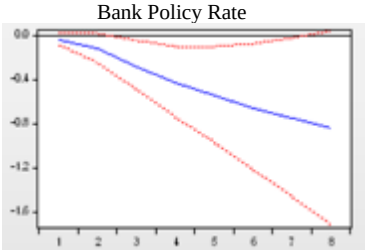
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

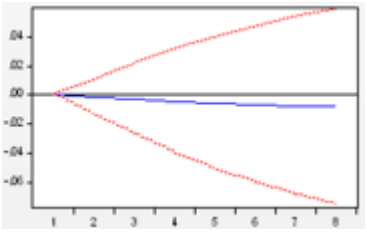


Japan

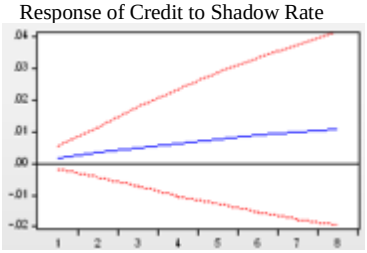
Figure A2.3 - Long Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

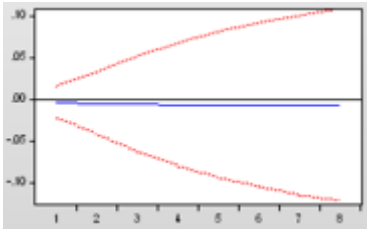
Response of Industrial Production to Shadow Rate



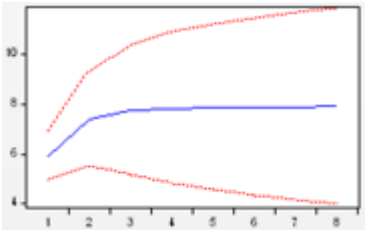
Response of Credit to Shadow Rate



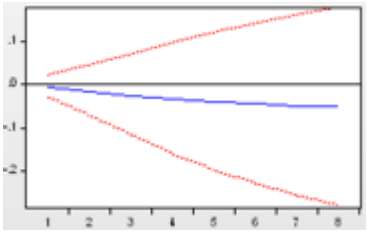
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

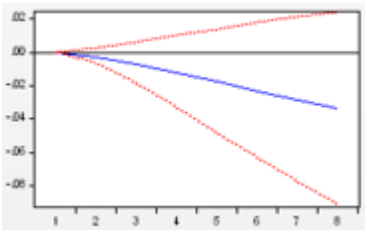


Portugal

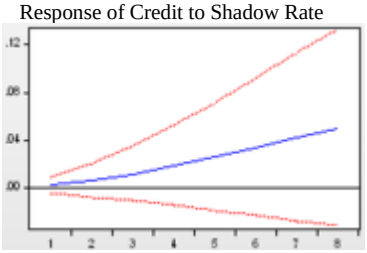
Figure A2.4 - Long Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

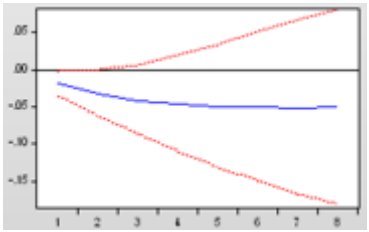
Response of Industrial Production to Shadow Rate



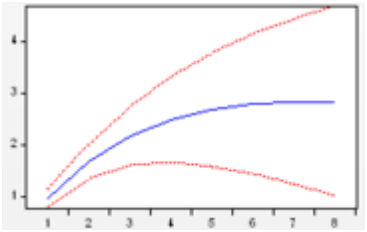
Response of Credit to Shadow Rate



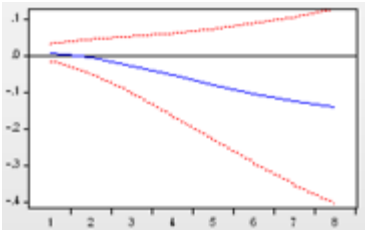
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

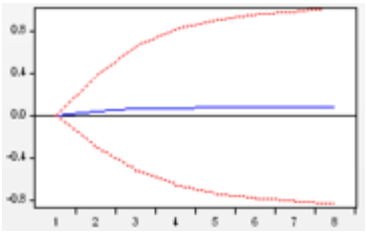


The UK

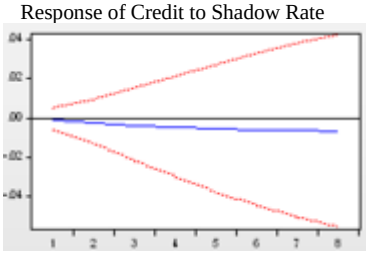
Figure A2.5 - Long Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

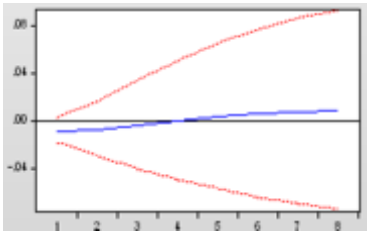
Response of Industrial Production to Shadow Rate



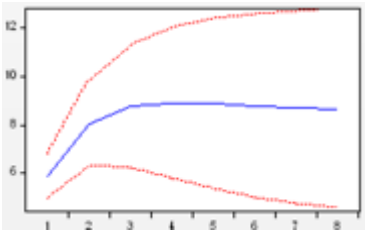
Response of Credit to Shadow Rate



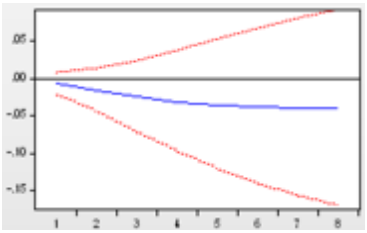
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



Note: Vertical Axes – the deviation from the baseline level
Horizontal Axes – the number of quarters after the shock
Source: Author's estimates based on Datastream and BIS statistics, IRFs generated in EViews.

2.7. Appendix B

B.1. Quarterly Variable Sources

Table B1 - Quarterly Sources of Variables

Variable	Code	Source	Frequenc	Initial Date	End Date
IndustrialProduction					
Chile	PRMNTO01CLQ661N	Federal Reserve Economic Data	Quarterly	01/01/1991	01/04/2019
Colombia	COLPRMNTO01IXOBQ	Federal Reserve Economic Data	Quarterly	01/01/1990	01/04/2019
Japan	PRMNTO01JPQ661N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
Portugal	PRMNTO01PTQ661N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
The UK	PRMNTO01GBQ657S	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
IndustrialProductionGrowth		Author's own calculations using IPTOTNSKD			
StockMarketUS					
Chile	SPASTT01CLQ661N	Federal Reserve Economic Data	Quarterly	01/01/1990	01/01/2019
Colombia	DSTKMKTXD	World Bank staff calculations based on Datastream and IMF International Finance Statistics data. GEM	Monthly	01/01/2003	01/06/2016
Japan	SPASTT01JPQ661N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/01/2019
Portugal	SPASTT01PTQ661N	Federal Reserve Economic Data	Quarterly	01/01/1988	01/01/2019
The UK	SPASTT01GBQ661N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/01/2019
StockMarketUSGrowth		Author's own calculations using DSTKMKTXD			
CBPolicyRate and ShadowRate					
Chile		International Financial Statistics (IFS)	Quarterly	01/07/1997	01/04/2019
Colombia	COLIR3TIB01STQ	Federal Reserve Economic Data	Quarterly	01/01/1986	01/04/2019
Japan		Krippner (2013), Krippner (2015) and https://www.ljkmfa.com	Monthly	31/01/1995	30/09/2019
Portugal		Krippner (2013), Krippner (2015) and https://www.ljkmfa.com	Monthly	31/01/1995	30/09/2019
The UK		Krippner (2013), Krippner (2015) and https://www.ljkmfa.com	Monthly	31/01/1995	30/09/2019
CBPolicyRateGrowth		Author's own calculations using Shadow Rate Data			
ExchangeRateUSDollarPostEuro					
Chile	CCUSSP02CLQ650N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
Colombia	COLCCUSSP02STQ	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
Japan	CCUSSP01JPQ650N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
Portugal	CCUSSP01EZQ650N	Federal Reserve Economic Data	Quarterly	01/01/1999	01/04/2019
The UK	CCUSSP01GBQ650N	Federal Reserve Economic Data	Quarterly	01/01/1960	01/04/2019
ExchangeRateUSDollarGrowthPostEuro		Author's own calculations using ExchangeRateUSDollarPostEuro			
CreditNonFinancial					
Chile	Q:CL:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/2002	30/09/2018
Colombia	Q:CO:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/1996	30/09/2018
Japan	Q:JP:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/1964	30/09/2018
Portugal	Q:PT:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/1979	30/09/2018
The UK	Q:GB:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/03/1976	30/09/2018
CreditNonFinancialGrowth		Author's own calculations using CreditNonFinancial			

B.2. Quarterly Variable Definitions

Table B2 - Quarterly Definitions of Variables

Variable	Description
IndustrialProduction	
Chile	Total Manufacturing Production for Chile, Index 2015=100, Quarterly, Not Seasonally Adjusted
Colombia	Production: Manufacturing: Total manufacturing: Total manufacturing for Colombia, Index 2015=100, Quarterly, Not Seasonally Adjusted
Japan	Total Manufacturing Production for Japan, Index 2015=100, Quarterly, Not Seasonally Adjusted
Portugal	Total Manufacturing Production for Portugal, Index 2015=100, Quarterly, Not Seasonally Adjusted
The UK	Total Manufacturing Production for the United Kingdom, Growth Rate Previous Period, Quarterly, Seasonally Adjusted
IndustrialProductionGrowth	Growth Rate in Industrial Production
StockMarketUS	
Chile	Total Share Prices for All Shares for Chile, Index 2015=100, Quarterly, Not Seasonally Adjusted
Colombia	Local equity market index valued in US$ terms. Monthly data averaged to quarterly.
Japan	Total Share Prices for All Shares for Japan, Index 2015=100, Quarterly, Not Seasonally Adjusted
Portugal	Total Share Prices for All Shares for Portugal, Index 2015=100, Quarterly, Not Seasonally Adjusted
The UK	Total Share Prices for All Shares for the United Kingdom, Index 2015=100, Quarterly, Not Seasonally Adjusted
StockMarketUSGrowth	Growth Rate in equity market index valued in US$
CBPolicyRate	
Chile	Financial, Interest Rates, Monetary Policy-Related Interest Rate, Percent per annum
Colombia	Interest Rates: 3-month or 90-day rates and yields: Interbank rates: Total for Colombia, Percent, Quarterly, Not Seasonally Adjusted
Japan	Monthly average Shadow Short Rate (SSR) estimates.
Portugal	Monthly average Shadow Short Rate (SSR) estimates.
The UK	Monthly average Shadow Short Rate (SSR) estimates.
CBPolicyRateGrowth	Growth Rate in Central Bank Policy Rates/Shadow Rates
ExchangeRateUSDollarPostEuro	
Chile	National Currency to US Dollar Spot Exchange Rate for Chile, US Dollar per National Currency Units, Quarterly, Not Seasonally Adjusted
Colombia	Currency Conversions: US$ exchange rate: Spot, end of period: National currency:USD for Colombia, National Currency Units per US Dollar, Quarterly, Not Seasonally Adjusted
Japan	US Dollar to National Currency Spot Exchange Rate for Japan, US Dollar per National Currency Units, Quarterly, Not Seasonally Adjusted
Portugal	US Dollar to National Currency Spot Exchange Rate for the Euro Area, US Dollar per National Currency Units, Quarterly, Not Seasonally Adjusted
The UK	US Dollar to National Currency Spot Exchange Rate for the United Kingdom, US Dollar per National Currency Units, Quarterly, Not Seasonally Adjusted
ExchangeRateUSDollarGrowthPostEuro	Growth Rate in Excahnge Rate
CreditNonFinancial	
Chile	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Colombia	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Japan	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Portugal	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
The UK	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
CreditNonFinancialGrowth	Growth Rate in Credit to Non-financial corporations

B.3. Quarterly Summary Statistics

Table B3 - Quarterly Summary Statistics for Chile, Colombia, Japan, Portugal and the UK

Summary Statistics					
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
Chile					
exchangerateusdollargrowth	58	0.0078667	0.1089709	-0.1950056	0.3256963
industrialproductiongrowth	58	0.0182668	0.0442929	-0.100076	0.1167647
stockmarketusgrowth	58	0.1100858	0.1708177	-.2086939	0.4607406
cbpolicyrategrowth	58	0.3674135	1.326971	-0.9393939	6.44
creditnonfinancialgrowth	58	0.0117912	0.0873494	-0.1123321	0.2605965
Colombia					
exchangerateusdollargrowth	53	-0.0026246	0.1038676	-.2039474	0.2601521
industrialproductiongrowth	53	0.027104	0.0503102	-0.0982398	0.1426854
stockmarketusgrowth	53	0.2437501	0.4813275	-0.5568744	1.36476
cbpolicyrategrowth	53	-0.0007892	0.0866519	-0.2980626	0.2325269
creditnonfinancialgrowth	53	0.011251	0.0751425	-0.1451683	0.1475684
Japan					
exchangerateusdollargrowth	90	0.0144532	0.1160113	-0.2099815	0.2933806
industrialproductiongrowth	82	0.0038293	0.0796377	-0.3323831	0.2485055
stockmarketusgrowth	90	0.0344054	0.2258526	-0.439352	0.590337
shadowgrowth	90	-1.306848	5.895291	-51.28868	6.831689
creditnonfinancialgrowth	90	-0.0163254	0.0289974	-0.0833943	0.05345
Portugal					
exchangerateusdollargrowth	75	-0.0026406	0.1030869	-0.1992657	0.2815318
industrialproductiongrowth	75	-0.0108857	0.0485363	-0.2036516	0.0869367
stockmarketusgrowth	75	0.0341661	0.2083774	-0.4834372	0.3633739
shadowgrowth	75	-0.3136986	1.46416	-7.21417	4.899424
creditnonfinancialgrowth	75	0.0184447	0.0652618	-0.08726	0.1191406
The UK					
exchangerateusdollargrowth	91	0.0115163	0.0955682	-0.1388465	0.3866806
industrialproductiongrowth	91	-0.0336491	1.715242	-5.611526	6.495533
stockmarketusgrowth	91	0.0435241	0.1433518	-0.3402923	0.3416169
shadowgrowth	91	-1.269996	6.554578	-48.86209	13.98622
creditnonfinancialgrowth	91	0.0185599	0.0519397	-0.1037838	0.1165354

2.8. Appendix C

C.1. Hylleberg, Engle, Granger and Yoo Unit Root Test for the Presence of a Unit Root

Table C1 - Results of Hylleberg, Engle, Granger and Yoo Unit Root Tests

		Test Statistic	1% Critical	5% Critical	10% Critical
Chile					
Industrial Production Index	Z(t) - Fr0	-2.951	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-4.418	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-6.761	-2.610	-1.900	-1.540
	Z(t) - Annual	-1.650	-2.380	-1.680	-1.300
	Joint Annual	27.380	4.770	3.080	2.350
	All frequencies	33.464	.	3.370	2.860
CB Policy Rate	Z(t) - Fr0	-3.644	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-4.865	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-0.123	-2.610	-1.900	-1.540
	Z(t) - Annual	-6.706	-2.380	-1.680	-1.300
	Joint Annual	22.509	4.770	3.080	2.350
	All frequencies	20.476	.	3.370	2.860
Credit	Z(t) - Fr0	-2.872	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-5.924	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-2.988	-2.610	-1.900	-1.540
	Z(t) - Annual	-5.739	-2.380	-1.680	-1.300
	Joint Annual	31.006	4.770	3.080	2.350
	All frequencies	30.715	.	3.370	2.860
Stock Market Index	Z(t) - Fr0	-4.034	-3.510	-2.890	-2.580
	Z(t) - Fr 1/2	-7.175	-2.600	-1.910	-1.580
	Z(t) - L.Ann	-6.551	-2.530	-1.880	-1.530
	Z(t) - Annual	-7.090	-2.360	-1.680	-1.310
	Joint Annual	86.291	4.730	3.000	2.360
	All frequencies	96.025	.	3.380	2.810
Exchange Rate	Z(t) - Fr0	-3.276	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-9.489	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-5.138	-2.570	-1.900	-1.530
	Z(t) - Annual	-10.551	-2.360	-1.660	-1.290
	Joint Annual	87.535	4.760	3.120	2.370
	All frequencies	69.516	.	3.320	2.810
Colombia					
Industrial Production Index	Z(t) - Fr0	-3.562	-3.510	-2.890	-2.580
	Z(t) - Fr 1/2	-6.330	-2.600	-1.910	-1.580
	Z(t) - L.Ann	-7.800	-2.530	-1.880	-1.530
	Z(t) - Annual	-5.737	-2.360	-1.680	-1.310
	Joint Annual	82.537	4.730	3.000	2.360
	All frequencies	95.854	.	3.380	2.810
CB Policy Rate	Z(t) - Fr0	-5.470	-3.510	-2.890	-2.580
	Z(t) - Fr 1/2	-5.687	-2.600	-1.910	-1.580
	Z(t) - L.Ann	-5.285	-2.530	-1.880	-1.530
	Z(t) - Annual	-2.870	-2.360	-1.680	-1.310
	Joint Annual	20.232	4.730	3.000	2.360
	All frequencies	38.054	.	3.380	2.810
Credit	Z(t) - Fr0	-3.385	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-7.851	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-1.176	-2.610	-1.900	-1.540
	Z(t) - Annual	-9.421	-2.380	-1.680	-1.300
	Joint Annual	49.205	4.770	3.080	2.350
	All frequencies	43.081	.	3.370	2.860
Stock Market Index	Z(t) - Fr0	-1.459	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-5.789	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-3.034	-2.610	-1.900	-1.540
	Z(t) - Annual	-5.167	-2.380	-1.680	-1.300
	Joint Annual	28.198	4.770	3.080	2.350
	All frequencies	26.377	.	3.370	2.860
Exchange Rate	Z(t) - Fr0	-3.230	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-9.228	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-9.472	-2.570	-1.900	-1.530
	Z(t) - Annual	-8.391	-2.360	-1.660	-1.290
	Joint Annual	130.945	4.760	3.120	2.370
	All frequencies	109.734	.	3.320	2.810

Japan					
Industrial Production Index	Z(t) - Fr0	-3.852	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-10.326	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-7.351	-2.570	-1.900	-1.530
	Z(t) - Annual	-15.241	-2.360	-1.660	-1.290
	Joint Annual	142.335	4.760	3.120	2.370
	All frequencies	214.902	.	3.320	2.810
Shadow Rate	Z(t) - Fr0	-4.238	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-4.093	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-6.396	-2.610	-1.900	-1.540
	Z(t) - Annual	-1.453	-2.380	-1.680	-1.300
	Joint Annual	21.511	4.770	3.080	2.350
	All frequencies	22.737	.	3.370	2.860
Credit	Z(t) - Fr0	-2.940	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-11.357	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-12.318	-2.570	-1.900	-1.530
	Z(t) - Annual	-13.223	-2.360	-1.660	-1.290
	Joint Annual	162.731	4.760	3.120	2.370
	All frequencies	147.412	.	3.320	2.810
Stock Market Index	Z(t) - Fr0	-4.284	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-12.363	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-8.244	-2.570	-1.900	-1.530
	Z(t) - Annual	-12.777	-2.360	-1.660	-1.290
	Joint Annual	116.592	4.760	3.120	2.370
	All frequencies	180.475	.	3.320	2.810
Exchange Rate	Z(t) - Fr0	-4.888	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-12.847	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-13.248	-2.570	-1.900	-1.530
	Z(t) - Annual	-8.886	-2.360	-1.660	-1.290
	Joint Annual	127.110	4.760	3.120	2.370
	All frequencies	140.904	.	3.320	2.810
Portugal					
Industrial Production Index	Z(t) - Fr0	-3.814	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-9.166	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-12.302	-2.570	-1.900	-1.530
	Z(t) - Annual	-7.613	-2.360	-1.660	-1.290
	Joint Annual	104.737	4.760	3.120	2.370
	All frequencies	84.295	.	3.320	2.810
Shadow Rate	Z(t) - Fr0	-4.057	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-4.967	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-1.878	-2.610	-1.900	-1.540
	Z(t) - Annual	-5.434	-2.380	-1.680	-1.300
	Joint Annual	16.527	4.770	3.080	2.350
	All frequencies	39.134	.	3.370	2.860
Credit	Z(t) - Fr0	-2.297	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-7.323	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-7.734	-2.570	-1.900	-1.530
	Z(t) - Annual	-8.180	-2.360	-1.660	-1.290
	Joint Annual	63.344	4.760	3.120	2.370
	All frequencies	53.985	.	3.320	2.810
Stock Market Index	Z(t) - Fr0	-3.233	-3.510	-2.890	-2.580
	Z(t) - Fr 1/2	-7.886	-2.600	-1.910	-1.580
	Z(t) - L.Ann	-5.506	-2.530	-1.880	-1.530
	Z(t) - Annual	-9.327	-2.360	-1.680	-1.310
	Joint Annual	58.954	4.730	3.000	2.360
	All frequencies	93.575	.	3.380	2.810
Exchange Rate	Z(t) - Fr0	-2.505	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-8.176	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-8.444	-2.610	-1.900	-1.540
	Z(t) - Annual	-5.996	-2.380	-1.680	-1.300
	Joint Annual	53.845	4.770	3.080	2.350
	All frequencies	55.291	.	3.370	2.860

The UK					
Industrial Production Index	Z(t) - Fr0	-8.484	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-11.691	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-20.592	-2.570	-1.900	-1.530
	Z(t) - Annual	-1.432	-2.360	-1.660	-1.290
	Joint Annual	213.023	4.760	3.120	2.370
	All frequencies	198.876	.	3.320	2.810
Shadow Rate	Z(t) - Fr0	-4.682	-3.470	-2.880	-2.580
	Z(t) - Fr 1/2	-4.151	-2.610	-1.950	-1.600
	Z(t) - L.Ann	-6.587	-2.610	-1.900	-1.540
	Z(t) - Annual	-1.633	-2.380	-1.680	-1.300
	Joint Annual	23.032	4.770	3.080	2.350
	All frequencies	26.258	.	3.370	2.860
Credit	Z(t) - Fr0	-3.231	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-9.760	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-10.216	-2.570	-1.900	-1.530
	Z(t) - Annual	-8.152	-2.360	-1.660	-1.290
	Joint Annual	85.482	4.760	3.120	2.370
	All frequencies	81.539	.	3.320	2.810
Stock Market Index	Z(t) - Fr0	-4.881	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-12.754	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-11.640	-2.570	-1.900	-1.530
	Z(t) - Annual	-11.318	-2.360	-1.660	-1.290
	Joint Annual	131.781	4.760	3.120	2.370
	All frequencies	179.060	.	3.320	2.810
Exchange Rate	Z(t) - Fr0	-4.244	-3.480	-2.870	-2.570
	Z(t) - Fr 1/2	-12.233	-2.580	-1.920	-1.590
	Z(t) - L.Ann	-10.208	-2.570	-1.900	-1.530
	Z(t) - Annual	-11.215	-2.360	-1.660	-1.290
	Joint Annual	114.828	4.760	3.120	2.370
	All frequencies	144.864	.	3.320	2.810

Note: Hylleberg, Engle, Granger and Yoo (HEGY) Test results based on: Ho: Series contains a unit root and Ha: No unit root present. The presence of a unit root is rejected for the cases where the |test statistic| < |critical value|. Cases where we fail to reject the null hypothesis of a unit root are highlighted in grey.

C.2. Augmented Dickey-Fuller Tests for the Presence of a Unit Root

Table C2 - Results of Augmented Dickey-Fuller Unit Root Tests (Level Data)

	Test Statistic	1% Critical	5% Critical	10% Critical	P-Value
Level Data					
Chile					
Industrial Production Index	-1.645	-3.506	-2.889	-2.579	0.4598
CB Policy Rate	-4.207	-3.532	-2.903	-2.586	0.0006
Credit	-2.713	-3.570	-2.924	-2.597	0.0718
Stock Market Index	0.112	-3.505	-2.889	-2.579	0.9669
Exchange Rate	-7.709	-3.465	-2.881	-2.571	0.0000
Colombia					
Industrial Production Index	-1.009	-3.505	-2.889	-2.579	0.7500
CB Policy Rate	-1.264	-3.500	-2.888	-2.578	0.6453
Credit	-2.296	-3.531	-2.902	-2.586	0.1733
Stock Market Index	-1.517	-3.572	-2.925	-2.598	0.5252
Exchange Rate	-8.936	-3.465	-2.881	-2.571	0.0000
Japan					
Industrial Production Index	-2.031	-3.467	-2.881	-2.571	0.2732
Shadow Rate	0.023	-3.516	-2.893	-2.582	0.9604
Credit	-1.154	-3.472	-2.882	-2.572	0.6929
Stock Market Index	-1.829	-3.465	-2.881	-2.571	0.3660
Exchange Rate	-1.386	-3.465	-2.881	-2.571	0.5891
Portugal					
Industrial Production Index	-1.831	-3.465	-2.881	-2.571	0.3652
Shadow Rate	-0.896	-3.516	-2.893	-2.582	0.7892
Credit	-0.679	-3.553	-2.915	-2.592	0.8521
Stock Market Index	-1.964	-3.502	-2.888	-2.578	0.3027
Exchange Rate	-1.546	-3.538	-2.906	-2.588	0.5104
The UK					
Industrial Production Index	-9.421	-3.466	-2.881	-2.571	0.0000
Shadow Rate	-1.591	-3.516	-2.893	-2.582	0.4879
Credit	-1.215	-3.487	-2.885	-2.575	0.6673
Stock Market Index	-0.284	-3.465	-2.881	-2.571	0.9277
Exchange Rate	-1.838	-3.465	-2.881	-2.571	0.3620

Note: Augmented Dickey-Fuller Unit Root Test results based on: Ho: Series contains a unit root and Ha: No unit root present. MacKinnon (1996) one-sided p-values are quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1.

C.3. Augmented Dickey-Fuller Tests for the Presence of a Unit Root

Table C3- Results of Augmented Dickey-Fuller Unit Root Tests (First Differenced Data)

	Test Statistic	1% Critical	5% Critical	10% Critical	P-Value
First Difference					
Chile					
Industrial Production Index	-4.563	-3.509	-2.890	-2.580	0.0002
CB Policy Rate	-4.207	-3.532	-2.903	-2.586	0.0006
Credit	-2.713	-3.570	-2.924	-2.597	0.0718
Stock Market Index	-7.171	-3.507	-2.889	-2.579	0.0000
Exchange Rate	-5.077	-3.467	-2.881	-2.571	0.0000
Colombia					
Industrial Production Index	-6.069	-3.506	-2.889	-2.579	0.0000
CB Policy Rate	-5.430	-3.500	-2.888	-2.578	0.0000
Credit	-3.260	-3.537	-2.905	-2.588	0.0167
Stock Market Index	-1.758	-3.577	-2.928	-2.599	0.4017
Exchange Rate	-5.301	-3.471	-2.882	-2.572	0.0000
Japan					
Industrial Production Index	-7.115	-3.469	-2.882	-2.572	0.0000
Shadow Rate	-5.627	-3.521	-2.896	-2.583	0.0000
Credit	-4.295	-3.473	-2.883	-2.573	0.0005
Stock Market Index	-7.395	-3.466	-2.881	-2.571	0.0000
Exchange Rate	-5.800	-3.466	-2.881	-2.571	0.0000
Portugal					
Industrial Production Index	-4.635	-3.466	-2.881	-2.571	0.0001
Shadow Rate	-5.542	-3.521	-2.896	-2.583	0.0000
Credit	-2.905	-3.493	-2.887	-2.577	0.0448
Stock Market Index	-5.298	-3.504	-2.889	-2.579	0.0000
Exchange Rate	-3.587	-3.545	-2.910	-2.590	0.0060
The UK					
Industrial Production Index	-9.421	-3.466	-2.881	-2.571	0.0000
Shadow Rate	-5.185	-3.521	-2.896	-2.583	0.0000
Credit	-4.448	-3.488	-2.886	-2.576	0.0002
Stock Market Index	-7.238	-3.466	-2.881	-2.571	0.0000
Exchange Rate	-6.986	-3.466	-2.881	-2.571	0.0000

Note: Augmented Dickey-Fuller Unit Root Test results based on: Ho: Series contains a unit root and Ha: No unit root present. MacKinnon (1996) one-sided p-values are quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1.

C.4. Phillips-Perron Test for the Presence of a Unit Root

Table C4 - Results of Phillips-Perron Unit Root Tests

	Test Statistic	1% Critical	5% Critical	10% Critical	P-Value
First Difference					
Chile					
Industrial Production Index	-4.675	-3.508	-2.890	-2.580	0.0001
CB Policy Rate	-3.462	-3.530	-2.901	-2.586	0.0090
Credit	-2.482	-3.567	-2.923	-2.596	0.1198
Stock Market Index	-3.565	-3.506	-2.889	-2.579	0.0065
Exchange Rate	-5.371	-3.466	-2.881	-2.571	0.0000
Colombia					
Industrial Production Index	-4.445	-3.506	-2.889	-2.579	0.0002
CB Policy Rate	-6.531	-3.499	-2.888	-2.578	0.0000
Credit	-3.404	-3.534	-2.904	-2.587	0.0108
Stock Market Index	-1.848	-3.574	-2.927	-2.598	0.3567
Exchange Rate	-5.030	-3.470	-2.882	-2.572	0.0000
Japan					
Industrial Production Index	-4.671	-3.469	-2.882	-2.572	0.0001
Shadow Rate	-7.080	-3.520	-2.896	-2.583	0.0000
Credit	-3.747	-3.473	-2.883	-2.573	0.0035
Stock Market Index	-5.275	-3.466	-2.881	-2.571	0.0000
Exchange Rate	-5.341	-3.466	-2.881	-2.571	0.0000
Portugal					
Industrial Production Index	-5.209	-3.466	-2.881	-2.571	0.0000
Shadow Rate	-4.094	-3.520	-2.896	-2.583	0.0010
Credit	-2.789	-3.493	-2.887	-2.577	0.0599
Stock Market Index	-3.767	-3.503	-2.889	-2.579	0.0033
Exchange Rate	-3.767	-3.544	-2.909	-2.590	0.0033
The UK					
Industrial Production Index	-13.700	-3.466	-2.881	-2.571	0.0000
Shadow Rate	-6.150	-3.520	-2.896	-2.583	0.0000
Credit	-4.327	-3.488	-2.886	-2.576	0.0004
Stock Market Index	-5.833	-3.466	-2.881	-2.571	0.0000
Exchange Rate	-5.822	-3.466	-2.881	-2.571	0.0000

Note: Phillips-Perron Unit Root Test results based on: Ho: Series contains a unit root and Ha: No unit root present. MacKinnon (1996) one-sided p-values are quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1.

2.9. Appendix D

The first robustness check makes use of a Structural Vector Autoregressive (SVAR) model and impulse response functions to identify the impact of monetary policy shocks on financial stability. I apply this methodology to the cases of Chile, Colombia, Japan, Portugal and the UK using monthly data. Growth rates are y-o-y.

The lag length is selected using AIC and FPE. The AIC and FPE suggest seven lags for Chile, Japan, Portugal and the UK while eight lags are suggested for Colombia.

Monthly time series data is used, with the exception being credit data, which is available quarterly. The quarterly credit data is interpolated using Cubic Spline to estimate the monthly values. The number of observations is based on a balanced SVAR; Chile has 165 observations, Colombia has 141 observations, Japan has 261 observations, Portugal has 213 observations and lastly, the UK has 261 observations.

D.1. Monthly Variable Sources

Table D1 - Monthly Sources of Variables

Variable	Code	Source	Frequenc	Initial Date	End Date
IndustrialProduction					
Chile	IPTOTNSKD	World Bank staff calculations based on Datastream data. Global Economic Monitor (GEM).	Monthly	01/01/1991	01/05/2018
Colombia	IPTOTNSKD	World Bank staff calculations based on Datastream data. Global Economic Monitor (GEM).	Monthly	01/01/1992	01/05/2018
Japan	IPTOTNSKD	World Bank staff calculations based on Datastream data. Global Economic Monitor (GEM).	Monthly	01/01/1993	01/05/2018
Portugal	IPTOTNSKD	World Bank staff calculations based on Datastream data. Global Economic Monitor (GEM).	Monthly	01/01/1994	01/05/2018
The UK	IPTOTNSKD	World Bank staff calculations based on Datastream data. Global Economic Monitor (GEM).	Monthly	01/01/1995	01/05/2018
IndustrialProductionGrowth		Author's own calculations using IPTOTNSKD			
StockMarketUS					
Chile	DSTKMKTXD	World Bank staff calculations based on Datastream and IMF International Finance Statistics data. GEM.	Monthly	01/07.2001	01/07/2018
Colombia	DSTKMKTXD	World Bank staff calculations based on Datastream and IMF International Finance Statistics data. GEM.	Monthly	01/01/2003	01/06/2016
Japan	DSTKMKTXD	Federal Reserve Economic Data	Monthly	01/01/1990	01/05/2018
Portugal	DSTKMKTXD	Federal Reserve Economic Data	Monthly	01/01/1993	01/07/2018
The UK	DSTKMKTXD	Federal Reserve Economic Data	Monthly	01/01/1990	01/07/2018
StockMarketUSGrowth		Author's own calculations using DSTKMKTXD			
CBPolicyRate					
Chile	M:CL	Central Bank of Chile	Monthly	28/02/1997	30/06/2019
Colombia	M:CO	Central Bank of Colombia	Monthly	30/04/1995	30/06/2019
Japan	M:JP	Bank of Japan	Monthly	31/01/1946	30/06/2019
Portugal	M:XM	Bank of Portugal	Monthly	31/01/1999	30/06/2019
The UK	M:GB	Bank of England	Monthly	31.01/1946	30/06/2019
CBPolicyRateGrowth		Author's own calculations using BIS_CBPOL			
ExchangeRateUSDollarPostEuro					
Chile	CCUSMA02CLM618N	Federal Reserve Economic Data	Monthly	01/01/1960	01/05/2019
Colombia	COLCCUSSP02STM	Federal Reserve Economic Data	Monthly	01/01/1960	01/05/2019
Japan	EXJPUS	Federal Reserve Economic Data	Monthly	01/01/1971	01/07/2019
Portugal	EXUSEU	Federal Reserve Economic Data	Monthly	01/01/1999	01/07/2019
The UK	EXUSUK	Federal Reserve Economic Data	Monthly	01/01/1971	01/07/2019
ExchangeRateUSDollarGrowthPostEuro		Author's own calculations using ExchangeRateUSDollarPostEuro			
CreditNonFinancial					
Chile	Q:CL:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/2002	30/09/2018
Colombia	Q:CO:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/1996	30/09/2018
Japan	Q:JP:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/1964	30/09/2018
Portugal	Q:PT:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/12/1979	30/09/2018
The UK	Q:GB:N:A:M:770:A	BIS total credit statistics.	Quarterly	31/03/1976	30/09/2018
CreditNonFinancialGrowth		Author's own calculations using CreditNonFinancial			

D.2. Monthly Variable Definitions

Table D2 - Monthly Definitions of Variables

Variable	Description
IndustrialProduction	
Chile	An economic indicator that measures changes in output for the industrial sector of the economy. The industrial sector includes manufacturing, mining, and utilities. Data is in constant US$, and not seasonally adjusted. The base year is 2005.
Colombia	An economic indicator that measures changes in output for the industrial sector of the economy. The industrial sector includes manufacturing, mining, and utilities. Data is in constant US$, and not seasonally adjusted. The base year is 2005.
Japan	An economic indicator that measures changes in output for the industrial sector of the economy. The industrial sector includes manufacturing, mining, and utilities. Data is in constant US$, and not seasonally adjusted. The base year is 2005.
Portugal	An economic indicator that measures changes in output for the industrial sector of the economy. The industrial sector includes manufacturing, mining, and utilities. Data is in constant US$, and not seasonally adjusted. The base year is 2005.
The UK	An economic indicator that measures changes in output for the industrial sector of the economy. The industrial sector includes manufacturing, mining, and utilities. Data is in constant US$, and not seasonally adjusted. The base year is 2005.
IndustrialProductionGrowth	Growth Rate in Industrial Production
StockMarketUS	
Chile	Local equity market index valued in US$ terms
Colombia	Local equity market index valued in US$ terms
Japan	Local equity market index valued in US$ terms
Portugal	Local equity market index valued in US$ terms
The UK	Local equity market index valued in US$ terms
StockMarketUSGrowth	Growth Rate in equity market index valued in US$
CBPolicyRate	
Chile	Central Bank Policy Rates
Colombia	Central Bank Policy Rates
Japan	Central Bank Policy Rates
Portugal	Central Bank Policy Rates
The UK	Central Bank Policy Rates
CBPolicyRateGrowth	Growth Rate in Central Bank Policy Rates
ExchangeRateUSDollarPostEuro	
Chile	National Currency to US Dollar Exchange Rate: Average of Daily Rates for Chile, National Currency Units per US Dollar, Monthly, Not Seasonally Adjusted
Colombia	Currency Conversions: US$ exchange rate: Spot, end of period: National currency:USD for Colombia, National Currency Units per US Dollar, Monthly, Not Seasonally Adjusted
Japan	Japan / U.S. Foreign Exchange Rate, Japanese Yen to One U.S. Dollar, Monthly, Not Seasonally Adjusted
Portugal	U.S. / Euro Foreign Exchange Rate, U.S. Dollars to One Euro, Monthly, Not Seasonally Adjusted - Post Euro Implementation
The UK	U.S. / U.K. Foreign Exchange Rate, U.S. Dollars to One British Pound, Monthly, Not Seasonally Adjusted
ExchangeRateUSDollarGrowthPostEuro	Growth Rate in Exchange Rate
CreditNonFinancial	
Chile	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Colombia	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Japan	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Portugal	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
The UK	Credit to Non-financial corporations from All sectors at Market value - Percentage of GDP - Adjusted for breaks
CreditNonFinancialGrowth	Growth Rate in Credit to Non-financial corporations

D.3. Monthly Summary Statistics

Table D3 - Monthly Summary Statistics for Chile, Colombia, Japan, Portugal and the UK

Summary Statistics					
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
Chile					
exchangerateusdollargrowth	165	0.006385	0.1123915	-0.226697	0.3370103
industrialproductiongrowth	165	0.0183469	0.0467193	-0.1333333	0.1384615
stockmarketusgrowth	165	0.1339619	0.2840849	-0.4269121	0.905665
cbpolicyrategrowth	165	0.4397107	1.545128	-0.9393939	9
creditnonfinancialgrowth	165	0.0150551	0.0873725	-0.1123321	0.2681873
Colombia					
exchangerateusdollargrowth	141	0.0213708	0.1678636	-0.2563613	0.6026025
industrialproductiongrowth	141	0.0253187	0.0590517	-0.137931	0.1643836
stockmarketusgrowth	141	0.1982585	0.4993862	-0.5837283	1.642121
cbpolicyrategrowth	141	0.0307655	0.3114321	-0.65	0.6666667
creditnonfinancialgrowth	141	0.0174562	0.0767357	-0.1451683	0.1506397
Japan					
exchangerateusdollargrowth	261	0.0084318	0.1074411	-0.217397	0.2697206
industrialproductiongrowth	261	0.0038353	0.0803374	-0.3610635	0.2791519
stockmarketusgrowth	261	0.0243926	0.2191659	-0.444071	0.6861854
shadowgrowth	261	-1.530569	7.109558	-57.9729	32.6405
creditnonfinancialgrowth	261	-0.0163142	0.0291939	-0.0850487	0.05345
Portugal					
exchangerateusdollargrowth	213	-0.0045911	0.1036223	-0.2064713	0.2781227
industrialproductiongrowth	213	-0.0003758	0.0563103	-0.1956522	0.1363636
stockmarketusgrowth	213	0.0063903	0.2745805	-0.5717196	0.6237707
shadowgrowth	213	-0.4330425	2.031648	-18.6168	6.96439
creditnonfinancialgrowth	213	0.0194145	0.0634335	-0.0923379	0.1214932
The UK					
exchangerateusdollargrowth	261	0.0107753	0.0955532	-0.1389162	0.4124914
industrialproductiongrowth	261	-0.0008895	0.0377978	-0.1428571	0.0909091
stockmarketusgrowth	261	0.0504947	0.1895813	-0.5363176	0.6029442
shadowgrowth	261	-2.570396	18.21171	-201.659	43.5209
creditnonfinancialgrowth	261	0.018743	0.0523632	-0.1037838	0.1195123

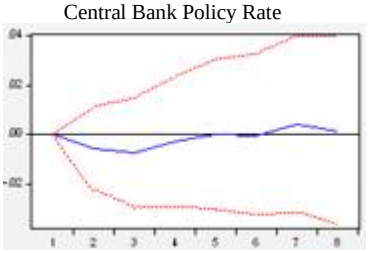
D.4. Structural Impulse Response Functions: Short Run Impact

Chile

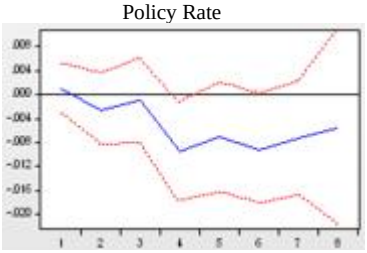
Figure D4.1 - Short Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

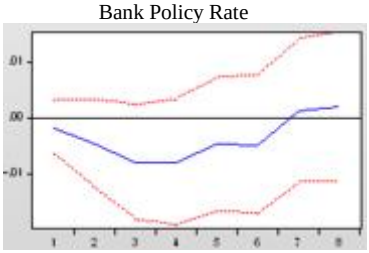
Response of Industrial Production to Central Bank Policy Rate



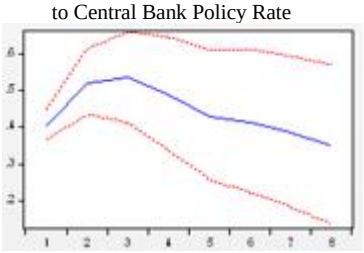
Response of Credit to Central Bank Policy Rate



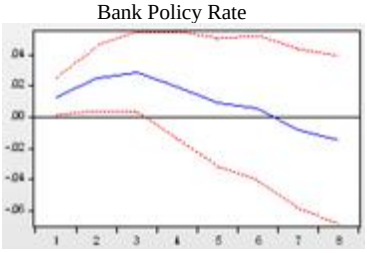
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

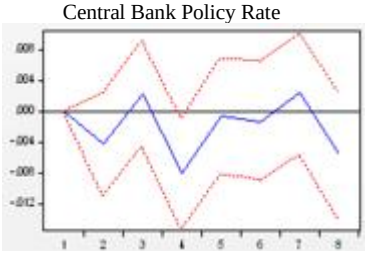


Colombia

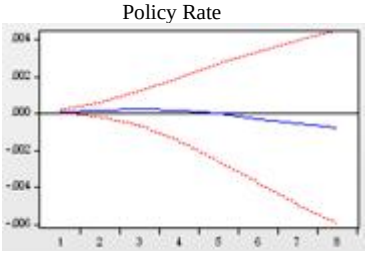
Figure D4.2 - Short Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

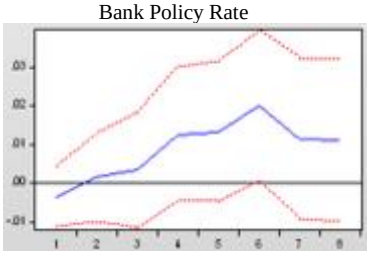
Response of Industrial Production to Central Bank Policy Rate



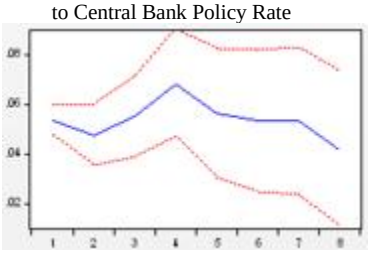
Response of Credit to Central Bank Policy Rate



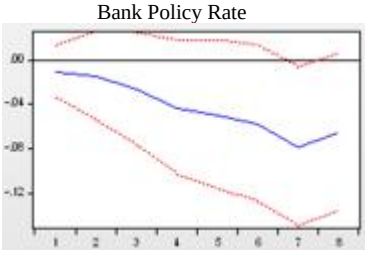
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

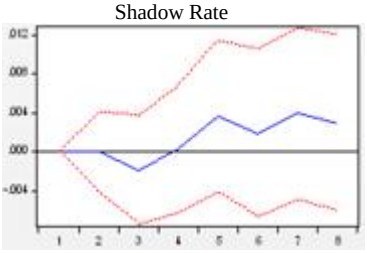


Japan

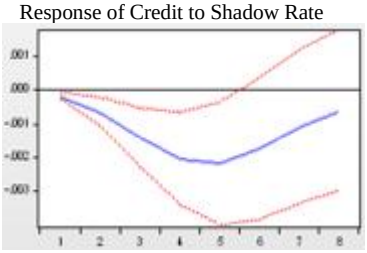
Figure D4.3 - Short Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

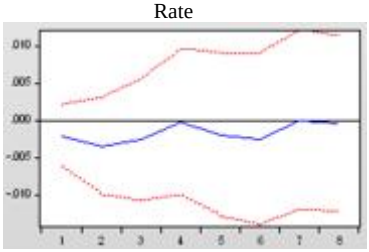
Response of Industrial Production to Shadow Rate



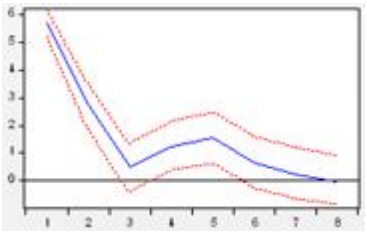
Response of Credit to Shadow Rate



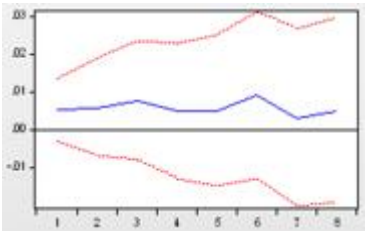
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

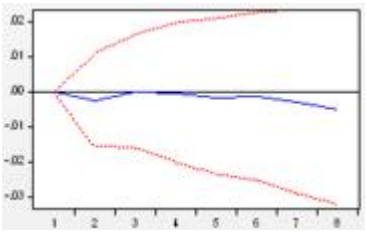


Portugal

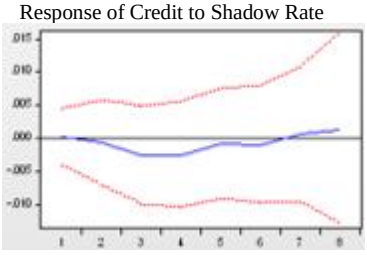
Figure D4.4 - Short Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

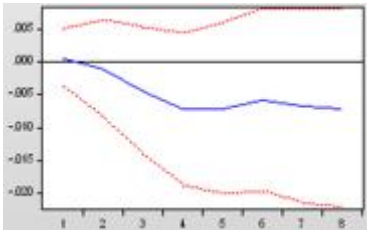
Response of Industrial Production to Shadow Rate



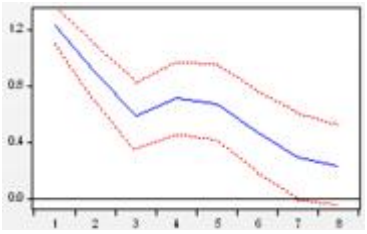
Response of Credit to Shadow Rate



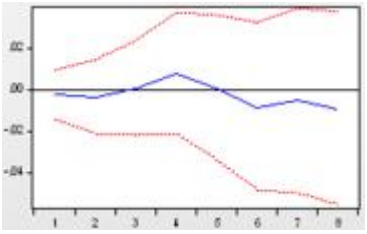
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

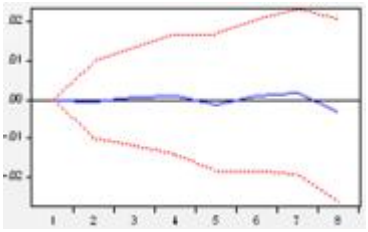


The UK

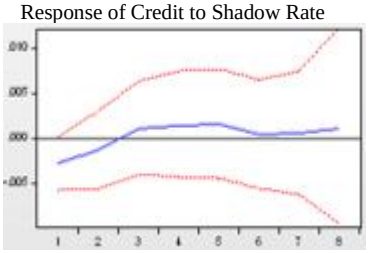
Figure D4.5 - Short Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in the UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

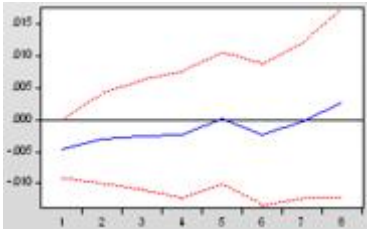
Response of Industrial Production to Shadow Rate



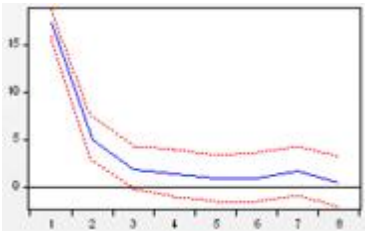
Response of Credit to Shadow Rate



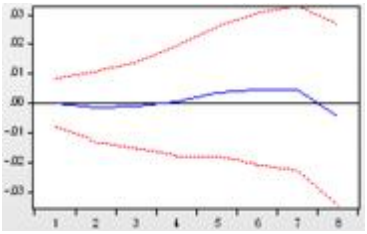
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



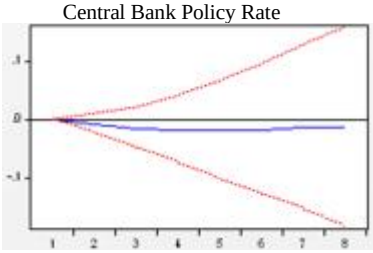
D.5. Cumulative Structural Impulse Response Functions: Long Run Impact

Chile

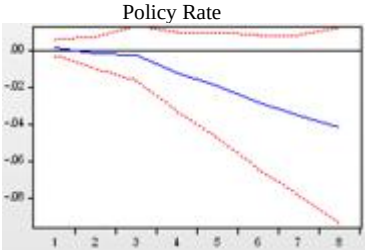
Figure D5.1 - Long Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

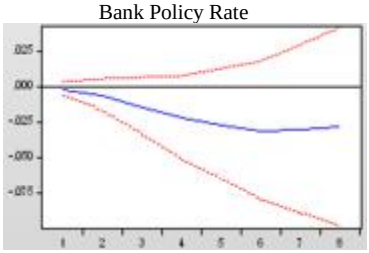
Response of Industrial Production to Central Bank Policy Rate



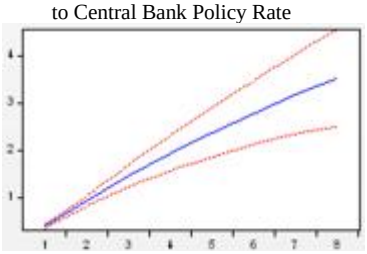
Response of Credit to Central Bank Policy Rate



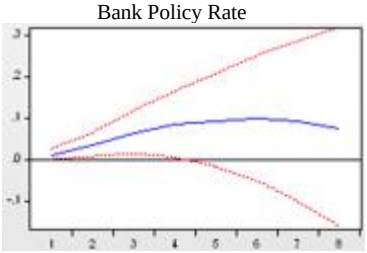
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

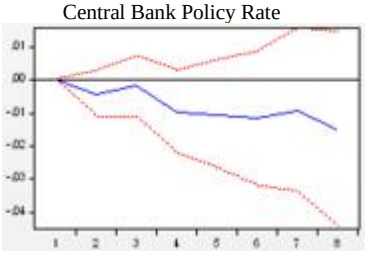


Colombia

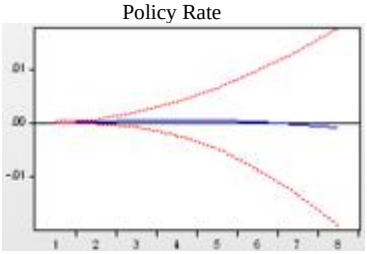
Figure D5.2 - Long Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

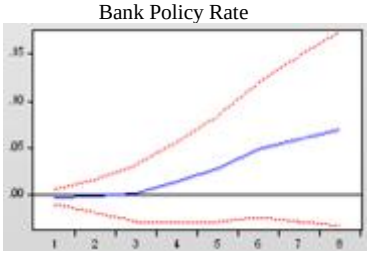
Response of Industrial Production to Central Bank Policy Rate



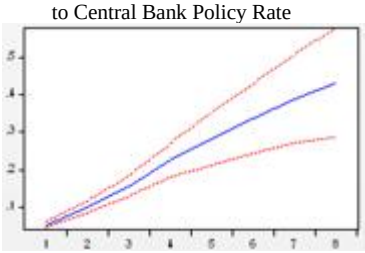
Response of Credit to Central Bank Policy Rate



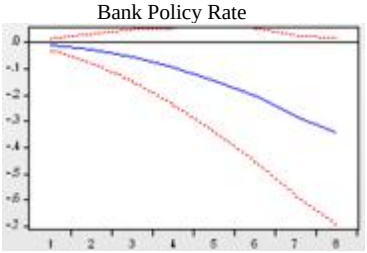
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

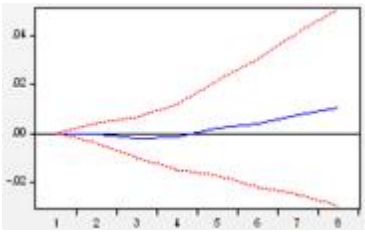


Japan

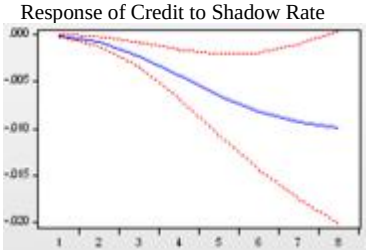
Figure D5.3 - Long Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

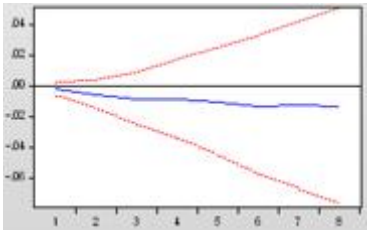
Response of Industrial Production to Shadow Rate



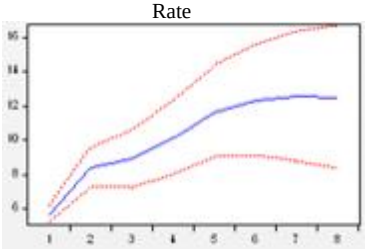
Response of Credit to Shadow Rate



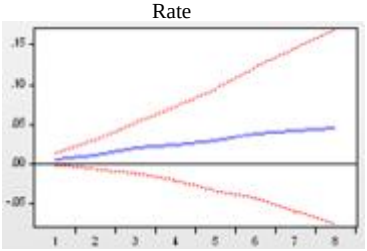
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

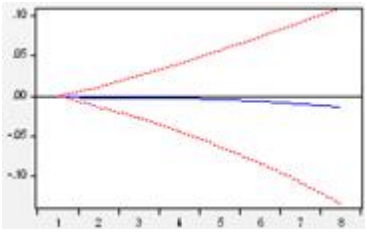


Portugal

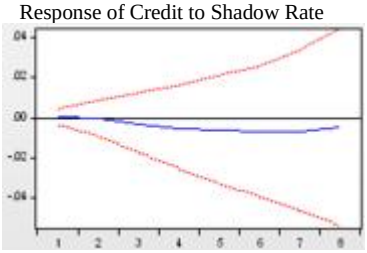
Figure D5.4 - Long Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

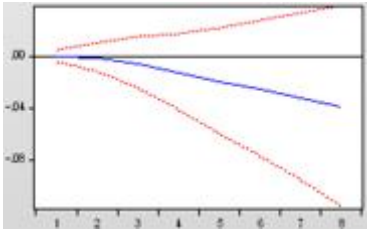
Response of Industrial Production to Shadow Rate



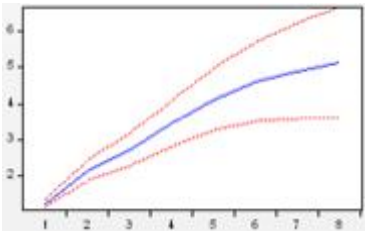
Response of Credit to Shadow Rate



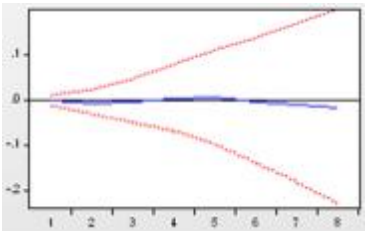
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

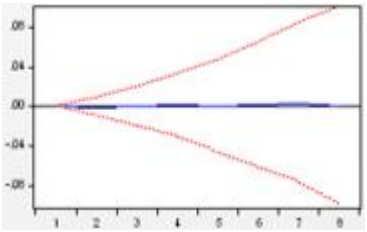


The UK

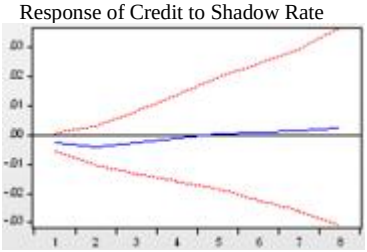
Figure D5.5 - Long Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

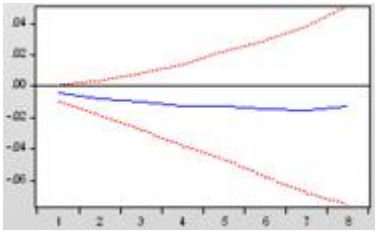
Response of Industrial Production to Shadow Rate



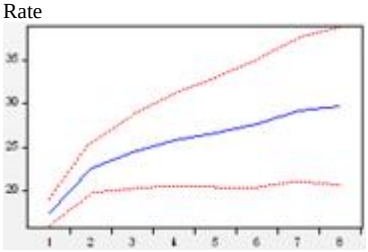
Response of Credit to Shadow Rate



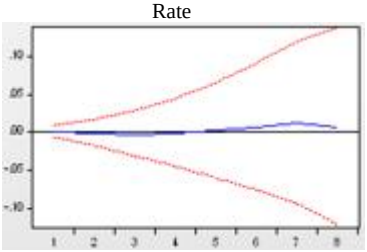
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



Note: Vertical Axes – the deviation from the baseline level
Horizontal Axes – the number of months after the shock
Source: Author's estimates based on Datastream and BIS statistics, IRFs generated in EViews.

2.10. Appendix E

The second robustness check makes use of a Structural Vector Autoregressive (SVAR) model and impulse response functions to identify the impact of monetary policy shocks on financial stability. I apply this methodology to the cases of Chile, Colombia, Japan, Portugal and the UK using quarterly data. Growth rates are y-o-y. The SVAR model and the impulse response functions are generated with a different Cholesky ordering to that of the main results. The Cholesky decomposition matrix is as follows:

$$\begin{pmatrix} u_{ir} \\ u_{ip} \\ u_{cg} \\ u_{sp} \\ u_{er} \end{pmatrix} = \begin{pmatrix} b_{11} & 0 & 0 & 0 & 0 \\ b_{21} & b_{22} & 0 & 0 & 0 \\ b_{31} & b_{32} & b_{33} & 0 & 0 \\ b_{41} & b_{42} & b_{43} & b_{44} & 0 \\ b_{51} & b_{52} & b_{53} & b_{54} & b_{55} \end{pmatrix} * \begin{pmatrix} \varepsilon_{ir} \\ \varepsilon_{ip} \\ \varepsilon_{cg} \\ \varepsilon_{sp} \\ \varepsilon_{er} \end{pmatrix} \begin{matrix} short\ term\ policy\ rates\ innovation \\ industrial\ production\ innovation \\ credit\ growth\ innovation \\ stock\ price\ innovation \\ exchange\ rate\ innovation \end{matrix} \quad .(9)$$

The lag length is selected using HQIC and the SBIC. Both the HQIC and the SBIC suggest 2 lags for the case of Chile, the SBIC suggests 2 lags for the case of Colombia and both the HQIC and the SBIC suggest 1 lag for the cases of Japan, Portugal and the UK.

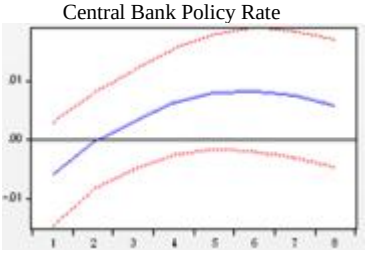
E.1. Structural Impulse Response Functions: Short Run Impact

Chile

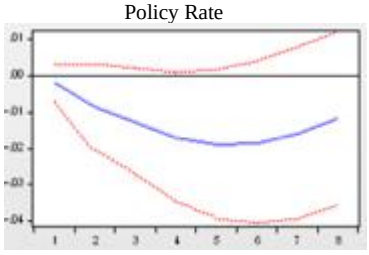
Figure E1.1 - Short Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

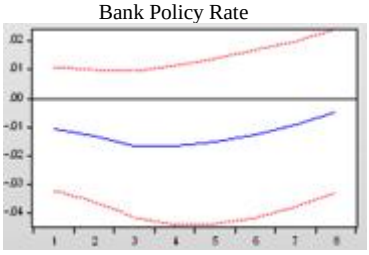
Response of Industrial Production to Central Bank Policy Rate



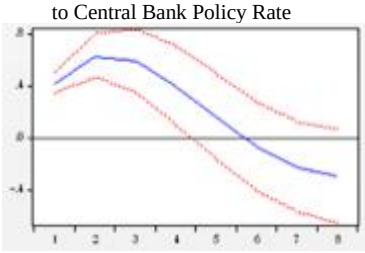
Response of Credit to Central Bank Policy Rate



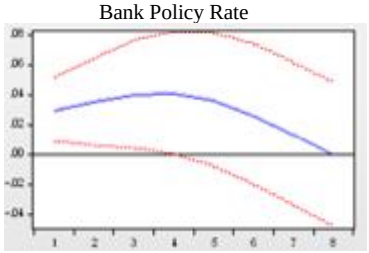
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

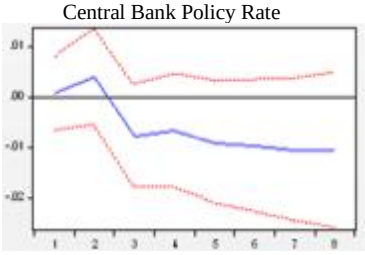


Colombia

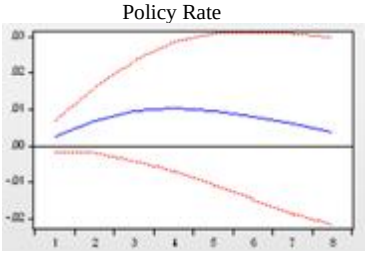
Figure E1.2 - Short Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

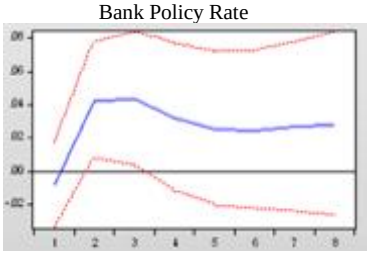
Response of Industrial Production to Central Bank Policy Rate



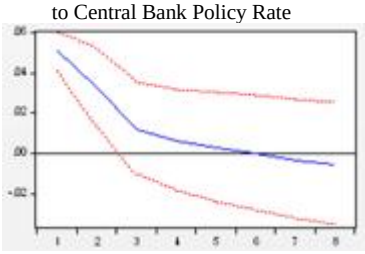
Response of Credit to Central Bank Policy Rate



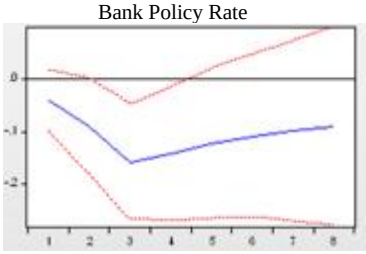
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

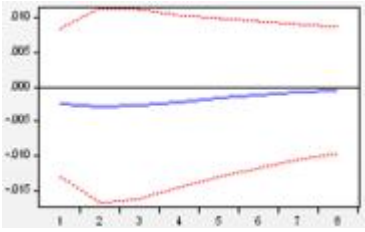


Japan

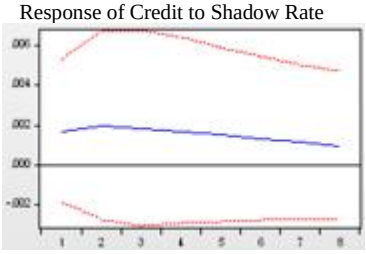
Figure E1.3 - Short Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

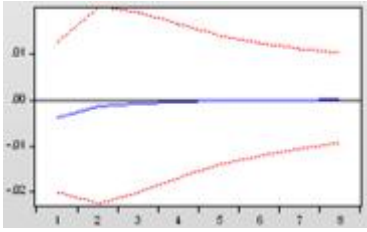
Response of Industrial Production to Shadow Rate



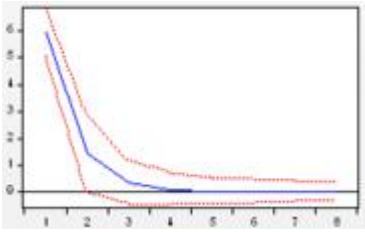
Response of Credit to Shadow Rate



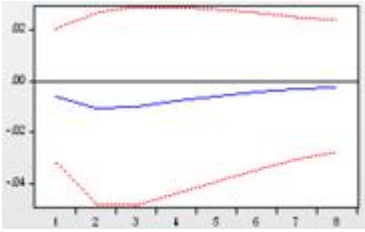
Response of Exchange Rate to Shadow Rate



Response Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

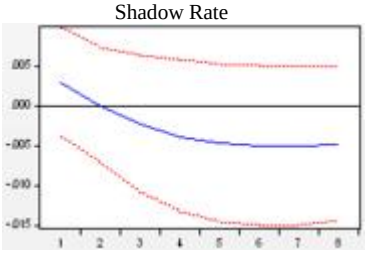


Portugal

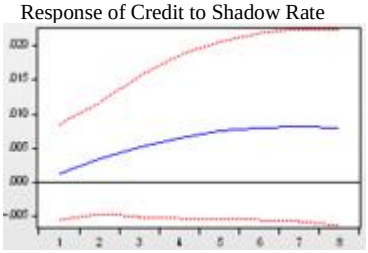
Figure E1.4 - Short Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

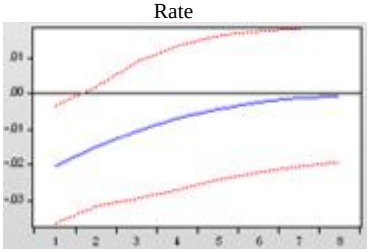
Response of Industrial Production to Shadow Rate



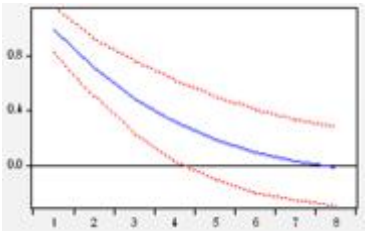
Response of Credit to Shadow Rate



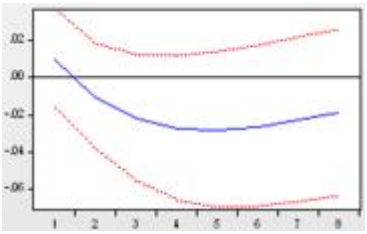
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

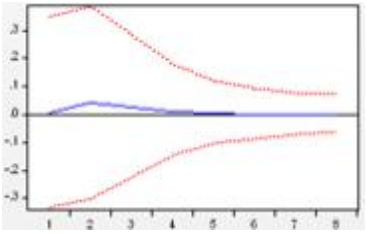


The UK

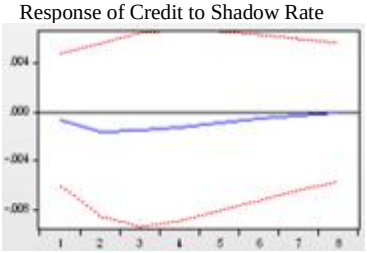
Figure E1.5 - Short Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

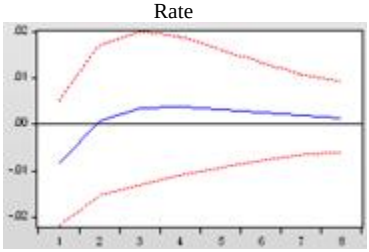
Response of Industrial Production to Shadow Rate



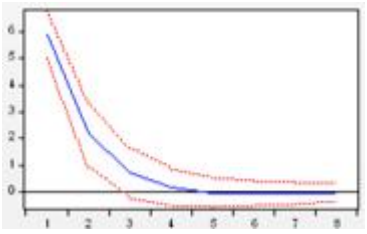
Response of Credit to Shadow Rate



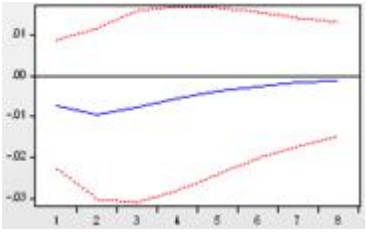
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



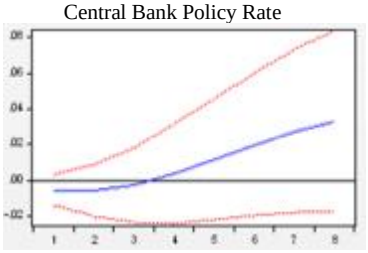
E.2. Cumulative Structural Impulse Response Functions: Long Run Impact

Chile

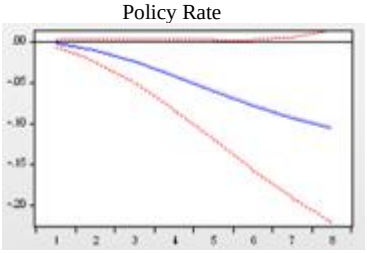
Figure E2.1 - Long Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

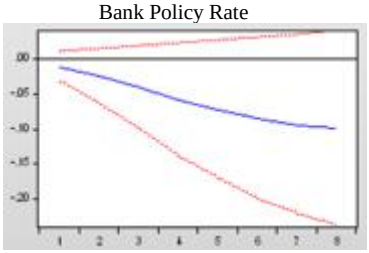
Response of Industrial Production to Central Bank Policy Rate



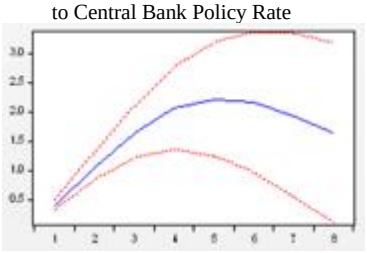
Response of Credit to Central Bank Policy Rate



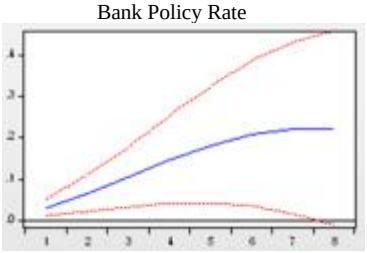
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

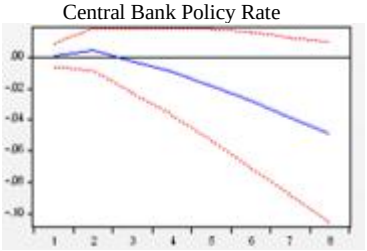


Colombia

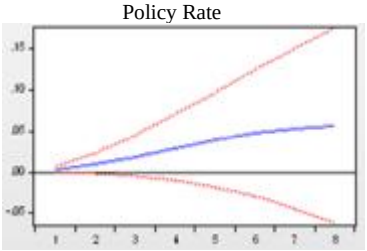
Figure E2.2 - Long Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

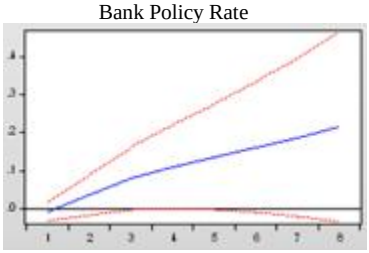
Response of Industrial Production to Central Bank Policy Rate



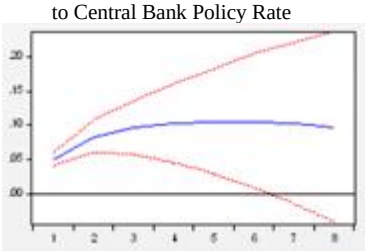
Response of Credit to Central Bank Policy Rate



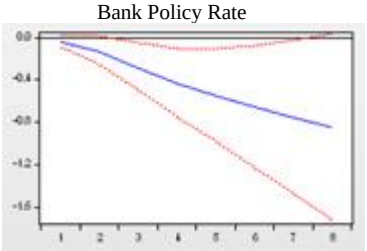
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

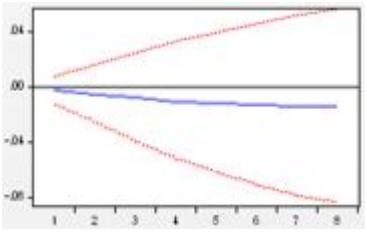


Japan

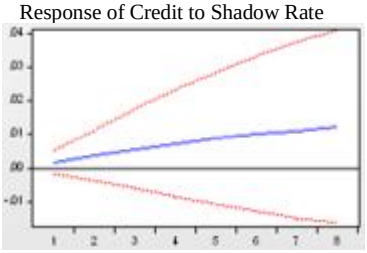
Figure E2.3 - Long Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

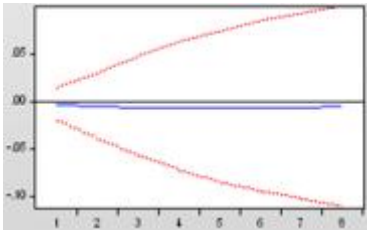
Response of Industrial Production to Shadow Rate



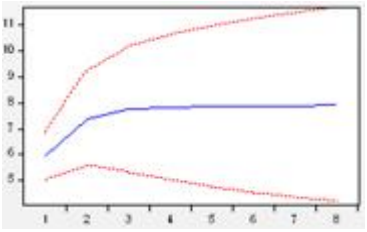
Response of Credit to Shadow Rate



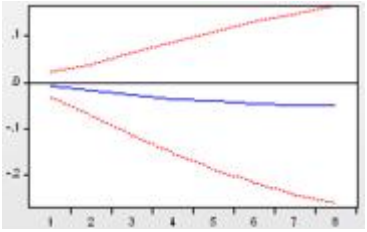
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

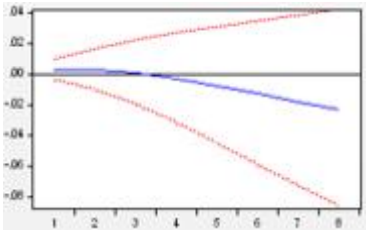


Portugal

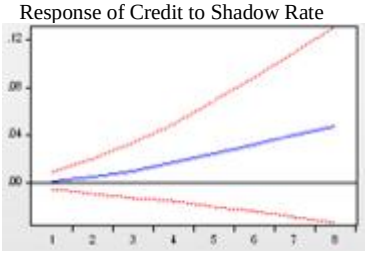
Figure E2.4 - Long Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

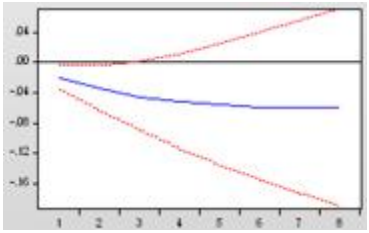
Response of Industrial Production to Shadow Rate



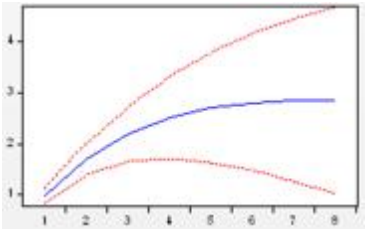
Response of Credit to Shadow Rate



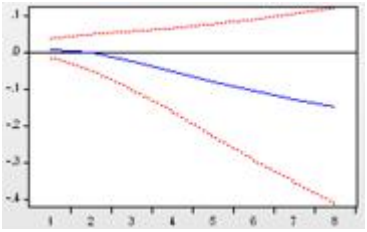
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

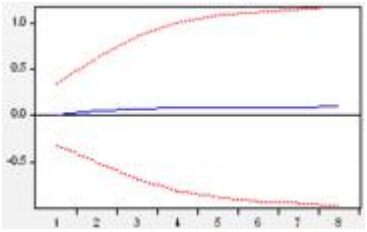


The UK

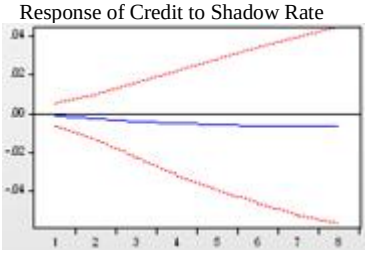
Figure E2.5 - Long Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

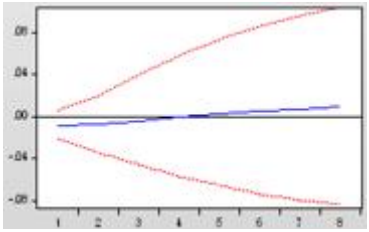
Response of Industrial Production to Shadow Rate



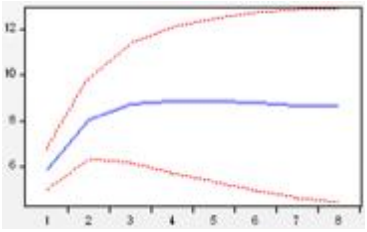
Response of Credit to Shadow Rate



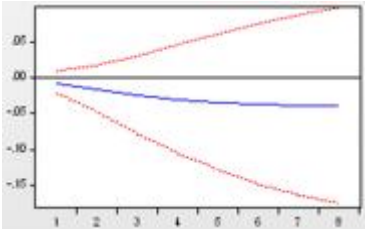
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



Note: Vertical Axes – the deviation from the baseline level
Horizontal Axes – the number of months after the shock
Source: Author's estimates based on Datastream and BIS statistics, IRFs generated in EViews.

2.11. Appendix F

The third robustness check makes use of a Structural Vector Autoregressive (SVAR) model and impulse response functions to identify the impact of monetary policy shocks on financial stability. I apply this methodology to the cases of Chile, Colombia, Japan, Portugal and the UK using quarterly data. Growth rates are y-o-y. The SVAR model and the impulse response functions are generated with a different Cholesky ordering to that of the main results. The Cholesky decomposition matrix is as follows:

$$\begin{pmatrix} u_{ir} \\ u_{ip} \\ u_{cg} \\ u_{er} \\ u_{sp} \end{pmatrix} = \begin{pmatrix} b_{11} & 0 & 0 & 0 & 0 \\ b_{21} & b_{22} & 0 & 0 & 0 \\ b_{31} & b_{32} & b_{33} & 0 & 0 \\ b_{41} & b_{42} & b_{43} & b_{44} & 0 \\ b_{51} & b_{52} & b_{53} & b_{54} & b_{55} \end{pmatrix} * \begin{pmatrix} \varepsilon_{ir} \\ \varepsilon_{ip} \\ \varepsilon_{cg} \\ \varepsilon_{er} \\ \varepsilon_{sp} \end{pmatrix} \begin{matrix} industrial\ production\ innovation \\ short\ term\ policy\ rates\ innovation \\ credit\ growth\ innovation \\ exchange\ rate\ innovation \\ stock\ price\ innovation \end{matrix} \quad .(10)$$

The lag length is selected using HQIC and the SBIC. Both the HQIC and the SBIC suggest 2 lags for the case of Chile, the SBIC suggests 2 lags for the case of Colombia and both the HQIC and the SBIC suggest 1 lag for the cases of Japan, Portugal and the UK.

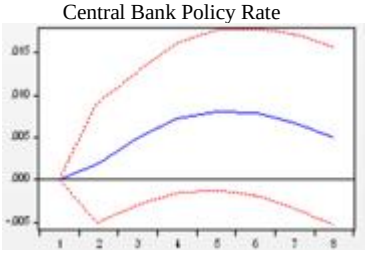
F.1. Structural Impulse Response Functions: Short Run Impact

Chile

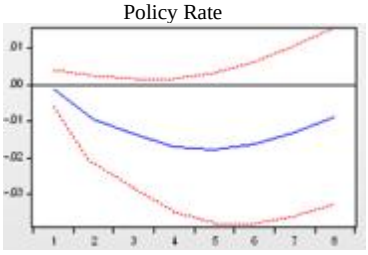
Figure F1.1 - Short Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

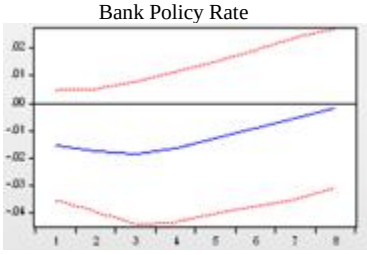
Response of Industrial Production to Central Bank Policy Rate



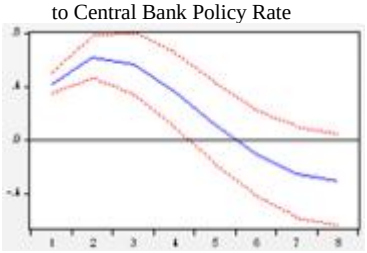
Response of Credit to Central Bank Policy Rate



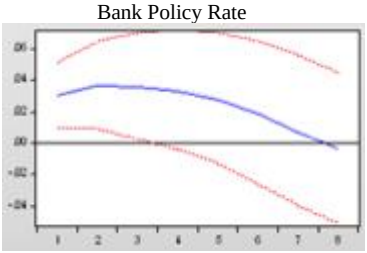
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

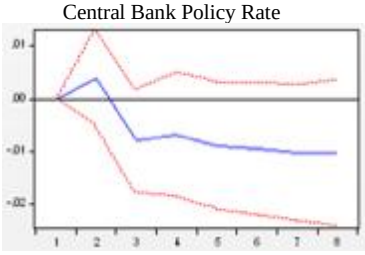


Colombia

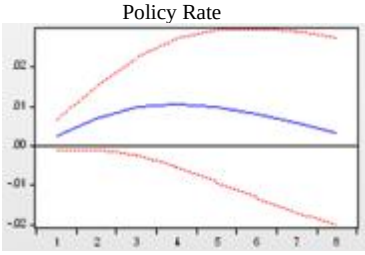
Figure F1.2 - Short Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

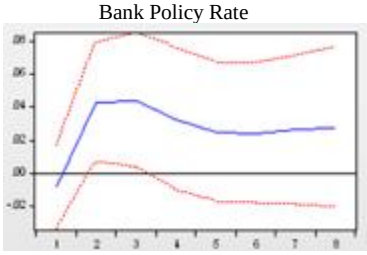
Response of Industrial Production to Central Bank Policy Rate



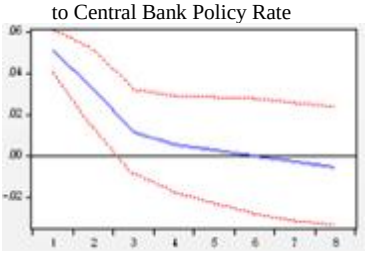
Response of Credit to Central Bank Policy Rate



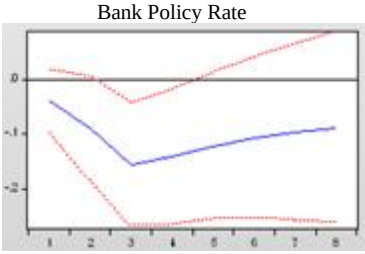
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

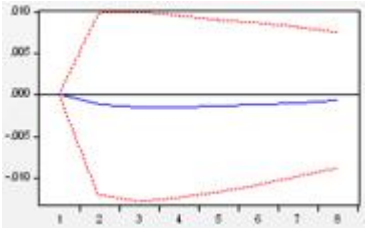


Japan

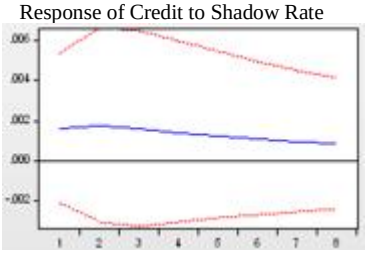
Figure F1.3 - Short Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

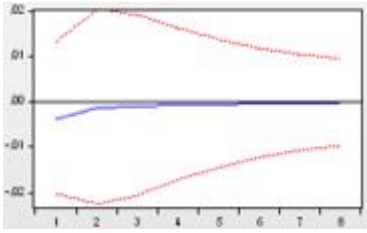
Response of Industrial Production to Shadow Rate



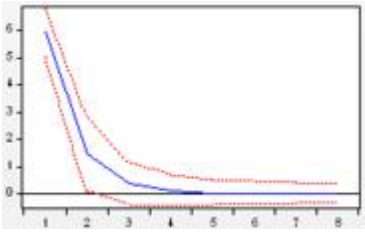
Response of Credit to Shadow Rate



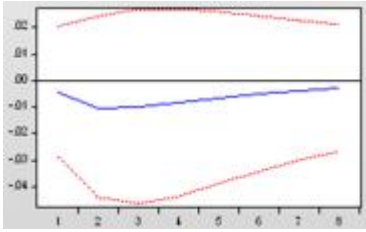
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

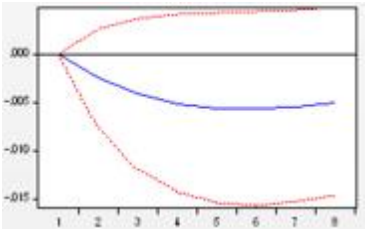


Portugal

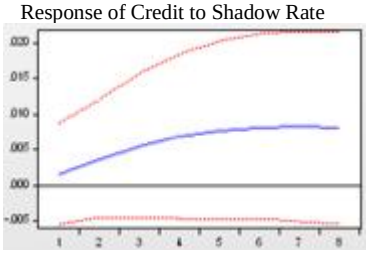
Figure F1.4 - Short Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

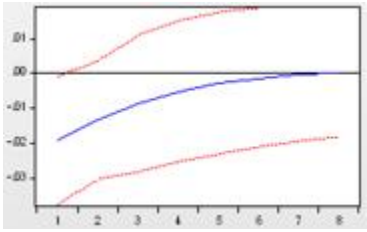
Response of Industrial Production to Shadow Rate



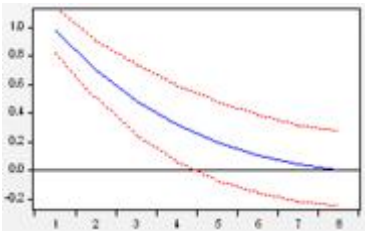
Response of Credit to Shadow Rate



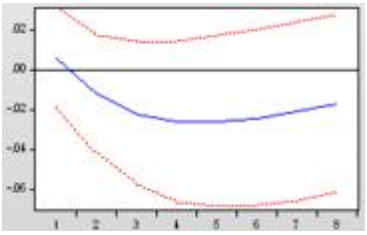
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

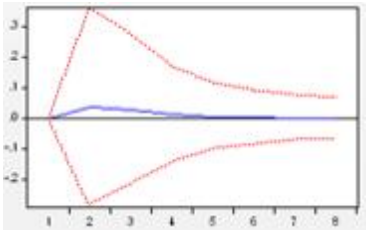


The UK

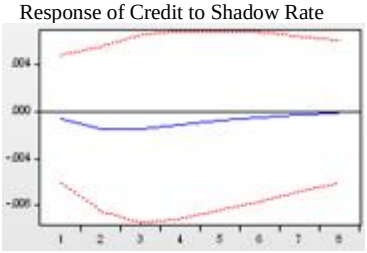
Figure F1.5 - Short Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

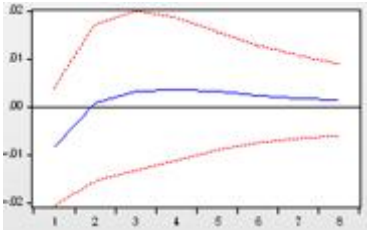
Response of Industrial Production to Shadow Rate



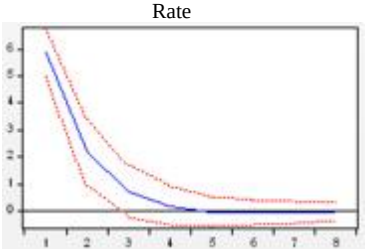
Response of Credit to Shadow Rate



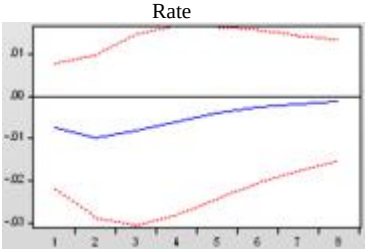
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



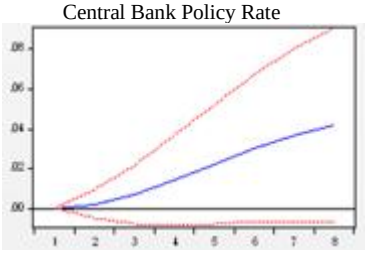
F.2. Cumulative Structural Impulse Response Functions: Long Run Impact

Chile

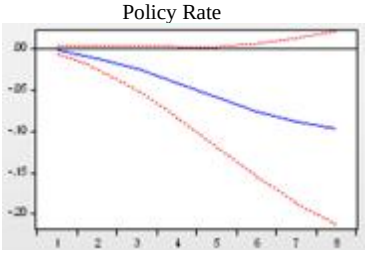
Figure F2.1 - Long Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

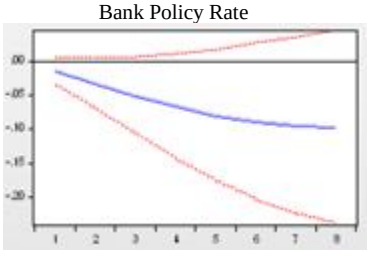
Response of Industrial Production to Central Bank Policy Rate



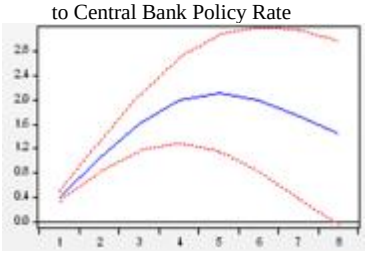
Response of Credit to Central Bank Policy Rate



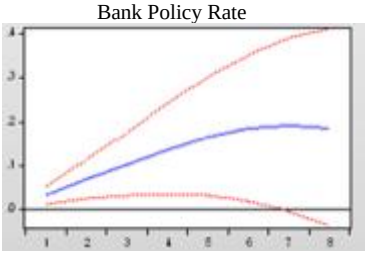
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

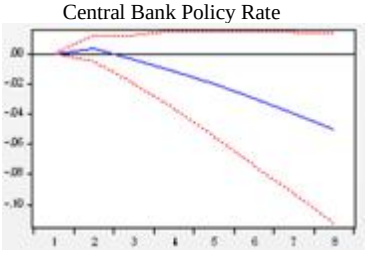


Colombia

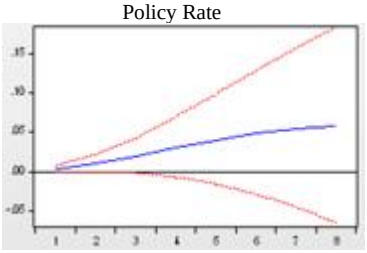
Figure F2.2- Long Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

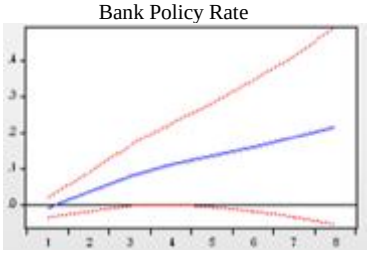
Response of Industrial Production to Central Bank Policy Rate



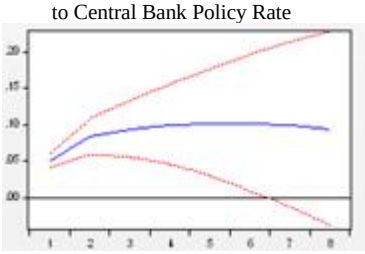
Response of Credit to Central Bank Policy Rate



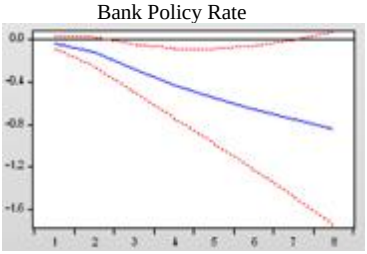
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

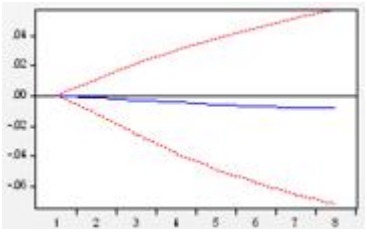


Japan

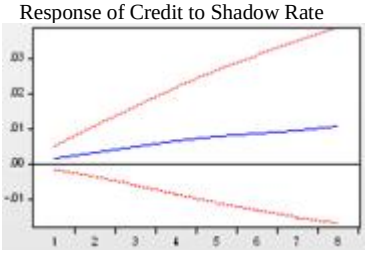
Figure F2.3 - Long Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

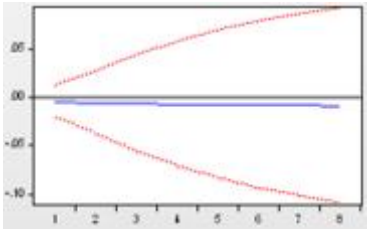
Response of Industrial Production to Shadow Rate



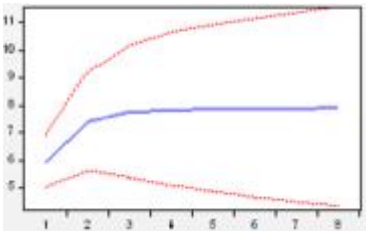
Response of Credit to Shadow Rate



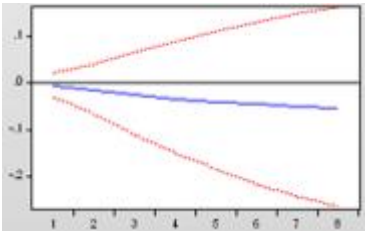
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

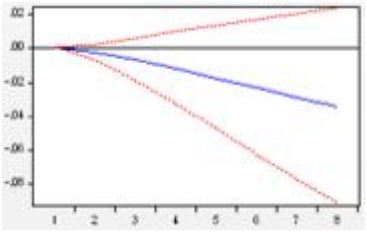


Portugal

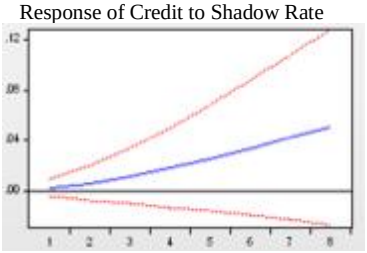
Figure F2.4 - Long Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

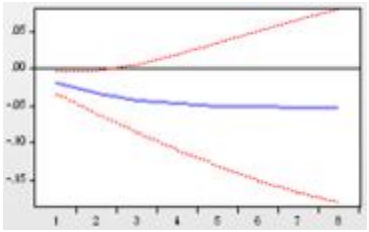
Response of Industrial Production to Shadow Rate



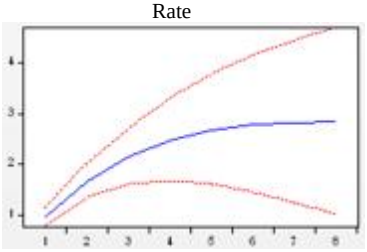
Response of Credit to Shadow Rate



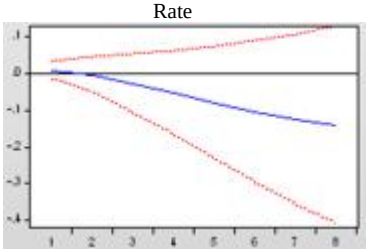
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

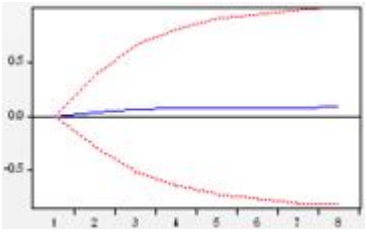


The UK

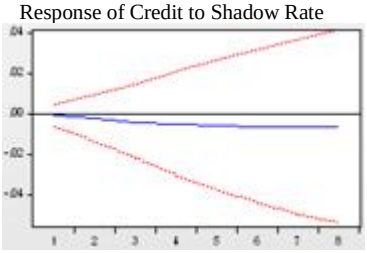
Figure F2.5 - Long Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

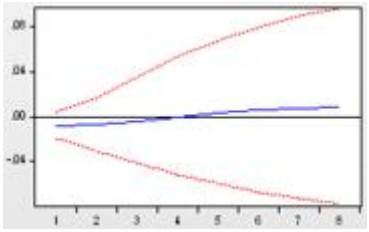
Response of Industrial Production to Shadow Rate



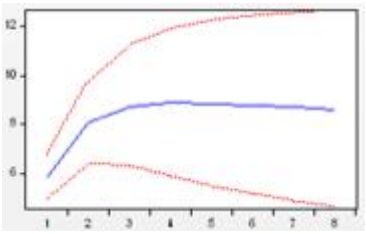
Response of Credit to Shadow Rate



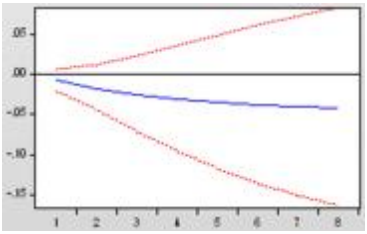
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



Note: Vertical Axes – the deviation from the baseline level
Horizontal Axes – the number of months after the shock
Source: Author's estimates based on Datastream and BIS statistics, IRFs generated in EViews.

2.12. Appendix G

The fourth robustness check makes use of a Bayesian Vector Autoregressive (BVAR) model and impulse response functions to identify the impact of monetary policy shocks on financial stability. I apply this methodology to the cases of Chile, Colombia, Japan, Portugal and the UK using quarterly data. Growth rates are y-o-y.

The BVAR model and the impulse response functions are generated with the same ordering to that of the main results. The lag length is selected using HQIC and the SBIC. Both the HQIC and the SBIC suggest 2 lags for the case of Chile, the SBIC suggests 2 lags for the case of Colombia and both the HQIC and the SBIC suggest 1 lag for the cases of Japan, Portugal and the UK.

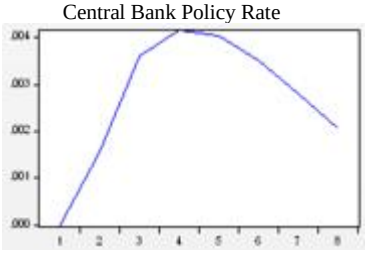
G.1. Structural Impulse Response Functions: Short Run Impact

Chile

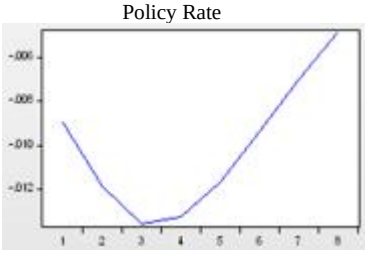
Figure G1.1 - Short Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

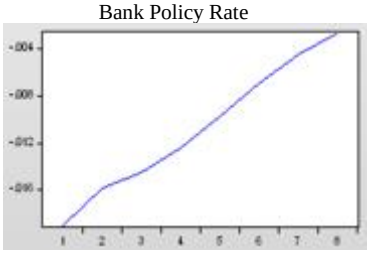
Response of Industrial Production to Central Bank Policy Rate



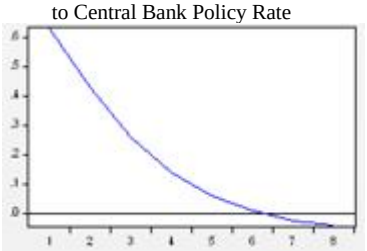
Response of Credit to Central Bank Policy Rate



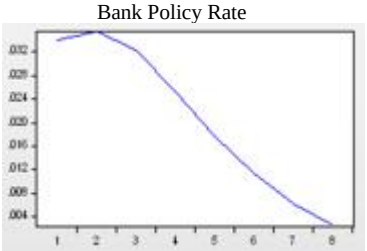
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

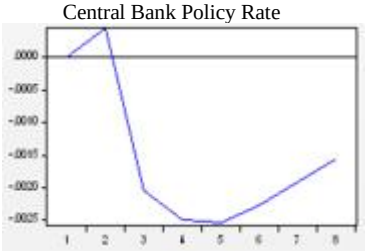


Colombia

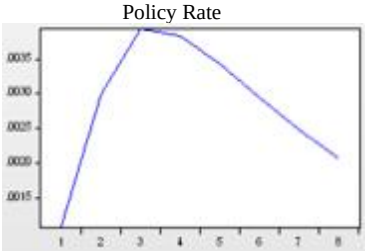
Figure G1.2 - Short Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

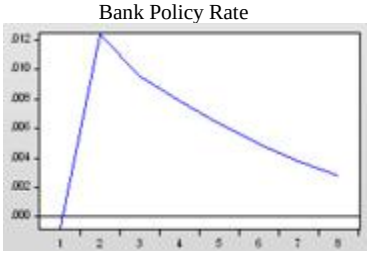
Response of Industrial Production to Central Bank Policy Rate



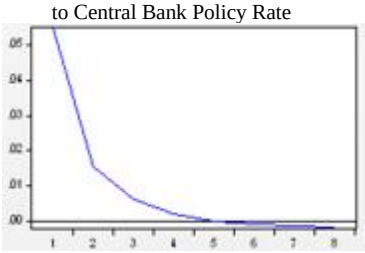
Response of Credit to Central Bank Policy Rate



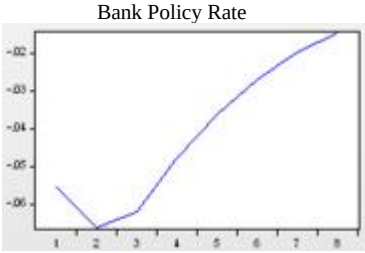
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

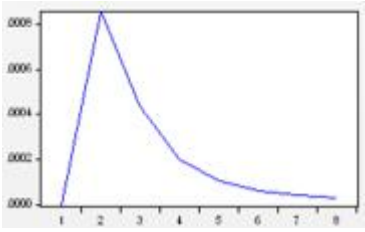


Japan

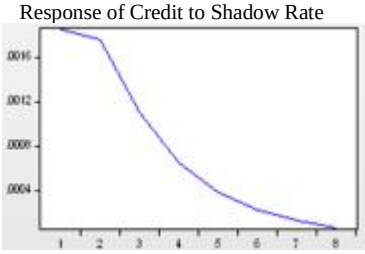
Figure G1.3 - Short Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

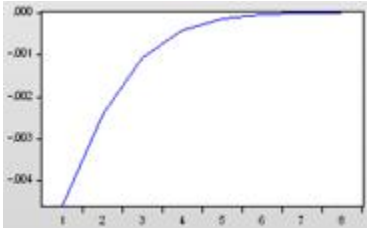
Response of Industrial Production to Shadow Rate



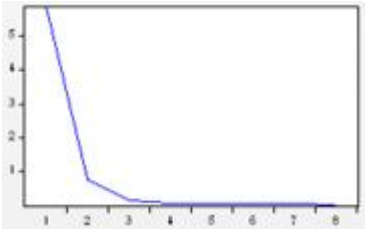
Response of Credit to Shadow Rate



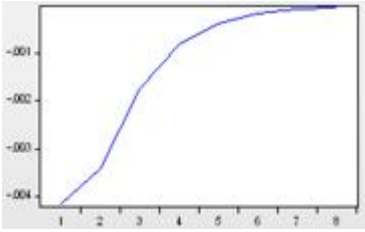
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

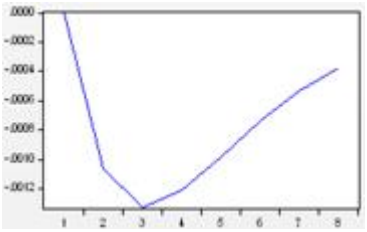


Portugal

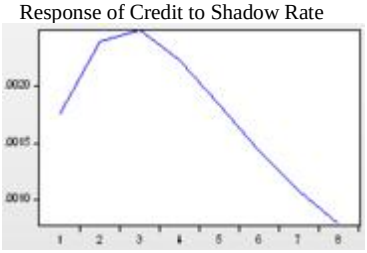
Figure G1.4 - Short Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

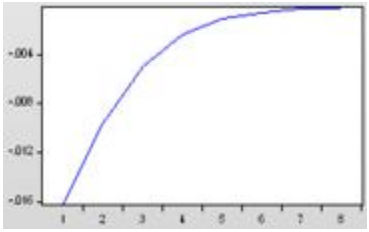
Response of Industrial Production to Shadow Rate



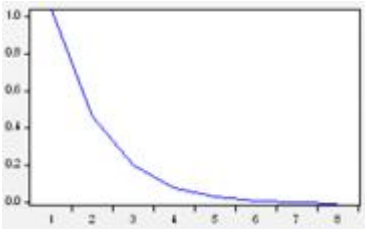
Response of Credit to Shadow Rate



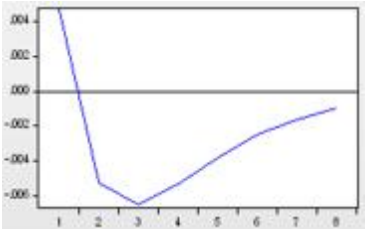
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

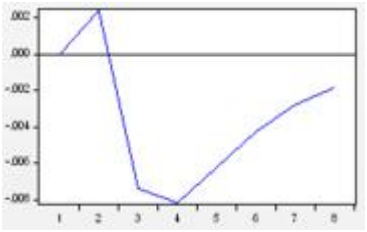


The UK

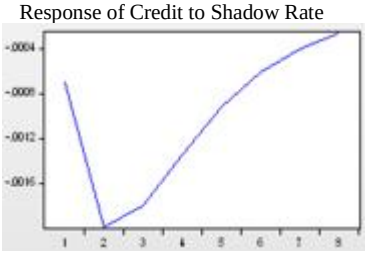
Figure G1.5 - Short Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

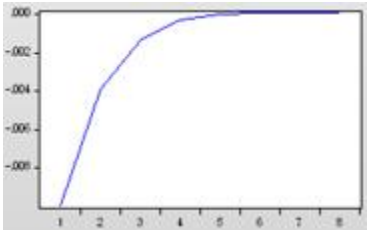
Response of Industrial Production to Shadow Rate



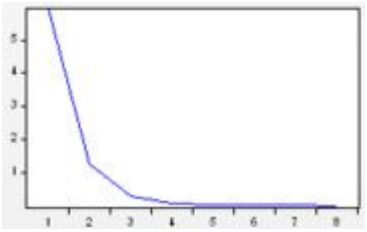
Response of Credit to Shadow Rate



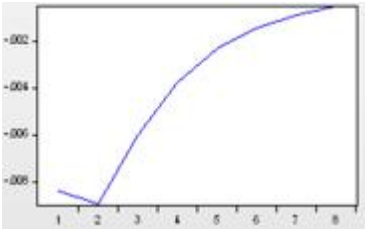
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate



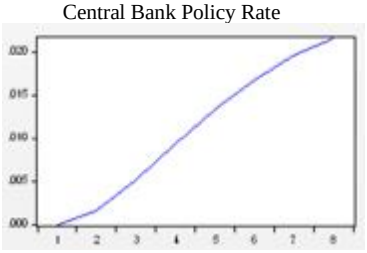
G.2. Cumulative Structural Impulse Response Functions: Long Run Impact

Chile

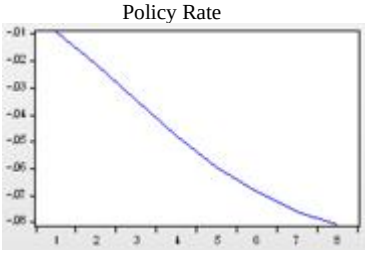
Figure G2.1 - Long Run Structural Impulse Response Function: Chile

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Chile to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

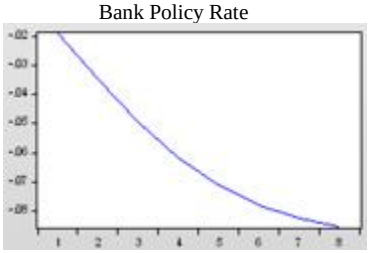
Response of Industrial Production to Central Bank Policy Rate



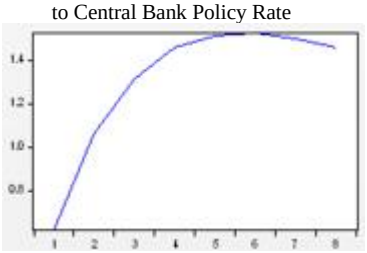
Response of Credit to Central Bank Policy Rate



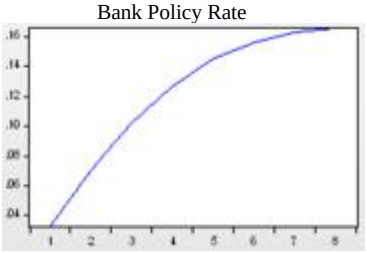
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

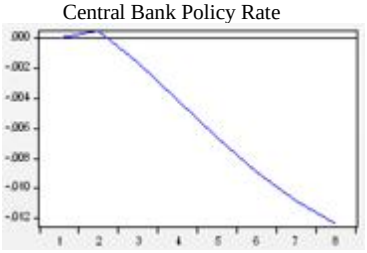


Colombia

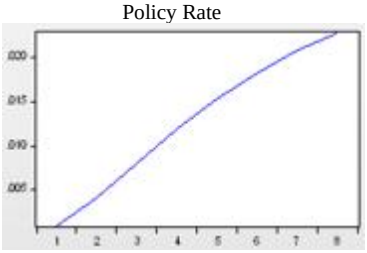
Figure G2.2- Long Run Structural Impulse Response Function: Colombia

Responses of industrial production, the Central Bank policy rate, credit, stock market and the exchange rate in Colombia to a Central Bank policy rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

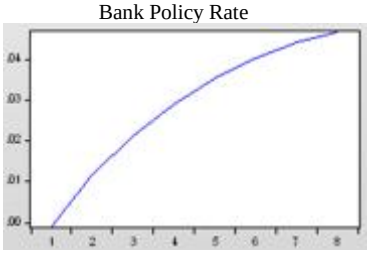
Response of Industrial Production to Central Bank Policy Rate



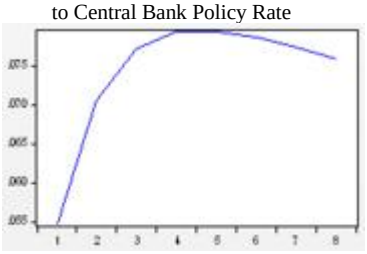
Response of Credit to Central Bank Policy Rate



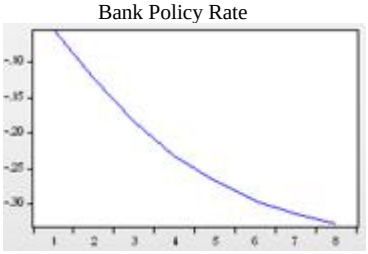
Response of Exchange Rate to Central Bank Policy Rate



Response of Central Bank Policy Rate to Central Bank Policy Rate



Response of Stock Market to Central Bank Policy Rate

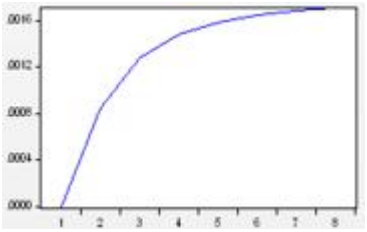


Japan

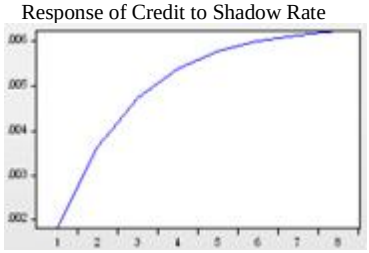
Figure G2.3 - Long Run Structural Impulse Response Function: Japan

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Japan to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

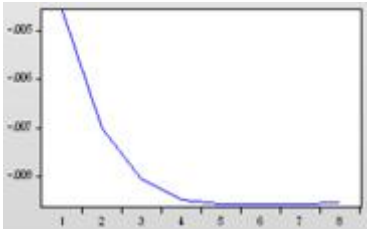
Response of Industrial Production to Shadow Rate



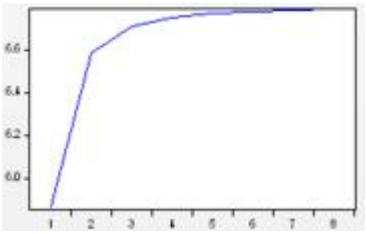
Response of Credit to Shadow Rate



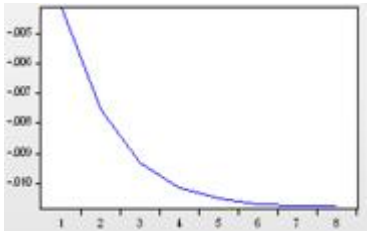
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



Response of Stock Market to Shadow Rate

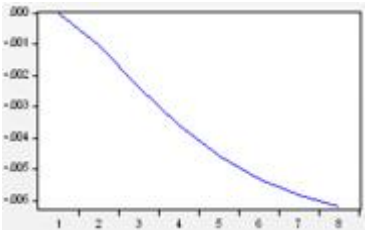


Portugal

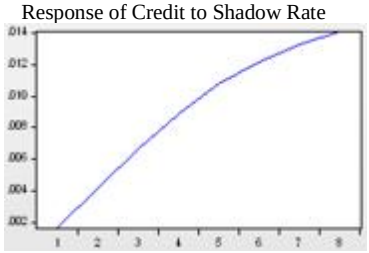
Figure G2.4 - Long Run Structural Impulse Response Function: Portugal

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in Portugal to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.

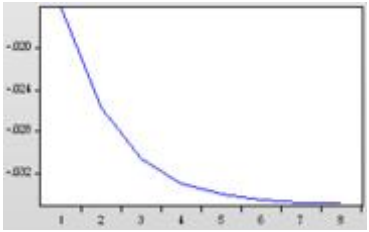
Response of Industrial Production to Shadow Rate



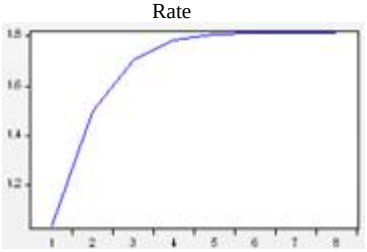
Response of Credit to Shadow Rate



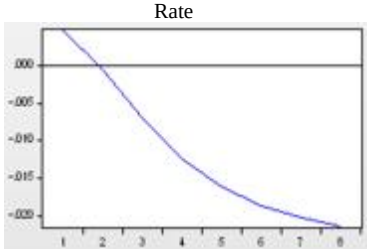
Response of Exchange Rate to Shadow Rate



Response of Shadow Rate to Shadow Rate



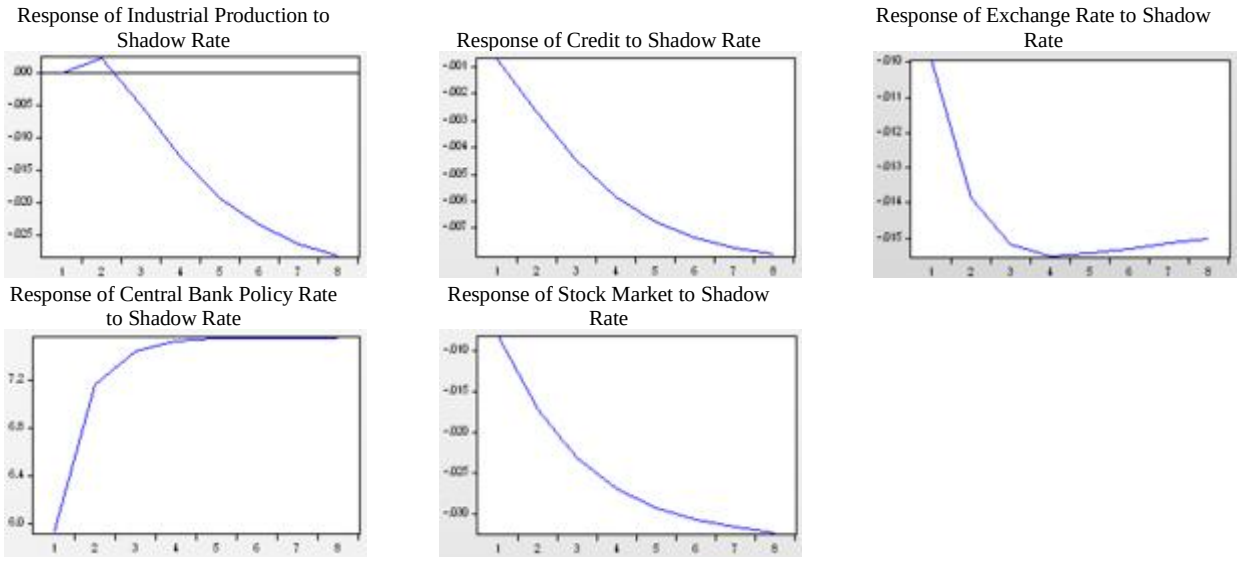
Response of Stock Market to Shadow Rate



The UK

Figure G2.5 - Long Run Structural Impulse Response Function: The UK

Responses of industrial production, the shadow rate, credit, stock market and the exchange rate in The UK to a shadow rate shock. A confidence interval of 2 standard deviations based on 1000 replications is included.



Note: Vertical Axes – the deviation from the baseline level
Horizontal Axes – the number of months after the shock
Source: Author's estimates based on Datastream and BIS statistics, IRFs generated in EViews.

2.13 Appendix H

H.1. List of Policy Choices Implemented in Chile, Colombia, Portugal, Japan and the UK

Chile

Dedollarization and dollarization events – 1959 to 1962

Partial dollarization - 1977 to 1982

Dedollarization and indexation – 1982 to 1983

Indexation – 1985 to 1989

Persistence of indexation – 1990 to 2000

Inflation targeting – 1991

Fully fledged inflation targeting – 1999

Free floating exchange rate - 1999

De-indexation – 2001

Reserve requirements allowing non-dollar reserves – 2008

No active reserve requirements – raise policy rates in times of capital inflows and reduce with outflows

Reserve requirements – 4.5%

Colombia

Pegged exchange rate – 1915 to 1931 (UK pound)

Pegged exchange rate – 1931 to 1993 (US dollar)

Free floating exchange rate – 1999

Inflation targeting – 1999

Marginal Reserve Requirements – 2007

Reserve Requirement Abolished – 2008

Portugal

Pegged exchange rate – 1928 to 1950s (UK pound)

Pegged exchange rate – 1992 to 1999 (US dollar)

Free floating euro exchange rate - 1999

Reserve requirements – 2% from 1999

Inflation targeting – 2003

Quantitative Easing – 2009

Reserve requirements – 1% from 2012

Extended Quantitative Easing Policies – 2016

Japan

Free floating exchange rate – 1973

Reserve requirements – 1.2% from 1991

Reserve requirements – 1.75% from 1986

Initial Quantitative Easing Policies (Not yet referred to as QE) – 1997 to 1998

Quantitative Easing – 2001

Extended Quantitative Easing Policies – 2010

Inflation targeting – 2013

Extended Quantitative Easing Policies – 2014

The UK

Reserve Requirement – 1971 to 1980

Reserve Requirement Abolished – 1981

Reserves averaging – 1981 to 2009

Inflation targeting – 1992

Free floating exchange rate – 1992

Interest on excess reserves – 2009

Quantitative Easing – 2009

Extended Quantitative Easing Policies – 2011

Extended Quantitative Easing Policies – 2016

Inflation targeting – 1992

Reference List

Afonso, A and Silva, J. 2019: Effects of Euro Area Monetary Policy on Institutional Sectors: The Case of Portugal. Cuadernos de Economia, 42 (120), 219-236..

Afonso, A and Sousa, R. 2011: The Macroeconomic Effects of Fiscal Policy in Portugal: a Bayesian SVAR Analysis. Portuguese Economic Journal 10 (1): 61-82.

Afonso, A and Sousa, R. 2012: The Macroeconomic Effects of Fiscal Policy. Applied Economics 44 (34): 4439-4454.

Allen, F and Gale, DM. 2007: An Introduction to Financial Crises. Wharton Financial Institutions Center Working Paper No. 07-20, Wharton Financial Institutions Center: Pennsylvania.

Angelos, K. 2010: A note on the relation between the equity risk premium and the term structure. Journal of Economics and Finance 34(1): 89-95, January, Springer, Academy of Economics and Finance.

Asriyan, V, Fornaro, L, Martin, A and Ventura, J. 2019: Monetary Policy for a Bubbly World. http://www.econ.upf.edu/~martin/AFMV.pdf, accessed 21 March 2020.

Bartov, E., and G.M. Bodnar. 1994: Firm valuation, earnings expectations, and the exchange rate exposure effect. Journal of Finance 44: 1755–1786.

Bernanke, BS and Lown, C. 1991: The credit crunch. Brookings Papers on Economic Activity 22, 205–248, https://www.brookings.edu/wp-content/uploads/1991/06/1991b_bpea_bernanke_lown_friedman.pdf, accessed 21 March 2020.

Borio, C. 2014: Monetary policy and financial stability: what role in prevention and recovery. BIS Working Papers 440, January 2014.

Caglayan, M, Mouratidis, K and Saeidinezhad, E. 2011: Monetary policy effects on output and exchange rates: Results from US, UK and Japan. Sheffield Economic Research Paper Series 2011016, Department of Economics, University of Sheffield: Sheffield.

Calvo, G and Reinhart, C. 2000: When capital inflows come to a sudden stop: Consequences and policy options. In Kenen, P, Swoboda, A (eds.). Reforming the International Monetary and Financial System. International Monetary Fund, Washington, D.C.

Catão, LAV and Pagan, A. 2011: The Credit Channel and Monetary Transmission in Brazil and Chile: A Structural VAR Approach. Working Papers Central Bank of Chile 579, Central Bank of Chile.

Cavallari, L. 2001: Current Account and Exchange Rate Dynamics. Economic Notes 30(1): 27-51.

Cocriş, V and Nucu, AE. 2013: Monetary policy and financial stability: empirical evidence from Central and Eastern European countries. Baltic Journal of Economics 13(1): 75-98.

Clarida, R and Galí, J. 1994: Sources of real exchange rate fluctuations: how important are nominal shocks? Carnegie Rochester Conference Series on Public Policy 41: 1-56.

Crockett, AD. 1997: Why is financial stability a goal of public policy. Economic Review 82 Q(IV): 5-22.

Dhrymes, PJ and Dimitrios, TD. 1997: Structural VAR, MARMA and Open Economy Models. Columbia University Discussion Paper 9798-07, Columbia, New York, https://core.ac.uk/download/pdf/161436576.pdf, accessed 21 March 2020.

Drehmann, M, Borio, C and Tsatsaronis, K. 2011: Anchoring countercyclical capital buffers: the role of credit aggregates. BIS Working Papers 355, November 2011, Bank for International Settlements: Basel, Switzerland.

Eichenbaum, M and Evans, C. 1995: Some Empirical Evidence on the Effects of Monetary Policy Shocks on Exchange Rates. Quarterly Journal of Economics 110, 975–1009.

Eichengreen, B and Gupta, P. 2015: Tapering talk: The impact of expectations of reduced Federal Reserve security purchases on emerging markets. Emerging Markets Review 25(C): 1-15.

Elbourne, A. 2008: The UK Housing Market and the Monetary Policy Transmission Mechanism: An SVAR Approach. Journal of Housing Economics 17: 65-87, https://doi.org/10.1016/j.jhe.2007.09.002, accessed 21 March 2020.

Fama, E. 1981: Stock Returns, Real Activity, Inflation, and Money. The American Economic Review 71(4): 545-565.

Faust, J and Rogers, J. 2003: Monetary Policy's role in exchange rate behaviour. Journal of Monetary Economics: 1-54.

Geske, R and Roll, R. 1983: The Fiscal and Monetary Linkage Between Stock Returns and Inflation. The Journal of Finance 38(1): 1-33.

Gourinchas PO and Obstfeld M. 2012: Stories of the Twentieth Century for the Twenty-First. American Economic Journal: Macroeconomics 4(1): 226-265.

Granville, B and Mallick, S. 2009: Monetary and financial stability in the euro area: Pro cyclicality versus trade-off. Journal of International Financial Markets, Institutions and Money 19(4): 662–674.

Grilli, V and Roubini, N. 1996: Liquidity models in open economies: Theory and empirical evidence. European Economic Review, 40: 847-859.

Hacker RS, Karlsson HK, Månsson, K. 2012: The relationship between exchange rates and interest rate differentials: a wavelet approach. World Econ 35(9):1162–1185.

Hurwicz, L. 1962: On the Structural Form of Interdependent Systems. In: Logic, Methodology and Philosophy of Science: 232–239. Stanford University Press: Stanford, CA.

Inoue, A and Rossi, B. 2019: The effects of conventional and unconventional monetary policy on exchange rates. Journal of International Economics 118(2019): 419-447.

Ivanov, V and Kilian, L. 2001: A Practioner's Guide to Lag-Order Selection for Vector Autorgressions. CEPR Discussion Papers 2685, C.E.P.R. Discussion Papers, Centre for Economic Policy Research: London.

Jiménez, G, Ongena, S, Peydró, JL and Saurina, J. 2012: Credit Supply and Monetary Policy: Identifying the Bank Balance-Sheet Channel with Loan Applications. American Economic Review 102(5): 2301-2326, American Economic Association August.

Jordà, O, Schularick, M and Taylor, A. 2011: Financial crises, credit booms, and external imbalances: 140 years of lessons. IMF Economic Review 59(2): 340–378.

Jordà, O, Schularick, M, and Taylor, AM. 2013: When Credit Bites Back. Journal of Money, Credit and Banking 45 (s2): 3–28.

Kim, S. 2001: International transmission of U.S. monetary policy shocks: Evidence from VAR's. Journal of Monetary Economics 48(2): 339-372.

Kim, K. 2003: Dollar Exchange Rate and Stock Price: Evidence from Multivariate Cointegration and Error Correction Model. Review of Financial Economics 12: 301 313.

Kim, S and Roubini, N. 2000: Exchange rate anomalies in the industrial countries: A solution with a structural VAR approach. Journal of Monetary Economics, 45(3): 561-586.

Krippner, Leo. 2013: Measuring the Stance of Monetary Policy in Zero Lower Bound Environments. Economics Letters 118: 135–38.

Krippner, Leo. 2015: Zero Lower Bound Term Structure Modelling: A Practitioner's Guide. Palgrave-Macmillan.

Kryvstov, O, Molico, M and Tomlin, B. 2015: On the nexus of monetary policy and financial stability: Recent developments and research. Bank of Canada Discussion Paper 2015-7: Bank of Canada, Ottawa.

Lee, J and Chinn, M. 2002: Current Account and the Real Exchange Rate Dynamics in the G-7 Countries. IMF Working Paper WP/02/130: Washington, D.C.

Litterman, RB. 1979: Techniques of Forecasting Using Vector Autoregressions. Federal Reserve Bank of Minneapolis Working paper 115, Federal Reserve Bank of Minneapolis: Minnesota, U.S.

Najand, M. and Noronha, G. 1998: Causal relations among stock returns, inflation, real activity, and interest rates: Evidence from Japan. Global Finance Journal 9(1): 71-80.

Nakahira, K. 2009: A structural VAR analysis of the monetary policy stance in Japan. The International Journal of Economic Policy Studies 4(5).

Ouhibi, S. and Hammami, S. 2015: Determinants of Non-performing Loans in the Southern Mediterranean Countries. International Journal of Accounting and Economic Studies, 3(1): 50-53.

Park, D, Ramayandi, A and Shin, K. 2016: Capital Flows during Quantitative Easing and Aftermath: Experiences of Asian Countries. Emerging Markets Finance & Trade 52 (4): 886–903.

Parrado, E. 2001: Effects of Foreign and Domestic Monetary Policy in a Small Open Economy: The Case of Chile. Central Bank of Chile Working Papers 108, Central Bank of Chile: Huérfanos.

Restrepo, JE. and Rincon, H. 2006: Identifying Fiscal Policy Shocks in Chile and Colombia. http://ssrn.com/abstract=2005164, accessed 4 April 2020.

Robinson, J. 1952: The Generalisation of the General Theory. In the Rate of Interest, and Other Essays 2, Macmillan: London.

Schenck, D. 2016: Structural Vector Autoregression Models. The STATA Blog, 20 September 2016, https://blog.stata.com/2016/09/20/structural-vector autoregression-models/, accessed 5 August 2019.

Schenkelberg, H and Watzka, S. 2013: Real effects of quantitative easing at the zero lower bound: Structural VAR-based evidence from Japan. Journal of International Money and Finance 33: 327-357.

Schularick, M and Taylor, A. 2012: Credit booms gone bust: Monetary policy, leverage cycles, and financial crises: 1870–2008. American Economic Review 102: 1029-1061.

Sims, CA. 1980: Macroeconomics and Reality. Econometrica 48 (1), 1–48.

Sims, CA. 2002: Structural VAR's. Econ. 513, Time Series Econometrics, Fall 2002, https://uh.edu/~bsorense/SimsVARS.pdf, accessed 22 March 2020.

Sousa, RM. 2014: The effects of monetary policy in a small open economy: the case of Portugal. Applied Economics 46(2): 240-251.

Yang, SY and Doong, SC. 2004: Price and Volatility Spillovers between Stock Prices and Exchange Rates: Empirical Evidence from the G-7 Countries. International Journal of Business and Economics 3(2):139-153, August, School of Management Development, Feng Chia University: Taichung, Taiwan.

Yanoy, K and Yoshinoz, N. 2009: Japanese Monetary Policy Reaction Function and Time Varying Structural Vector Autoregressions: A Monte Carlo Particle Filtering Approach.
https://pdfs.semanticscholar.org/2595/b8e647256f4e28d2df7c02cfce0f961b8323.pdf_ga=2.265536966.898582935.1586039441-563876310.1586039441, accessed 4 April 2020.

Chapter 3

The Role of Central Banks and the Political Environment in Financial Stability: A Few Case Studies

Chile, Colombia, Japan, Portugal and the UK

3.1. Introduction

On 15 September 2008, the Great Recession entered a critical phase when Lehman Brothers filed for bankruptcy. The financial crisis was preceded by a period known as the Great Moderation, which saw the US experience a period of major financial deregulation. Financial instability and the subsequent credit crunches experienced by a number of countries following two decades of global structural reforms highlighted the importance of stabilising credit supply and assigning a higher importance to financial stability. Although many EMEs such as those in Latin America started to assign a higher importance to financial stability following earlier crises experienced by the region in the early 1990s, the financial stability of AEs only became a concern during the financial crisis when AEs failed to contain and prevent the damage caused.

As Latin American economies continue to become more open and integrated in global markets, the study of the financial stability of these countries becomes paramount. Additionally, in light of the consequences of the GFC and the somewhat limited reach of conventional monetary pool tools in recent times, the study of the financial stability as well as the use of alternative policy frameworks of the AEs in this analysis is fundamental. The level of CBI is the degree of direct influence that the government and politicians have over monetary policy decisions. Higher levels of CBI are generally associated with increased

transparency and in turn, improved institutional quality. In this chapter, higher levels of CBI indicate a greater degree of monetary policy freedom. Maxfield (1997) points out that while only three Central Banks became legally independent in the 1980s, the 1990s saw more than thirty Central Banks become legally independent. Cukierman (2008) notes that, "during the forty years ending in 1989 there had hardly been reforms in CB legislation". Further, Fernández-Albertos (2015) shows that the majority of reforms occurred during the 1990s.

In this chapter, I look at the structure and functioning of Central banks in two Latin American countries namely, Chile and Colombia, two European countries namely, the UK and Portugal and one Asian country namely, Japan. I then consider the political environment and the financial stability of these countries, I substantiate the discussion with a brief empirical analysis of the effect of CBI on credit growth using an existing database created by Romelli (2018). Our main results show that there is a positive relationship between credit growth and the level of CBI due to the positive and statistically significant coefficient on the interaction term between growth in domestic credit to the private sector and the level of CBI for the cases of Portugal and the UK for the second regression equation. When considering domestic credit by deposit money banks and other financial institutions, the interaction term is positive and statistically significant for the cases of Chile, Portugal and the UK for the second regression and the UK for the third regression equation. A number of robustness checks show that the coefficient is positive and statistically significant for a number of cases when implementing a variety of estimation methods. Indeed, lending booms are needed to ensure financial development in the form of increased intermediation (permanent capital deepening) on the part of banks. However, banking crises are often preceded by periods of intense credit growth in which capital deepening is not permanent.[12] Fluctuations in credit growth are larger for higher levels of CBI and hence, in periods of financial instability or ultimately financial crises, CBI would be reined back in an effort to re-establish financial stability.

The rest of the chapter is as follows, Section 2 discusses the Central Bank setting and Section 3 discusses both the political environment and the financial stability in these countries, Section 4 makes use of a simple empirical analysis to substantiate the discussion and lastly, Section 5 concludes.

[12] See Gourinchas et al. (2001).

3.2. The Central Banks

According to Bernhard (2002), CBI is the ability of the Central Bank to control monetary instruments. Bernhard (1998, 2002) also points out that economic integration may lead to intra-party conflict over monetary policy that could in turn damage the stability of the government. At the same time CBI may remove intra-party conflicts over monetary policy and as such may be viewed as a channel by which cabinet stability and durability may increase. Bodea and Hicks (2015), Cukierman (1992), Cukierman et al. (1992), Cukierman et al. (2002), Persson and Tabellini (1990) and Rogoff (1985) all show that CBI has the ability to stabilise the economy by decreasing inflation, reducing inflation volatility, reducing uncertainty in the economy and increasing monetary policy credibility. Independent Central Bank countries are also more likely to maintain or attract capital inflows during interwar periods as investors have confidence in the lack of political motives behind the pegging with gold (Simmons, 1994). Garriga (2016) finds that lower-middle income and low-income countries had more stable levels of CBI throughout the period between 1970 and 2012.

The five countries analysed all have somewhat autonomous Central Banks. According to the CBI index used in this chapter, BdP is the most independent Central Bank in the sample, *Banco de la República* is the most independent when considering the two Latin American countries in the sample and Bank of Japan is the least independent. All five Central Banks act as a lender of last resort and the main objective of all five Central Banks is the achievement of price stability by controlling monetary supply and interest rates. However, four of these Central Banks are also responsible for the maintenance of a stable financial system by ensuring the settlement of funds amongst banks and other financial institutions. The governor of the *Banco de la República* is not accountable for financial stability as it is considered to be beyond the scope of the Central Banks' mandate. All five countries have Deposit Insurance Systems[13] which, are designed to minimise or eliminate depositors' risk when depositing funds in bank accounts. The existence of this guarantee ties in with the lender of last resort function.

BCCH was established with a degree of operational independence in August 1925. The BCCH adopted a partial inflation-targeting framework for monetary policy in 1990 and in 1999, the

[13] The Deposit Insurance Systems in Colombia, Japan and the UK belong to the International Association of Deposit Insurers as of April 2020.

Central Bank fully adopted an inflation-targeting framework in combination with a flexible exchange rate regime. Adopting a flexible exchange rate regime removes the BCCH's ability to intervene in the market when atypical circumstances present themselves. In the years leading up to an independent monetary policy for the BCCH, fiscal policy was given preference in decision making which resulted in periods of extreme inflation due to the inability to implement an effective stabilisation policy (Marshall, 2003). Looking at the opposite side of the coin, sustainable monetary policy aimed at maintaining price stability may lead to both lower inflation and lower output volatility. In 1975, the Monetary Council was established, the orderly and progressive development of the national economy took place and the autonomy of the Central Bank was legally established. In 2007, the maintenance of annual inflation of the CPI at a level of 3 percent with a 1 percent leeway in each direction became the main objective of the BCCH.

The Colombian Central Bank (*Banco Nacional*) was established in 1880 and served as the government's banker and the issuer of the national currency. The Law of the *Banco de la República* (Law 31) states that "*Banco de la República* is a legal entity of the public law, which will continue functioning as a state-owned body of the constitutional rank, with a legal regimen of its own, with its own and special nature, and with administrative, patrimonial and technical autonomy". A number of structural reforms have been implemented over the past three decades in an effort to promote and ensure greater independence of *Banco de la República*. The most important reform was the decision to prioritise inflation control and hence to preserve the currency's buying power although, the consideration and co-ordination with general economic policy remained important. The Central Banks' mandate of maintaining price stability is established at a constitutional level in Colombia with the main monetary instrument used in monetary policy being the Repo interest rate.

The BoJ was established with the Bank of Japan Act of 1882 in an effort to centralize currency production although the *yen* had been established earlier with the New Currency Act of 1871. In 1949, the Policy Board was established, the Policy Board is the highest decision-making body within the Bank. The BoJ Act of 1942 stated that, "the regulation of the currency, control and facilitation of credit and finance, and the maintenance and fostering of the credit system, pursuant to national policy, in order that the general economic activities of the nation might be

adequately enhanced", are the objectives of the BoJ. Revisions to the BoJ Act in 1997 gave the CBI as it originally acted as a branch of the Japanese government and today, the Bank is neither a governmental agency nor a private corporation. The BoJ introduced a price stability target in 2013 namely, an inflation rate target of 2 percent. Lastly, the Bank is responsible for upholding confidence in the currency.

BdP was established in 1846 by the Decree of 19 November 1846 and served as the country's Central Bank until 1999. Although it still acts as its own entity, it is now a member of the ESCB and as such pursues the objectives of the ESCB. 1931 saw a new era for banking rules in which the growth of liabilities of BdP was limited to a proportion of the amount held in foreign reserves, this resulted in improved monetary control, as the Bank was no longer able to freely finance the government. The Bank became increasingly more dependent on the government for administrative purposes and started to pursue both fixed interest and fixed exchange rates. By 1960, laws had been approved that required banks to hold minimum cash reserve balances and also gave BdP the power to intervene in both credit control and interest rate movements. BdP was founded as a public limited company and was nationalised in 1974. The Organic Law of 15 November 1975 redefined BdP's functions and officially gave the Bank the role of Central Bank, the Bank was also given the power to supervise the banking system. The Organic Law of October 1990 increased the independence of board members and the Organic Law of January 1998 reinforced the independence of BdP. The CCR contains credit related information and is managed by BdP. BdP is responsible for the regulation of banking activities in Portugal as well as ensuring the stability, efficiency and robustness of the financial system.

The delegation of interest rate responsibility to the BoE in 1997 meant that the Bank became politically independent and now, the BoE is responsible for the setting of monetary policy and hence, the maintenance of monetary stability and the maintenance of financial stability. The BoE works closely with the Treasury who is responsible for economic and financial policy. The MPC which, is a division of the BoE, is responsible for interest rate decisions with the aim of achieving the inflation target established by the Chancellor of the Exchequer. As a whole, the BoE says that its role is "Promoting the good of the people of the United Kingdom by maintaining monetary and financial stability", the 1988 BoE Act confirms this by stating that

the Banks' top priority is achieving price stability.[14] The Bank's position as a lender of last resort once again became apparent in 2007 when the BoE acted as a lender of last resort to Northern Rock following a bank failure. The BoE and the PRA published discussion notes on proposals in October and December of 2018 in preparation for the UK's departure from the EU in an effort to ensure that the legal framework is well established at the time of the UK's departure from the EU.

3.3. The Political Environment and Financial Stability

Bernhard and Leblang (2002) and Clark et al. (2013) show that CBI may have important political consequences. Eijffinger and de Haan (1996)[15] discuss the three dimensions of CBI namely, financial, personnel and policy independence. King (2003) points out that politicians now have a reduced number of instruments available as they have transferred monetary policy control to unelected Central Bankers. Unfortunately, an independent Central Bank does not necessarily shield the Central Bank from the influence of the government and threats to CBI still exist (Lohmann, 1998).

McNamara (2002) points out that Central Banks remain resolutely political and partisan institutions due to policy making which has identifiable and important distribution effects. Berman and McNamara (1999) mention that democratic accountability may be of concern when Central Banks are responsible for monetary policy as Central Bankers are not elected by the public and hence, are not accountable to the public. Many politicians choose to artificially stimulate the economy in the lead up to elections, Clark et al. (1998) point out that politicians who hope to maximize their votes will favour the ability to influence monetary policy and hence, will not choose to have an independent Central Bank, which limits their ability to affect monetary policy. In more recent times, due to financial and economic integration, political leaders are held accountable to foreign markets and the independence of Central Banks has once again become attractive (Keohane and Milner, 1996).

[14] Price stability in the case of the BoE is defined as an inflation rate of 2 percent per annum.
[15] Financial independence refers to the government's ability to use Central Bank loans to fund expenditures, to avoid monetary policy subordination (Garriga, 2016). Personnel independence deals with the ability of the government to influence the board membership of the Central Bank. Policy independence refers to the Central Bank's ability to formulate, specify, execute or set goals for monetary policy (Debelle and Fischer, 1995).

Empirical studies by Vernon (1983), Shan (1991) and Kim and Hwang (1992) identify a negative relationship between political and economic risks and the level of ownership in the foreign investment. Hennart (1988) and Hill et al. (1990) find that the utilisation of lower ownership models in host countries exhibiting higher political risk and uncertainty may reduce the level of host country risk and transaction costs. On one hand, De Haas et al. (2011) shows that multinational bank subsidiaries reduce lending more drastically than domestic banks. On the other hand, Navaretti et al. (2010) find that multinational banks maintained stable loan-to-deposit ratios and hence, acted as a stabilizing agent in Europe and De Haas and Van Lelyveld (2006) show that during local crises, foreign bank lending is typically more stable than domestic bank lending in emerging European countries

3.3.1. Chile

The dictatorship saw Chile become one of the most open economies of the developing world.[16] The economic reforms implemented during President Allende's rule set the basis for the major investment and growth that the country experienced in the early 1990s. This military government was also responsible for the abolishment of a democratic political tradition and at the heart of multiple human rights violations. In March 1990, Chile returned to a democracy, following the seventeen-year dictatorship, when Christian Democrat Patricio Aylwin was elected. The remnants of a dictatorship continued to influence the democratic government for almost a decade. The turn of the century saw the democratic process become more resilient and in 2005, the senate approved changes to Pinochet's constitution. August 2006 saw Beijing sign its first South American free-trade deal[17] and by 2017, the binomial voting system[18] was also abandoned resulting in a fully democratic election process. Pinochet's economy was extremely successful due to the lifting of the U.S. trade sanctions against the Allende government. The election of President Sebastian Pinera in 2017 has resulted in improved economic circumstances, decreased unemployment and an overall feeling of certainty.

[16] "Neoliberalism is generally associated with policies like cutting trade tariffs and barriers. Its influence has liberalized the international movement of capital, and limited the power of trade unions. It's broken up state-owned enterprises, sold off public assets and generally opened up our lives to dominance by market thinking." (Birch, 2017)

[17] Chile and China sign a free-trade deal.

[18] Each district elects one representative from the largest two political parties unless the most popular party is twice as popular as the second most popular party. Critics claim that a binomial election process is undemocratic as it makes it more difficult for smaller political parties to gain parliamentary seats and the views of the general public are not necessarily reflected.

Laeven and Valencia (2012) show that Chile has not experienced a systematic banking crisis since 1982. This may be an indicator of at least some level of financial stability. The financial crisis at the beginning of the 1980s can be attributed to an unstable macro policy framework combined with a liberalised and privatised banking system, which lacked both regulation and supervision. The late 1970s saw erratic capital inflows due to the open capital account and the fixed exchange rate. As is the experience of many Latin American countries leading up to and during a crisis, the banks' low-quality credit supply boomed as a result of lax lending standards. An increase in the number of currency mismatches led to the collapse of banks following the abandonment of the fixed exchange rate regime, which, in turn brought the Chilean economy to an abrupt halt. Laeven and Valencia's dataset shows that the Chilean financial crisis of 1982 had a fiscal cost of 43 percent of GDP, an output loss of 8.6 percent and an 88 percent (of GDP) increase in public debt.

The Chilean *peso* is known as a 'commodity currency' and currency movements in the past have generally followed the movements in copper prices. Chile's position as a commodity exporter increases the country's vulnerability to capital inflows and spillovers. Therefore, macroprudential policy tools are needed to address these risks, pension funds have already successfully stabilized non-resident capital flows. The Chilean policy makers have chosen to adapt a simplistic macroeconomic and macrofinance stance. Because of this they abstain from actively updating their position. Rodriguez-Delgado et al. (2013) focus on the recovery of Brazil and Chile and find that while Chile's GDP is 3.5 percent below the pre-crisis trend, Brazil's GDP is significantly lower at 11 percent below the pre-crisis trend level.

Between 1996 and 2012, both the Chilean *peso* and Chilean home prices appreciated significantly. Chilean policy makers felt that although the deficit would need to be monitored, the strong domestic demand had sustained imports (exports were weakened by abnormally high copper prices and lower demand in trade partners). The deficit was not severe enough to cause any immediate or near-term stability risk. Kamil and Rai (2010) found that multinational banking subsidiaries that relied on domestic deposits were a stable credit source during the global crisis for Latin American countries. The availability of credit allows businesses to fund profitable projects and to improve their investment prospects. Further, the availability of credit gives households the opportunity to smooth consumption over their life cycle. However, excess

credit and lax lending standards could potentially lead to higher credit delinquency ratios, excessive leverage, maturity mismatches and the general erosion of the financial system.

3.3.2. Colombia

Multiple Liberal and UP presidential candidates were murdered upon drug cartel instruction in 1989. As a result, Cesar Gaviria was elected on an anti-drug platform. Political peace seemed to be a real possibility. Colombian citizens, in a manner unmatched in Latin America, tend to resort to violence when political differences present themselves. Three presidential candidates were assassinated during the 1990 presidential campaign and many others had attempts made on their lives. In particular, the assassination of Luis Carlos Galan shook the country and resulted in university students organizing a *Marcha del Silencio* as a means of protesting against indiscriminate violence. Although a new constitution was written in 1991 in an effort to restore peace, several guerrilla groups re-entered the political arena. To make a precarious situation even worse, drug lords had taken over as the main threat to both political and social instability.[19]

The credit boom in Colombia (and other Latin American countries) in the early 1990s led to an increase in the number of households taking out mortgages which, in turn led to a large increase in house prices. As household leverage and financial burden increased, the support for higher home prices decreased and prices began to plummet. In 1998 and 1999, Colombia experienced a credit crunch and faced extreme financial instability and systematic risk. By the early 2000s, 20 percent of all mortgages in Colombia were not performing and banks had an indirect exposure to exchange rate risk due to unhedged borrowers. Government indebtedness grew and currency mismatches presented themselves leading to the deepest recession that Colombia had experienced in history. As discussed in King (2003), Mosley (2000) points out that policy details were not a major concern in the past. Instead, broad macroeconomic indicators were used to assess the global financial markets. Although this may have been true in the past, the systematic crises experienced in Latin America made policy makers aware of the need to focus on policy details. In an effort to prevent future crises and to limit systematic risk, the Colombian government chose to implement macroprudential policy.

[19] FARC was formally disbanded in 2017.

Colombia relies heavily on exports; has a small, open and banking orientated economy and low levels of domestic savings[20]. In the early 1990s, the Colombian government implemented a series of structural reforms with the aim of promoting economic openness and financial liberalisation. By the late 1990s, the country experienced one of the most severe financial crises in Colombian history as both financial operations as well as interest rates became less restricted. Colombia's increased openness facilitated a large amount of capital inflows, which in Colombia are highly and positively correlated with credit supply.[21]

3.3.3. Japan

During the Meiji Restoration, Japan experienced a political system that relied on uncompetitive domestic forces and a less than ideal set of incentives for politicians. The Japanese described their country as having a "first-rate economy and third-rate politics (*keizai irchiryu, seiji sanryu*)" (Rosenbluth and Thies, 2010). More recently, Japan's new electoral rules established during 1994 have led to global integration and a more open work environment. Ito (1990) finds that there is evidence that Japanese election timings are influenced by growth and inflation circumstances. In an effort to sway voters, elections tend to be called in high growth and low inflation periods. Yet, there is no influence of international variables such as exchange rates and foreign reserves on the timing of general elections or local economic performance.

The new electoral system has also resulted in higher electoral volatility as prime ministers have rotated on an almost annual basis since 2006 (Kushida and Shimizu, 2013). This ultimately counteracts the enhanced global integration and openness and this political instability spills over to the economy. Shinzo Abe became the prime minister of Japan in 2012 when the LDP once again won the national election; he was re-elected in 2014 and 2017. Abe has implemented a 'three-arrow' economic framework known as 'Abenomics'[22] aimed at boosting the Japanese economy. Improved economic growth and a strong stock market resulted in Abe's approval rating increasing to 70 percent. Unfortunately, political disagreements still exist, a prime example being the spiralling Senkaku/Diaoyu islands dispute. This resulted in the exports to China falling by 14.5 percent between June and November 2012. Japan's electoral system

[20] See Uribe (2012).
[21] See Carrasquilla et al. (2000), Tenjo & Lopez (2002), Villar et al. (2005) and Uribe (2012).
[22] The 'three arrows' of this economic framework are monetary easing, a flexible fiscal policy and structural reform and to date, the framework has been somewhat successful at stabilizing the *yen* exchange rate, improving consumer confidence and improving the integration of the stock market.

weakens the power of trade unions and may result in stubborn income inequality for years to come as the two largest political parties compete against one-another for the median vote. Although political debates now take place, public participation in elections is still low and many Japanese still feel a lack of trust and pride in both the political system and the country.

A stronger, floating currency, asset deflation, and economic stagnation[23] combined with the low demand for Japanese products led to a systematic crisis in 1997. By 1997, Sanyo Securities and a number of financial institutions went bust as panic flooded the Japanese financial system. To add to this, Japan relies heavily on the export of cars and technology. When worldwide demand for Japanese exports decreased during the global crisis, Japan entered its first recession since 2002. To make matters worse, the 2011 Tsunami, increased the reliance on imports as all nuclear reactors[24] in Japan were closed down and energy supply was reduced. The Japanese financial system is sensitive to heightened financial risks from abroad and in October 2016, many factories across the globe, including those in Japan, decreased production as demand started to slow down in the face of the US-China trade war, slower global growth and political uncertainty in the presence of Brexit. The lower demand and slower production resulted in reduced exports.

Hoshi and Okazaki (2002) note that the MoF was more concerned about rising real estate prices and the relationship with income distribution than the relationship between credit supply growth and financial instability. Real estate prices and credit supply continued to grow as the MoF failed to decisively implement measures or regulation to curb this. 'Shadow Banking' also emerged in Japan in a similar way to the 'Shadow Banking' system in the US whereby Japanese banks provided credit to non-banking financial institutions who in turn provided real estate projects with credit. The use of the 'Shadow Banking' system continued to increase as the MoF's recommendations on credit supply in the regulated banking sector became stricter. Japanese policy makers tend to implement the necessary policies after the fact instead of as a preventative measure which raises questions about the policy makers forecasting methods or policy choice implementation strategy[25]. A large portion of Japanese national debt is held by

[23] Dekle and Kletzer (2003) and Brewer et al. (2003) attribute the poor economic growth to financial sector or banking sector problems.
[24] Basic Energy Plan may reduce the country's reliance on nuclear power.
[25] Kanaya and Woo (2000) point out that the hesitation of authorities in implementing measures was caused by the fear that the banking sector would be plunged into a state of panic.

domestic lenders. These are large financial institutions that are dependent on the Japanese government for continued protection (Kushida and Shimizu, 2013). In this way the economy is protected from swings in the exchange rate and global financing conditions which would see the value of debt payments increase drastically.

3.3.4. Portugal

The Salazar era (*Estado Novo*[26]) left Portugal isolated from the global political scheme as the country's third world status deepened in a European context. The Carnation Revolution in 1974 led to the restoration of democracy in Portugal. Still, this rapid liberalisation and leadership confusion resulted in 'democratic chaos' as both political and economic plans failed under a wave of corruption and extremists. Prime Minister Cavaco Silva denationalised the state-owned banks and other public enterprises in 1989 as privatisation, economic deregulation and tax reform became the primary focus of public policy in the lead up to EU membership. Double-digit growth and low unemployment was achieved in Portugal in the late 1980s and the early 1990s as a large infusion of capital was used in an effort to rescue the economy. Prime Minister Socrates was at the centre of the €78 billion bailout from the European troika as Portuguese unemployment soared, government bond yields reached double digit territory and the fiscal deficit increased. This bailout resulted in higher taxes on corporate income. President Rebelo de Sousa was elected in 2016 and campaigned to heal the discord caused by the debt crisis of 2011 to 2014. By the end of 2016, the Portuguese economy was the fastest growing in Europe. Today, both the political and economic situation of Portugal has stabilized as y-o-y growth continues to improve and unemployment reached a ten-year low of 8.5 percent in the third quarter of 2017.

The Portuguese economy experienced strong growth between the 1930s and the early 1960s as the credit worthiness improved and the fiscal budget recovered. In 1960, Portugal joined the EFTA; the following year Portugal joined the IMF and the World Bank; and in 1962, Portugal joined the GATT. Economic growth became even more important when guerrilla warfare threatened the stability of the Portuguese economy as well as the government's budget. In 1974, the post dictatorship regime published its Economic and Social Program. This program was not well defined and simply called for the reformation of the tax system and the

[26] The *Estado Novo* was established through the new constitution of 1933.

implementation of a new framework. The Portuguese government was forced to implement IMF-monitored stabilisation programs in both 1977 and 1983 as both the political and the economic environment remained unstable in the period after the revolution. Prime Minister Cavaco Silva denationalised the state-owned banks and other public enterprises in 1989 as privatisation, economic deregulation and tax reform became the primary focus of public policy in the lead up to EC membership.

In under two decades, the Portuguese economy has experienced major tests to its financial stability. The Portuguese economy experienced a period of extreme expansion decreased between 1995 and 2001 as economic prospects bloomed and the investment risk. This led to higher levels of private debt, improved labour productivity growth[27] and a boom due to higher domestic demand. However, this boom gave way to a severe bust and a decade of economic woes. In 2002, Portugal started to experience stagnated GDP growth and declining investment as the country became less competitive and ever more indebted. By 2004, general government debt reached a level of 60 percent of GDP and by 2010, Portuguese sovereign bond interest rates followed the upward trend of Greek sovereign bond interest rates. In April 2011, the Portuguese economy received a rescue package from the *troika* made up of the IMF, EC and ECB. Portuguese banks tightened lending standards and the government increased taxes in an effort to decrease public expenditure. Portugal experienced mass emigration at levels that had not been experienced since the Salazar era.

Although the views on Portugal's recovery differ, I favour the view that the recovery is grounded in lasting structural changes over the two decades prior to recovery combined with policy initiatives which were aimed at fostering an environment of business and consumer confidence.[28] On the other hand, the deflationary argument is counteracted by the skyrocketing home prices and rental costs that we have seen[29]. In 2017, Portugal exited the EC's excessive deficit procedure following improved growth, controlled budgets and falling interest costs. Yet, Government debt was still amongst the highest in Europe. Still, the country's sovereign debt became eligible for inclusion in several international bond markets, which improves investment prospects and creates an opportunity to cover debt payments at a faster rate. Low household

[27] See Corrado et al. (2016)
[28] See Gouveia and Coelho (2018) and Centeno and Coelho (2018)
[29] See Chen et al. (2012), ESM (2017), IMF (2017) and the EC (2016)

savings rates also pose a threat to Portuguese financial stability as Portugal has an aging population and a far-reaching social security system. Yet simultaneously, households are highly indebted. The Portuguese banking sector is the most profitable it has been since the crisis as a series of recapitalisations which improved capital positions and cleaned up balance sheets has reduced the susceptibility of the banking sector to external shocks and hence, stabilised the banking sector (Sušec, 2019).

3.3.5. The UK

Margaret Thatcher was elected as British Prime Minister in 1979 after a period of stagflation[30], extreme power of trade unions and incredibly high national debt resulted in the UK applying for an IMF bailout in 1976. Although BoE independence was proposed by Conservative Chancellor Lawson in 1988 (Lawson, 1992), Hansard (1993) notes that Thatcher's rejection of BoE operational independence was based on political motives as increasing interest rates would have affected homeowners who constituted the majority of the voting population. Thatcher's popularity started to decline after her second re-election in 1987 when a 'Community Charge'[31] replaced the earlier local property taxes. King (2003) concludes, "while policy makers will continue to focus on the signals they are receiving from this international audience, policies such as institutional reform will continue to be made on the basis of electoral calculations that reflect domestic interests." Theresa May took over as Prime Minister upon David Cameron's resignation in 2016. Her term was marred by a "lack of integration and inadequate legitimacy" (Grubb, 2019) as the electorate remained deeply divided and a solution and strategy to Brexit remained unattainable for an extended period of time. The uncertainty surrounding Brexit and the global political shift towards the right while liberal beliefs are abandoned, presents an ever-increasing risk to the UK and global political freedom. The UK's political system is likely to revolve around Brexit in the future as attaining political stability may take years in the aftermath of the UK's exit from the EU.

EC membership clearly played an important role in halting the economic decline relative to the EU6 that the UK was experiencing at the time.[32] Globalisation led to renewed international

[30] Economic stagnation combined with high inflation

[31] This 'Community Charge' was a "flat individual charge on all adult residents, regardless of income, to pay for local services. The poll was introduced in Scotland in 1989 and in England and Wales in 1990." (Lauderdale, 2015)

[32] Between 1973 and 2010, the GDP per capita ratio was stable (Campos and Coricelli, 2015).

pressure for governments to implement prudent economic policies. The return of the Labour party in 1997, saw economic stability, low inflation, low borrowing levels and the promotion of private enterprises take centre stage. In the aftermath of the GFC, the UK offered both political and economic stability in a turbulent global environment. However, in 2014 the UK had the largest current account and budget deficits in Europe relative to GDP and political and economic uncertainty emerged as the UK prepared for a referendum on UK independence from the EU. Aiyar (2011) shows that British banks experienced a decline in local lending after the Lehman Brothers default due to lower levels of foreign funding.[33] More recently, economic growth[34] has been strong, wages have been on the rise and foreign investment has maintained a high level. Even so, the threat of a bursting housing bubble remains imminent, public services pay demands continue to increase and political and economic uncertainty in the face of Brexit remains a concern.

3.4. An Empirical Analysis

We use a regression to substantiate our discussion on the importance of Central Banks. Romelli (2018) constructs a comprehensive index of Central Bank Independence using the Grilli et al. (1991) and Cukierman et al. (1992) GMT and CWN indices as a starting point. The Romelli (2018) Extended Central Bank Independence (ECBI) index includes information on the 1.) Governor and Central Bank board, 2.) Monetary policy and conflicts resolution, 3.) Objectives, 4.) Limitations on lending to the government, 5.) Financial independence and lastly, 6.) Reporting and accountability. The ECBI index included in the Romelli (2018) paper covers 154 countries for the period of 1972 to 2017. The dataset provided to me by Davide Romelli[35] covers an earlier period for Chile, Colombia, Japan, Portugal and the UK. Hence, my empirical analysis focuses on the period between 1962 and 2017 (full sample) and the period between 1990 and 2017 (VIX restricted sample). The CBI index, as coded by Romelli (2018), ranges from zero to one with one representing the highest level of CBI.

[33] See Rose and Wieladek (2011) and Kamil and Rai (2010).

[34] Rawdanowicz et al. (2014) show that quantitative easing in the UK may have provided a temporary boost to real GDP of about 2 percent.

[35] Romelli (2018) covers an extensive period as well as an extensive country set, this data is not yet available publicly. The data for the extended time period (1962 to 2017) and the country set (Chile, Colombia, Japan, Portugal and the UK) covered in this chapter was provided to me by Davide Romelli on request and hence, the analysis focuses on five country cases specifically. The countries chosen are by no means assumed to be a representative group instead, the countries are analysed on a case by case basis with the panel of five countries simply being included for completeness. The regression equations (1 to 3) are firstly applied to the panel of five countries and then to the five individual country cases.

The regression equations are as follows:

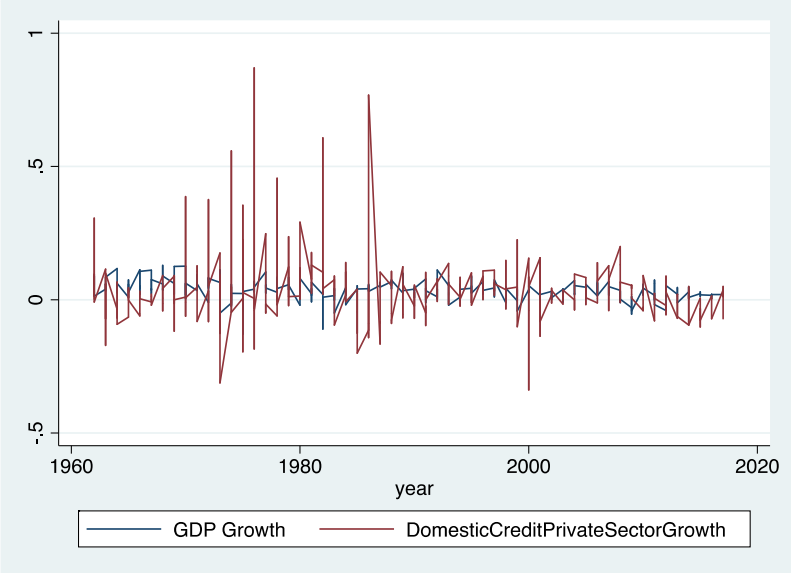
$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_1\text{Credit\_Growth}_{it-1} + \beta_3\text{ECBI}_{it-1} + \beta_4 y_{it-1} + \beta_5 \text{vix}_{t-1} + \varepsilon_{it} \quad (1)$$

$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_2\text{Credit\_Growth}_{it-1}*\text{ECBI}_{it-1} + \beta_4 y_{it-1} + \beta_5 \text{vix}_{t-1} + \beta_6 y_{it-1}*\text{ECBI}_{it-1} + \beta_7 \text{vix}_{t-1}*\text{ECBI}_{it-1} + \varepsilon_{it} \quad (2)$$

$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_1\text{Credit\_Growth}_{it-1} + \beta_2\text{Credit\_Growth}_{it-1}*\text{ECBI}_{it-1} + \beta_3\text{ECBI}_{it-1} + \beta_4 y_{it-1} + \beta_5 \text{vix}_{t-1} + \beta_6 y_{it-1}*\text{ECBI}_{it-1} + \beta_7 \text{vix}_{t-1}*\text{ECBI}_{it-1} + \varepsilon_{it} \quad (3)$$

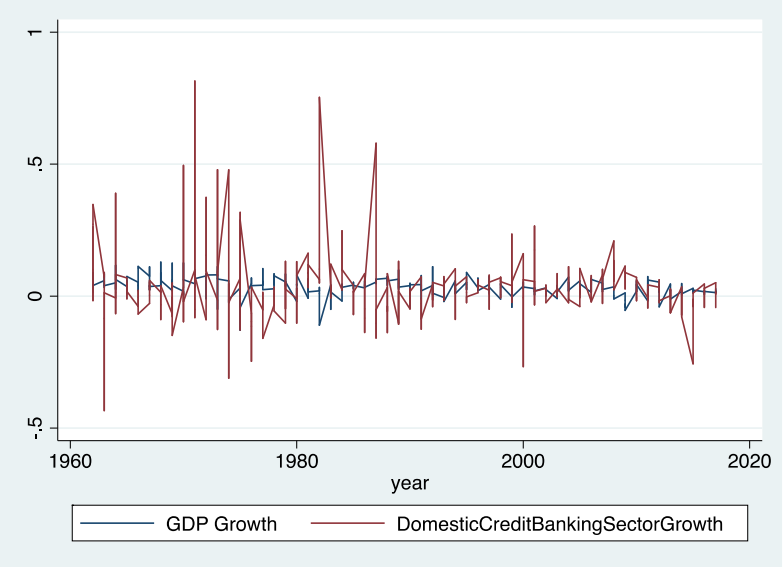
where, $\text{Credit\_Growth}_{it}$ is the annual growth in the level of credit and ECBI is the level of the ECBI index, y_{it} is the annual GDP growth rate, vix_t is the level of the volatility index, φ_i are country fixed effects to account for unobserved cross-country heterogeneity and ε_{it} is a disturbance term satisfying the standard conditions of zero mean and constant variance. Both Figure 2 and Figure 3 show the relationship between the credit growth rate and the GDP growth rate between 1962 and 2017. The credit growth measure in Figure 2 is domestic credit to the private sector, while the credit growth measure in Figure 3 is domestic credit by deposit banks and other financial institutions. The correlation between domestic credit to the private sector and GDP growth is -0.0089 and the correlation between domestic credit by deposit banks and other financial institutions and GDP growth is -0.1978 when considering the entire period. The graphs show that credit and GDP have similar growth paths in recent years, and GDP growth is included in the analysis due to the relationship between the two fundamentals.

Figure 2 - GDP Growth vs. Growth in Domestic Credit to the Private Sector



Data Source: World Bank

Figure 3 - GDP Growth vs. Growth in Domestic Credit by Deposit Banks and Other Financial Institutions



Data Source: World Bank

The analysis is repeated for two measures of credit growth namely, domestic credit to the private sector and domestic credit by deposit banks and other financial institutions. Credit growth acts as a proxy for financial stability as financial crises are often preceded by credit and asset growth (Borio, 2018). As such, we are able to study the impact of CBI on financial stability.

The results of our statistical tests are included in Appendices. The Augmented Dickey-Fuller tests for the presence of a unit root shows that we fail to reject the null hypothesis of the presence of a unit root for the lagged level of ECBI. The absence of a unit root implies that the effect of a shock dissipates over time. In the case of the level of CBI, this may not be the case. The presence of a unit root is rejected for the lagged credit growth, the lagged GDP growth and the lagged level of VIX. The Wooldridge test for autocorrelation shows that the panel does indeed suffer from serial correlation for both domestic credit to the private sector and domestic credit to deposit banks and other financial institutions.

The Modified Wald test for heteroskedasticity shows that the panel also suffers from heteroskedasticity, the main panel results (Table 2 and Table 3) therefore include corrections for both heteroskedasticity and serial correlation. The Modified Wald test for heteroskedasticity shows that heteroskedasticity is not an issue in the individual country cases. The Durbin-Watson test for autocorrelation shows that there is no first order autocorrelation in the majority of cases with the exception being the third regression for the case of Colombia when considering domestic credit by deposit banks and other financial institutions and the third regression for the case of Japan when considering domestic credit by deposit banks and other financial institutions. Therefore, the main results for the country cases (Table 8 and Table 9) include unadjusted fixed effects regression results for all cases except the third regression for the cases of Colombia and Japan, in these two cases, the results are corrected for serial correlation. The inclusion of the lagged dependent variable, namely credit growth, in the first and third regression equation may result in Nickell Bias in the panel. A robustness check available in appendices shows results in which this issue is corrected for using the LSDV methodology, the results show that there are no coefficient sign changes except for the case of lagged domestic credit by deposit money banks and other financial institutions for the first regression. The magnitude of the coefficient is not of importance in this empirical analysis.[36]

Table 8 shows the results of regressing growth in domestic credit to the private sector on its lagged value, the lagged value of the ECBI index, lagged GDP growth and the lagged level of VIX (with country fixed effects). When domestic credit to the private sector is regressed on the ECBI index in the panel, the coefficient is negative. However, this coefficient is only

[36] The changes in magnitude are not noticeable for the majority of cases.

statistically significant in the third regression equation. The coefficient on the interaction term between domestic credit growth and the level of the ECBI is positive and statistically significant for the cases of the UK and Portugal for the second regression equation. Table 9 shows the results of regressing growth in domestic credit by deposit money banks and other financial institutions on its lagged value, the lagged value of the ECBI index, lagged GDP growth and the lagged level of VIX (with country fixed effects). The coefficient on the interaction term between domestic credit growth and the level of the ECBI is positive and statistically significant for the case of the UK for the third regression equation. Romelli (2018) finds that the political environment and institutional setting do not play an important role in the likelihood of reforms of CBI and that financial crises tend to result in reforms aimed at reducing CBI. Our results show that credit growth and ECBI move in the same direction. Hence, higher level of CBI results in higher levels of credit supply. In times of financial stress when credit supply is growing exponentially and credit conditions show signs of overheating, CBI may need to be reined back in an effort to slow down credit supply, this substantiates the view of Romelli (2018).

A number of robustness checks are included in Appendices. Additional domestic credit growth regressions including corrections for heteroskedasticity and serial correlation as well as domestic credit growth regressions focusing on the period after the GFC of 2008 are included. Further, we also include robustness checks using private credit by deposit banks and private credit by deposit banks and other financial institutions are also included. The coefficient on the interaction term between private credit growth and the ECBI is positive for the majority of robustness checks when considering the panel for the second regression. The same holds for the domestic credit growth measures. In the cases where the coefficient is statistically significant, the sign is positive, in line with the main results in Table 8 and Table 9. A few exceptions to the rule include the regression results for the cases in which serial correlation is corrected for when considering domestic credit measures for regression equation two and the sign on the coefficient of the interaction term is negative for the case of the UK. The positive and statistically significant coefficient on the interaction term between credit growth and the ECBI index indicates that for higher levels of CBI, the impact on credit growth is larger. This implies that in times of financial instability, CBI would be reined back in an effort to re-establish financial stability.

3.4.1. Regression Results: Domestic Credit to Private Sector

Table 8 - Regression Results: Domestic Credit to the Private Sector

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2604 (0.1795)	0.2024 (0.1882)	-0.2080 (0.1860)	0.7874 (0.1241)***	0.2638 (0.2137)	0.4309 (0.1647)**
	β_2	$ECBI_{t-1}$	-0.0520 (0.0671)	0 .	0.1101 (0.1811)	0.0777 (0.0722)	-0.2861 (0.5965)	-0.1213 (0.0750)
	β_4	GDP_Growth_{t-1}	1.2096 (0.4668)*	0.6531 (0.4160)	3.0691 (0.8724)***	0.6896 (0.4040)	0.0360 (0.4489)	1.2234 (0.5305)**
	β_5	VIX_{t-1}	0.0005 (0.0006)	-0.0006 (0.0021)	0.0007 (0.0032)	-0.0023 (0.0013)*	-0.0002 (0.0015)	0.0014 (0.0021)
		Constant	0.0049 (0.0380)	0.0107 (0.0524)	-0.1687 (0.1569)	0.0165 (0.0308)	0.1553 (0.1857)	0.0709 (0.0625)
	R^2		0.2479	0.0732	0.2964	0.6537	-0.0421	0.5057
	Observations		135	27	27	27	27	27
	P-Value		0.0018	0.1981	0.0181	0.0000	0.5763	0.0005
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_3	$DomesticCredit\_Growth*ECBI_{t-1}$	0.2870 (0.2659)	0.2775 (0.2579)	-0.1865 (0.2343)	2.2637 (0.3440)***	0.6624 (0.7033)	0.5383 (0.2006)**
	β_4	GDP_Growth_{t-1}	0.0292 (0.7732)	0.6531 (0.4160)	-29.9643 (16.1143)*	-0.2951 (1.0459)	10.6374 (14.6073)	-0.1299 (2.9429)
	β_5	VIX_{t-1}	0.0016 (0.0019)	-0.0006 (0.0021)	0.0489 (0.0269)*	-0.0018 (0.0024)	-0.0062 (0.0228)	0.0095 (0.0065)
	β_6	$GDP\_Growth*ECBI_{t-1}$	1.8957 (1.6035)	0 .	43.9307 (21.4456)*	3.7190 (3.2981)	-33.6296 (46.1944)	1.5278 (3.6427)
	β_7	$VIX*ECBI_{t-1}$	-0.0020 (0.0026)	0 .	-0.0620 (0.0345)*	-0.0004 (0.0051)	0.0161 (0.0674)	-0.0097 (0.0061)
		Constant	-0.0222 (0.0200)	0.0107 (0.0524)	-0.1221 (0.0799)	0.0243 (0.0303)	0.0167 (0.0384)	-0.0261 (0.0462)
	R^2		0.2463	0.0732	0.3825	0.6766	-0.0689	0.4940
	Observations		135	27	27	27	27	27
	P-Value		.	0.1981	0.0082	0.0000	0.6541	0.0013
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.5727 (0.4921)	0.2024 (0.1882)	-423.7574 (301.5617)	-0.3379 (1.4331)	-29.2837 (41.4204)	-0.9403 (1.5573)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.5191 (0.0633)	0 .	559.5522 (398.3494)	3.2258 (4.1112)	90.7997 (127.2757)	1.5892 (1.7889)
	β_3	$ECBI_{t-1}$	-0.1886 (0.0633)**	0 .	59.2604 (42.3696)	-0.0141 (0.3981)	3.3437 (7.0069)	-0.3269 (0.5377)
	β_4	GDP_Growth_{t-1}	-0.5553 (0.8028)	0.6531 (0.4160)	3.3509 (0.8055)***	-0.2222 (1.4017)	16.1568) (46.7221)	1.8034 (4.3227)
	β_5	VIX_{t-1}	-0.0025 (0.0013)	-0.0006 (0.0021)	0.0026 (0.0032)	-0.0018 (0.0057)	0.1200 (0.2175)	-0.0066 (0.0281)
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.9086 (1.7325)	0 .	0 .	3.6340 (4.4527)	48.9462 (143.7697)	-0.6049 (5.0467)
	β_7	$VIX*ECBI_{t-1}$	0.0051 (0.0022)*	0 .	0 .	0 (0.0198)	-0.3719 (0.6716)	0.0086 (0.0322)
		Constant	0.0839 (0.0308)*	0.0107 (0.0524)	-44.9986 (30.1573)	0.0237 (0.1301	-1.0771 (2.3336)	0.2601 (0.4648)
	R^2		0.2740	0.0732	0.3870	0.6443	-0.0983	0.4537
	Observations		135	27	26	27	26	27
	P-Value		.	0.1981	0.0094	0.0002	0.6868	0.0068

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

3.4.2. Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions

Table 9 - Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	-0.2501 (0.0816)***	0.4730 (0.2152)**	-0.2397 (0.1877)	0.7767 (0.1414)***	-0.33837 (0.2855)	0.4444 (0.1616)**
	β_3	$ECBI_{t-1}$	-0.0079 (0.1080)	0 .	0.1819 (0.2088)	0.0917 (0.0725)	-0.3073 (0.5414)	-0.0542 (0.0637)
	β_4	GDP_Growth$_{t-1}$	1.1474 (0.2868)***	0.4502 (0.5287)	2.3557 (0.9361)**	0.7982 (0.3950)*	-0.5478 (0.4483)	0.9698 (0.4373)**
	β_5	VIX_{t-1}	0.0038 (0.0013)***	-0.0017 (0.0027)	0.0055 (0.0037)	-0.0019 (0.0014)	0.0019 (0.0012)	0.0026 (0.0019)
		Constant	-0.0649 (0.0368)*	0.0272 (0.0674)	-0.2910 (0.1814)	-0.0022 (0.0307)	0.0843 (0.1694)	-0.0023 (0.0545)
	R^2		0.1348	0.0790	0.1294	0.5817	0.0519	0.4557
	Observations		129	27	27	27	26	27
	P-Value		0.0000	0.1861	0.1352	0.0001	0.2875	0.0014
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.3881 (0.1089)***	0.6485 (0.2951)**	-0.2780 (0.2439)	2.4945 (0.3544)***	-1.1134 (0.8955)	0.4890 (0.2023)**
	β_4	GDP_Growth$_{t-1}$	-0.6137 (0.8063)	0.4502 (0.5287)	-24.3496 (19.2086)	-0.4740 (0.9188)	-11.7972 (10.8562)	-1.8782 (2.5431)
	β_5	VIX_{t-1}	0.0012 (0.0030)	-0.0017 (0.0027)	0.0413 (0.0320)	-0.0014 (0.0021)	0.0194 (0.0187)	0.0095 (0.0055)*
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.7828 (1.1915)**	0 .	35.6245 (25.6021)	4.8515 (2.8976)	35.6034 (34.1383)	3.4724 (3.1607)
	β_7	$VIX*ECBI_{t-1}$	0.0036 (0.0041)	0 .	-0.0460 (0.0412)	-0.0007 (0.0045)	-0.0524 (0.0555)	-0.0077 (0.0051)
		Constant	-0.0598 (0.0164)***	0.0271 0.0674)	-0.1833 (0.0956)*	0.0135 (0.0260)	-0.0269 (0.0297)	-0.0531 (0.0399)
	R^2		0.1801	0.0790	0.1675	0.6990	0.0495	0.4695
	Observations		129	27	27	27	26	27
	P-Value		0.0000	0.1861	0.1133	0.0000	0.3193	0.0020
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.0509 (0.3927)	0.4730 (0.2153)**	-23.1237 (28.9530)	-1.5223 (0.8191)*	-11.7698 (9.8710)	-1.0278 (1.7566)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.3103 (0.5375)	0 .	30.0945 (38.2449)	6.9060 (2.3901)***	35.3967 (30.3233)	1.6484 (1.9979)
	β_3	$ECBI_{t-1}$	-0.1928 (0.1461)	0 .	3.3278 (4.4440)	-0.1426 (0.2805)	-10.2984 (3.8233)**	-0.2380 (0.5269)
	β_4	GDP_Growth$_{t-1}$	-0.9580 (0.8590)	0.4502 (0.5287)	2.8437 (0.9732)***	-0.0474 (1.0645)	-20.9044 (13.7899)	-0.8774 (3.5659)
	β_5	VIX_{t-1}	-0.0012 (0.0037)	-0.0017 (0.0027)	0.0074 (0.0042)*	-0.0025 (0.0046)	-0.1782 (0.0709)**	-0.0022 (0.0274)
	β_6	$GDP\_Growth*ECBI_{t-1}$	3.3685 (1.2836)***	0 .	0 .	4.4604 (3.3574)	65.4450 (42.6885)	2.3276 (4.2130)
	β_7	$VIX*ECBI_{t-1}$	0.0080 (0.0056)	0 .	0 .	0.0052 (0.0139)	0.5633 (0.2193)**	0.0055 (0.0313)
		Constant	0.0478 (0.0490)	0.0272 (0.0674)	-2.7274 (2.5737)	0.0355 (0.0890)	3.2594 (0.7231)***	0.1587 (0.4572)
	R^2		0.1719	0.0790	0.2596	0.7422	0.3713	0.4240
	Observations		129	27	26	27	26	27
	P-Value		0.0000	0.1861	0.0475	0.0000	0.0294	0.0104

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

3.5. Conclusion

The views on the CBI of EMEs vary with Garriga (2016) stating that the move towards independence has been more stable while, Crowe and Meade (2007) believe that an impressive shift in CBI has taken place over the past two decades. However, there is a consensus view

that CBI has the ability to stabilise the economy. The countries discussed all have Central Banks that are somewhat autonomous. *Banco Central de Chile*'s autonomy was legalised in 1975, *Banco de la República*'s level of autonomy was increased in 1992 and *Banco de Portugal* became autonomous in 1998 after being nationalised in 1974. Both the Bank of England and the Bank of Japan became autonomous in 1997 although the Bank of Japan still acts as a government's bank.

Although Romelli (2018) concludes that the political and institutional setting does not influence the introduction of Central Bank reforms, I tend to disagree. As Clark et al. (1998) point out, politicians may favour control over monetary policy when they are seeking additional voter support. In the Latin American countries considered, improved political freedom and stability has resulted in more trade. This has led to improved economic growth and financial stability. In the UK and Portugal, the political history has indeed influenced both the Central Banks and financial stability. Central Bank autonomy was rejected for a number of years in the UK due to the potential negative consequences on the political powers, Portugal saw its Central Bank being nationalised after the fall of the *Estado Novo* and autonomy was only granted when political stability was re-established.

In this chapter, the institutional setting and the structure and functioning of Central Banks in Chile, Colombia, Japan, Portugal and the UK is considered. The political environment and the financial stability is then discussed and the discussion is substantiated with a brief empirical analysis of the effect of CBI on credit growth using an existing database created by Romelli (2018). Our main results show that there is a positive relationship between credit growth and the level of CBI. Our robustness checks show that the coefficient is positive and statistically significant for a number of cases when implementing a variety of estimation methods. Fluctuations in credit growth are larger for higher levels of CBI. Hence, in periods of financial instability or ultimately financial crises, CBI would be reined back in an effort to re-establish financial stability. In times of surging credit supply, policy makers should attempt to decrease the level of CBI in countries with highly independent. At the same time, less independent Central Banks should be wary of reducing independence. Instead, these Central Banks should increase independence. As such, there should be a threshold level of Central Bank independence to ensure financial stability.

3.6. Appendix I

I.1. Summary Statistics

Table I1 - Summary Statistics

Summary Statistics					
Variable	Obs	Mean	Std. Dev	Min	Max
Chile					
ECBI	27	0.7295	0	0.7295	0.7295
GDPGrowth	27	0.0473977	0.0281747	-0.0156424	0.1116671
VIX	27	19.23317	6.053049	11.09024	32.69261
PrivateCreditDepositandOtherGrowth	26	0.0370199	0.0422779	-0.0226983	0.1404464
PrivateCreditDepositGrowth	26	0.0291379	0.0616929	-0.130428	0.1741297
DomesticCreditPrivateSectorGrowth	27	0.0373761	0.0525105	-0.0492298	0.1992182
DomesticCreditBankingSectorGrowth	27	0.0264794	0.0676098	-0.1250441	0.2092005
Colombia					
ECBI	27	0.7440741	0.0671651	0.408	0.757
GDPGrowth	27	0.0350959	0.0237503	-0.0420402	0.0736253
VIX	27	19.23317	6.053049	11.09024	32.69261
PrivateCreditDepositandOtherGrowth	26	0.036159	0.0759151	-0.1642179	0.1621889
PrivateCreditDepositGrowth	26	0.0359849	0.0730314	-0.1745119	0.1621889
DomesticCreditPrivateSectorGrowth	27	0.0297984	0.1014584	-0.3382399	0.1576303
DomesticCreditBankingSectorGrowth	27	0.0281355	0.1045733	-0.266814	0.2657867
Japan					
ECBI	27	0.3185741	0.0132467	0.295	0.3415
GDPGrowth	27	0.0100924	0.0184469	-0.0541641	0.0419174
VIX	27	19.23317	6.053049	11.09024	32.69261
PrivateCreditDepositandOtherGrowth	26	-0.0008865	0.0232101	-0.041477	0.0564762
PrivateCreditDepositGrowth	26	-0.0151795	0.0745433	-0.2843215	0.0564762
DomesticCreditPrivateSectorGrowth	27	-0.0036419	0.037351	-0.1370304	0.0665961
DomesticCreditBankingSectorGrowth	26	0.0126796	0.0307663	-0.0497242	0.0895695
Portugal					
ECBI	27	0.8119074	0.1530463	0.4865	0.8955
GDPGrowth	27	0.0137127	0.0235269	-0.0402826	0.0479177
VIX	27	19.23317	6.053049	11.09024	32.69261
PrivateCreditDepositandOtherGrowth	26	0.0414844	0.0741631	-0.0918976	0.1950099
PrivateCreditDepositGrowth	26	0.0414844	0.0741631	-0.0918976	0.1950099
DomesticCreditPrivateSectorGrowth	27	0.0346887	0.0815426	-0.0945309	0.2244713
DomesticCreditBankingSectorGrowth	27	0.0354183	0.0671955	-0.0785967	0.2349657
The UK					
ECBI	27	0.2971296	0.0913966	0.1465	0.3665
GDPGrowth	27	0.0205305	0.0173252	-0.0424655	0.0429307
VIX	27	19.23317	6.053049	11.09024	32.69261
PrivateCreditDepositandOtherGrowth	26	0.0116602	0.0574653	-0.0853037	0.1410989
PrivateCreditDepositGrowth	26	0.0116602	0.0574653	-0.0853037	0.1410989
DomesticCreditPrivateSectorGrowth	27	0.0109639	0.0548236	-0.0952018	0.1313066
DomesticCreditBankingSectorGrowth	27	0.0168093	0.0497735	-0.0717585	0.1346457

I.2. Variable Definitions

Table I2 - Definitions and Sources of Variables

Variable Name	Code	Indicator Name	Long definition	Source
ECBI			Extended Central Bank Independence index that provides information on central bank institutional design across six dimensions: 1) Governor and central bank board, 2) Monetary policy and conicts resolution, 3) Objectives, 4) Limitations on lending to the government, 5) Financial independence and 6) Reporting and accountability.	Romelli (2018)
GDP_Growth	NY.GDP.MKTP.KD.ZG	GDP growth (annual %)	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 US dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	World Bank national accounts data, and OECD National Accounts data files.
VIX	VIXCLS	Level of the volatility index (annual average)	VIX measures market expectation of near term volatility conveyed by stock index option prices.	Chicago Board Options Exchange
PrivateCreditDepositandOther	GFDD.DI.12	Private credit by deposit money banks and other financial institutions to GDP (%)	Private credit by deposit money banks and other financial institutions to GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI. Raw data are from the electronic version of the IMF's International Financial Statistics. Private credit by deposit money banks and other financial institutions (IFS lines 22d, 42d, FOSAOP and FFSAP); GDP in local currency (IFS line NGDP); end-of period CPI (IFS line PCPI); and average	International Financial Statistics (IFS), International Monetary Fund (IMF)

			annual CPI is calculated using the monthly CPI values (IFS line PCPI)	
PrivateCreditDepositandOtherGrowth		Growth in Private credit by deposit money banks and other financial institutions to GDP (%)		Author's own calculations using World Bank Data
PrivateCreditDeposit	GFDD.DI.01	Private credit by deposit money banks to GDP (%)	Private credit by deposit money banks and other financial institutions to GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI. Raw data are from the electronic version of the IMF's International Financial Statistics. Private credit by deposit money banks (IFS line 22d and FOSAOP); GDP in local currency (IFS line NGDP); end-of period CPI, (IFS line PCPI); and average annual CPI is calculated using the monthly CPI values (IFS line PCPI).	International Financial Statistics (IFS), International Monetary Fund (IMF)
PrivateCreditDepositGrowth		Growth in Private credit by deposit money banks to GDP (%)		Author's own calculations using World Bank Data
DomesticCreditPrivateSector	FS.AST.PRVT.GD.ZS	Domestic credit to private sector (% of GDP)	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates. Portugal 1961 to 1968 World Bank data from: https://www.theglobaleconomy.com/Portugal/domestic_credit_private_sector/

			corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.	
DomesticCreditPrivateSectorGrowth		Growth in Domestic credit to private sector (% of GDP)		Author's own calculations using World Bank Data
DomesticCreditBankingSector	FS.AST.DOMS.GD.ZS	Domestic credit provided by financial sector (% of GDP)	Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.
DomesticCreditBankingSectorGrowth		Growth in Domestic credit provided by financial sector (% of GDP)		Author's own calculations using World Bank Data

3.7. Appendix J

J.1. Augmented Dickey-Fuller Tests for the Presence of a Unit Root

Table J1 - Results of Augmented Dickey-Fuller Unit Root Tests

Augmented Dickey-Fuller Tests for the Presence of a Unit Root **H0: Presence of a Unit Root**							
Domestic Credit to the Private Sector				**Domestic Credit by Deposit Banks and Other Financial Institutions**			
	Periods	Statistic	P-Value		Periods	Statistic	P-Value
Full				**Full**			
Creditit-1	56	4.2422	0.9358	Creditit-1	56	2.9590	0.9824
Credit_Growthit-1	56	73.5280	0.0000	Credit_Growthit-1	56	85.3642	0.0000
ECBIit-1	56	2.7638	0.9864	ECBIit-1	56	2.7638	0.9864
yit-1	56	62.5072	0.0000	yit-1	56	62.5072	0.0000
vixt-1	28	34.5568	0.0001	vixt-1	28	34.5568	0.0001
Chile				**Chile**			
Creditit-1	56	0.1516	0.9270	Creditit-1	56	0.4830	0.7854
Credit_Growthit-1	56	7.9250	0.0190	Credit_Growthit-1	56	12.6783	0.0018
ECBIit-1	56	0.9661	0.6169	ECBIit-1	56	0.9661	0.6169
yit-1	56	16.9592	0.0002	yit-1	56	16.9592	0.0002
vixt-1	28	6.9114	0.0316	vixt-1	28	6.9114	0.0316
Colombia				**Colombia**			
Creditit-1	56	0.7025	0.7038	Creditit-1	56	0.7251	0.6959
Credit_Growthit-1	56	23.8227	0.0000	Credit_Growthit-1	56	25.4519	0.0000
ECBIit-1	56	0.4738	0.7891	ECBIit-1	56	0.4738	0.7891
yit-1	56	9.3121	0.0095	yit-1	56	9.3121	0.0095
vixt-1	28	6.9114	0.0316	vixt-1	28	6.9114	0.0316
The UK				**The UK**			
Creditit-1	56	0.6364	0.7274	Creditit-1	56	0.3887	0.8234
Credit_Growthit-1	56	12.1876	0.0023	Credit_Growthit-1	56	12.0874	0.0024
ECBIit-1	56	0.5835	0.7470	ECBIit-1	56	0.5835	0.7470
yit-1	56	21.7252	0.0000	yit-1	56	21.7252	0.0000
vixt-1	28	6.9114	0.0316	vixt-1	28	6.9114	0.0316
Japan				**Japan**			
Creditit-1	56	1.7222	0.4227	Creditit-1	55	0.6584	0.7195
Credit_Growthit-1	56	23.6855	0.0000	Credit_Growthit-1	55	25.0972	0.0000
ECBIit-1	56	0.5668	0.7532	ECBIit-1	56	0.5668	0.7532
yit-1	56	5.7424	0.0566	yit-1	56	5.7424	0.0566
vixt-1	28	6.9114	0.0316	vixt-1	28	6.9114	0.0316
Portugal				**Portugal**			
Creditit-1	56	1.0295	0.5977	Creditit-1	56	0.7038	0.7033
Credit_Growthit-1	56	5.9072	0.0522	Credit_Growthit-1	56	10.0493	0.0066
ECBIit-1	56	0.1735	0.9169	ECBIit-1	56	0.1735	0.9169
yit-1	56	8.7683	0.0125	yit-1	56	8.7683	0.0125
vixt-1	28	6.9114	0.0316	vixt-1	28	6.9114	0.0316

Note: Augmented Dickey-Fuller Test results based on: Ho: All panels contain unit roots and Ha: At least one panel is stationary. The results of an Inverse Chi-squared (2) test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1.

J.2. Wooldridge Test for Autocorrelation in Panel Data and Durbin Watson Test for Autocorrelation: Domestic Credit Measures

Table J2 - Results of Wooldridge Test for Autocorrelation in Panel Data and Durbin Watson Test for Autocorrelation: Domestic Credit Measures

Wooldridge Test for Autocorrelation in Panel Data H0: No First-Order Autocorrelation							
Domestic Credit to the Private Sector				Domestic Credit by Deposit Banks and Other Financial Institutions			
	Periods	Statistic	P-Value		Periods	Statistic	P-Value
Full				**Full**			
I	135	41.252	0.0030	I	134	7.933	0.0480
II	135	74.320	0.0010	II	134	12.226	0.0250
III	135	43.770	0.0027	III	134	11.206	0.0286

Durbin Watson Test for Autocorrelation H0: No First-Order Autocorrelation									
Domestic Credit to the Private Sector					Domestic Credit by Deposit Banks and Other Financial Institutions				
	Periods	Statistic	dL	dU		Periods	Statistic	dL	dU
Chile					**Chile**				
I	27	1.8741	0.878	1.514	I	27	1.9249	0.878	1.514
II	27	1.8741	0.808	1.625	II	27	1.9249	0.808	1.625
III	27	1.8741	0.669	1.867	III	27	1.9249	0.669	1.867
Colombia					**Colombia**				
I	27	1.7799	0.878	1.514	I	27	1.7406	0.878	1.514
II	27	1.9121	0.808	1.625	II	27	1.7517	0.808	1.625
III	27	1.9121	0.669	1.867	III	27	1.7517	0.669	1.867
The UK					**The UK**				
I	27	2.4868	0.878	1.514	I	27	2.3332	0.878	1.514
II	27	2.6165	0.808	1.625	II	27	2.4538	0.808	1.625
III	27	2.5864	0.669	1.867	III	27	2.2620	0.669	1.867
Japan					**Japan**				
I	27	1.8823	0.878	1.514	I	26	2.0711	0.855	1.517
II	27	1.9794	0.808	1.625	II	26	1.9458	0.782	1.635
III	27	2.0247	0.669	1.867	III	26	1.7722	0.640	1.889
Portugal					**Portugal**				
I	27	1.9222	0.878	1.514	I	27	1.6095	0.878	1.514
II	27	1.9507	0.808	1.625	II	27	1.6044	0.808	1.625
III	27	1.8953	0.669	1.867	III	27	1.5502	0.669	1.867

Note: Wooldridge Test for Autocorrelation results based on: Ho: No First-Order Autocorrelation and Ha: First Order Autocorrelation. The results of the F-test and the corresponding p-values are presented in the above table. The null hypothesis of no first-order autocorrelation is rejected for the cases where the p-value < 0.1. Durbin Watson Test for Autocorrelation results based on: Ho: No Autocorrelation and Ha: Positive Autocorrelation or Inconclusive Results. The Durbin Watson Test Statistic is quoted in the table above, the upper and lower Durbin Watson bounds from Savin and White at a 1% Confidence Interval are also quoted in the above table. Test Statistic values above the upper bound result in the null hypothesis not being rejected and hence, no positive serial correlation is present. A Test Statistic below the lower bound results in the assumption that positive serial correlation is present and a Test Statistic within the bounds results in an inconclusive result.

J.3. Modified Wald Test for Heteroskedasticity: Domestic Credit Measures

Table J3 - Results of Modified Wald Test for Heteroskedasticity: Domestic Credit Measures

Modified Wald Test for Heteroskedasticity H0: sigma(i)^2 = sigma^2 for all i							
Domestic Credit to the Private Sector				Domestic Credit by Deposit Banks and Other Financial Institutions			
	Periods	Statistic	P-Value		Periods	Statistic	P-Value
Full				**Full**			
I	135	20.63	0.0010	I	134	96.48	0.0000
II	135	12.80	0.0253	II	134	190.65	0.0000
III	135	34.91	0.0000	III	134	130.65	0.0000
Chile				**Chile**			
I	27	0.01	0.9370	I	27	0.01	0.9382
II	27	0.01	0.9370	II	27	0.01	0.9382
III	27	0.01	0.9370	III	27	0.01	0.9382
Colombia				**Colombia**			
I	27	0.02	0.8901	I	27	0.01	0.9306
II	27	0.02	0.8853	II	27	0.01	0.9312
III	27	0.02	0.8853	III	27	0.01	0.9312
The UK				**The UK**			
I	27	0.03	0.8703	I	27	0.03	0.8651
II	27	0.03	0.8742	II	27	0.03	0.8562
III	27	0.03	0.8743	III	27	0.03	0.8699
Japan				**Japan**			
I	27	0.01	0.9335	I	26	0.03	0.8554
II	27	0.01	0.9286	II	26	0.03	0.8573
III	27	0.01	0.9310	III	26	0.02	0.88863
Portugal				**Portugal**			
I	27	0.00	0.9492	I	27	0.01	0.9298
II	27	0.00	0.9533	II	27	0.01	0.9300
III	27	0.00	0.9552	III	27	0.01	0.9318

Note: Modified Wald Test for Heteroskedasticity results based on: Ho: No Heteroskedasticity present and Ha: Heteroskedasticity present. The results of a Chi-squared (1) test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The absence of Heteroskedasticity is rejected for the cases where the p-value < 0.1.

J.4. Wooldridge Test for Autocorrelation in Panel Data and Durbin Watson Test for Autocorrelation: Private Credit Measures

Table J4 - Results of Wooldridge Test for Autocorrelation in Panel Data and Durbin Watson Test for Autocorrelation: Private Credit Measures

Wooldridge Test for Autocorrelation in Panel Data H0: No First-Order Autocorrelation							
Private Credit by Deposit Banks and Other Financial Institutions				Private Credit by Deposit Banks			
	Periods	Statistic	P-Value		Periods	Statistic	P-Value
Full				**Full**			
I	130	66.293	0.0012	I	130	33.836	0.0043
II	130	51.723	0.0020	II	130	26.461	0.0068
III	130	72.635	0.0010	III	130	46.648	0.0024

Durbin Watson Test for Autocorrelation H0: No First-Order Autocorrelation									
Private Credit by Deposit Banks and Other Financial Institutions					Private Credit by Deposit Banks				
	Periods	Statistic	dL	dU		Periods	Statistic	dL	dU
Chile					**Chile**				
I	26	1.4602	0.855	1.517	I	26	1.7023	0.855	1.517
II	26	1.4602	0.782	1.635	II	26	1.7023	0.782	1.635
III	26	1.4602	0.640	1.889	III	26	1.7023	0.640	1.889
Colombia					**Colombia**				
I	26	1.7290	0.855	1.517	I	26	2.1267	0.855	1.517
II	26	1.9575	0.782	1.635	II	26	2.1632	0.782	1.635
III	26	1.4733	0.640	1.889	III	26	2.1632	0.640	1.889
The UK					**The UK**				
I	26	2.3030	0.855	1.517	I	26	2.5610	0.855	1.517
II	26	2.1023	0.782	1.635	II	26	2.3268	0.782	1.635
III	26	1.9893	0.640	1.889	III	26	2.4425	0.640	1.889
Japan					**Japan**				
I	26	1.7504	0.855	1.517	I	26	1.3013	0.855	1.517
II	26	1.6686	0.782	1.635	II	26	1.2968	0.782	1.635
III	26	1.6646	0.640	1.889	III	26	1.2998	0.640	1.889
Portugal					**Portugal**				
I	26	1.7230	0.855	1.517	I	26	2.0172	0.855	1.517
II	26	1.7583	0.782	1.635	II	26	1.9921	0.782	1.635
III	26	1.6743	0.640	1.889	III	26	1.9236	0.640	1.889

Note: Wooldridge Test for Autocorrelation results based on: Ho: No First-Order Autocorrelation and Ha: First Order Autocorrelation. The results of the F-test and the corresponding p-values are presented in the above table. The null hypothesis of no first-order autocorrelation is rejected for the cases where the p-value < 0.1. Durbin Watson Test for Autocorrelation results based on: Ho: No Autocorrelation and Ha: Positive Autocorrelation or Inconclusive Results. The Durbin Watson Test Statistic is quoted in the table above, the upper and lower Durbin Watson bounds from Savin and White at a 1% Confidence Interval are also quoted in the above table. Test Statistic values above the upper bound result in the null hypothesis not being rejected and hence, no positive serial correlation is present. A Test Statistic below the lower bound results in the assumption that positive serial correlation is present and a Test Statistic within the bounds results in an inconclusive result.

J.5. Modified Wald Test for Heteroskedasticity: Private Credit Measures

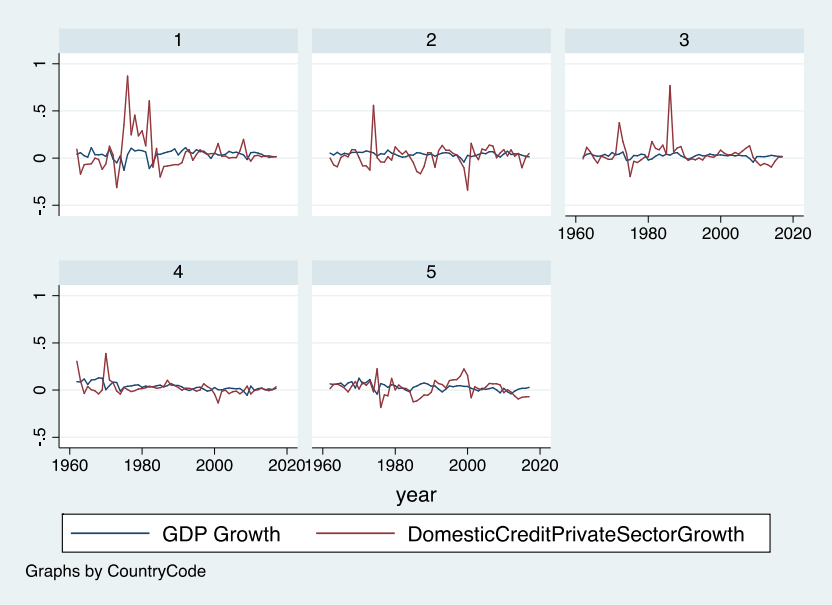
Table J5 - Results of Modified Wald Test for Heteroskedasticity: Private Credit Measures

Modified Wald Test for Heteroskedasticity H0: sigma(i)^2 = sigma^2 for all i							
Private Credit by Deposit Banks and Other Financial Institutions				Private Credit by Deposit Banks			
	Periods	Statistic	P-Value		Periods	Statistic	P-Value
Full				**Full**			
I	130	69.99	0.0000	I	130	16.51	0.0055
II	130	129.93	0.0000	II	130	21.49	0.0007
III	130	45.16	0.0000	III	130	27.29	0.0001
Chile				**Chile**			
I	26	0.01	0.9032	I	26	0.01	0.9313
II	26	0.01	0.9032	II	26	0.01	0.9313
III	26	0.01	0.9032	III	26	0.01	0.9313
Colombia				**Colombia**			
I	26	0.03	0.8526	I	26	0.01	0.9147
II	26	0.03	0.8679	II	26	0.01	0.9080
III	26	16250	0.0000	III	26	0.01	0.9080
The UK				**The UK**			
I	26	0.02	0.8952	I	26	0.02	0.8952
II	26	0.02	0.9021	II	26	0.02	0.9021
III	26	0.02	0.8976	III	26	0.02	0.8976
Japan				**Japan**			
I	26	0.02	0.8887	I	26	0.01	0.9329
II	26	0.02	0.8935	II	26	0.01	0.9294
III	26	0.02	0.8752	III	26	0.01	0.9299
Portugal				**Portugal**			
I	26	0.00	0.9475	I	26	0.00	0.9475
II	26	0.00	0.9516	II	26	0.00	0.9516
III	26	0.00	0.9488	III	26	0.00	0.9488

Note: Modified Wald Test for Heteroskedasticity results based on: Ho: No Heteroskedasticity present and Ha: Heteroskedasticity present. The results of a Chi-squared (1) test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The absence of Heteroskedasticity is rejected for the cases where the p-value < 0.1.

J.6. Additional: GDP Growth vs. Credit Growth (Domestic Credit to Private Sector)

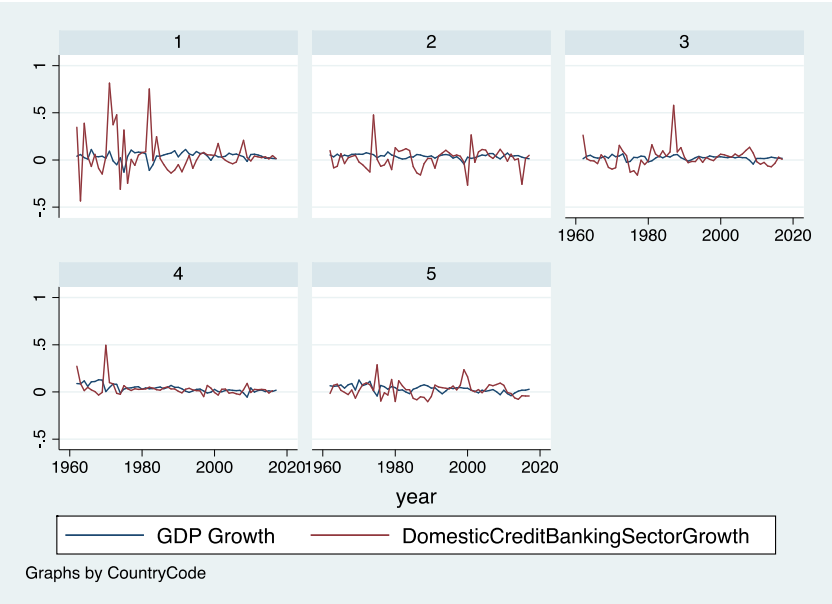
Figure J6 - GDP Growth vs. Credit Growth (Domestic Credit to Private Sector) for The United Kingdom, Japan and Portugal



Note: Country 1 = Chile, Country 2 = Chile, Country 3 = United Kingdom, Country 4 = Japan, Country 5 = Portugal.

J.7. Additional: GDP Growth vs. Credit Growth (Domestic Credit by Deposit Banks and Other Financial Institutions)

Figure J7 - GDP Growth vs. Credit Growth (Domestic Credit by Deposit Banks and Other Financial Institutions) for Chile, Colombia, The UK, Japan and Portugal



Note: Country 1 = Chile, Country 2 = Chile, Country 3 = United Kingdom, Country 4 = Japan, Country 5 = Portugal.

J.8. Additional Credit Growth Regression: Domestic Credit to Private Sector (No Corrections)

Table J8 shows the results of regressing growth in domestic credit to the private sector on its lagged value, the lagged value of the ECBI index, lagged GDP growth and the lagged level of VIX (with country fixed effects). When domestic credit to the private sector is regressed on the ECBI index in the panel, the coefficient is negative. This coefficient is only statistically significant in the third regression equation. The coefficient is positive for the case of Japan and Colombia in the third regression equation and the coefficient is negative in the case of the UK and Portugal. However, this coefficient is still not statistically significant. The coefficient on lagged GDP growth is statistically significant in the case of Colombia with the coefficient having a positive sign in the first and third regressions. However, the coefficient has a negative sign in the second regression. The coefficient on the interaction term between credit growth and the ECBI index is positive and statistically significant in the second regression in the case of the panel, the UK and Portugal and in the case of Colombia in the third regression.

Table J9 shows the results of regressing domestic credit by deposit banks and other financial institutions on its lagged value, the lagged value of the ECBI index, lagged GDP growth and the lagged level of VIX (with country fixed effects). The coefficient on the interaction term between credit growth and ECBI is positive and statistically significant in the second regression for the cases of Chile, the UK and Portugal while the coefficient is only positive and statistically significant in the case of the UK in the third regression. The positive and statistically significant sign on the coefficient of the interaction term between credit growth and ECBI in the cases of the UK and Portugal in the second regression is therefore consistent when considering both domestic credit to the private sector in Table J8 as well domestic credit by deposit banks and other financial institutions in Table J9.

Table J8 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (No Corrections)

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2604 (0.0789)***	0.2024 (0.1882)	-0.2080 (0.1860)	0.7874 (0.1241)***	0.2638 (0.2137)	0.4309 (0.1647)**
	β_3	$ECBI_{t-1}$	-0.0520 (0.0567)	0 .	0.1101 (0.1811)	0.0777 (0.0722)	-0.2861 (0.5965)	-0.1213 (0.0750)
	β_4	GDP_Growth_{t-1}	1.2096 (0.2582)***	0.6531 (0.4160)	3.0691 (0.8724)***	0.6896 (0.4040)	0.0360 (0.4489)	1.2234 (0.5305)**
	β_5	VIX_{t-1}	0.0005 (0.0010)	-0.0006 (0.0021)	0.0007 (0.0032)	-0.0023 (0.0013)*	-0.0002 (0.0015)	0.0014 (0.0021)
		Constant	0.0049 (0.0372)	0.0107 (0.0524)	-0.1687 (0.1569)	0.0165 (0.0308)	0.1553 (0.1857)	0.0709 (0.0625)
	R^2		0.2240	0.0732	0.2964	0.6537	-0.0421	0.5057
	Observations		135	27	27	27	27	27
	P-Value		0.0000	0.1981	0.0181	0.0000	0.5763	0.0005
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.2870 (0.1133)**	0.2775 (0.2579)	-0.1865 (0.2343)	2.2637 (0.3440)***	0.6624 (0.7033)	0.5383 (0.2006)**
	β_4	GDP_Growth_{t-1}	0.0292 (0.6968)	0.6531 (0.4160)	-29.9643 (16.1143)*	-0.2951 (1.0459)	10.6374 (14.6073)	-0.1299 (2.9429)
	β_5	VIX_{t-1}	0.0016 (0.0018)	-0.0006 (0.0021)	0.0489 (0.0269)*	-0.0018 (0.0024)	-0.0062 (0.0228)	0.0095 (0.0065)
	β_6	$GDP\_Growth*ECBI_{t-1}$	1.8957 (1.0380)*	0 .	43.9307 (21.4456)*	3.7190 (3.2981)	-33.6296 (46.1944)	1.5278 (3.6427)
	β_7	$VIX*ECBI_{t-1}$	-0.0020 (0.0024)	0 .	-0.0620 (0.0345)*	-0.0004 (0.0051)	0.0161 (0.0674)	-0.0097 (0.0061)
		Constant	-0.0222 (0.0231)	0.0107 (0.0524)	-0.1221 (0.0799)	0.0243 (0.0303)	0.0167 (0.0384)	-0.0261 (0.0462)
	R^2		0.2222	0.0732	0.3825	0.6766	-0.0689	0.4940
	Observations		135	27	27	27	27	27
	P-Value		0.0000	0.1981	0.0082	0.0000	0.6541	0.0013
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.5727 (0.2869)**	0.2024 (0.1882)	-3.5543 (1.6686)**	-0.3379 (1.4331)	-27.2467 (29.9047)	-0.9403 (1.5573)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.5191 (0.4065)	0 .	4.5088 (2.2360)*	3.2258 (4.1112)	84.5016 (92.0556)	1.5892 (1.7889)
	β_3	$ECBI_{t-1}$	-0.5191 (0.0986)*	0 .	0.1953 (0.1749)	-0.0141 (0.3981)	3.1350 (6.3866)	-0.3269 (0.5377)
	β_4	GDP_Growth_{t-1}	-0.5553 (0.7445)	0.6531 (0.4160)	3.2913 (0.8247)***	-0.2222 (1.4017)	-14.5514 (34.4366)	1.8034 (4.3227)
	β_5	VIX_{t-1}	-0.0025 (0.0026)	-0.0006 (0.0021)	0.0020 (0.0031)	-0.0018 (0.0067)	0.1129 (0.1864)	-0.0066 (0.0281)
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.9086 (1.1310)**	0 .	0 .	3.6340 (4.4527)	44.1001 (106.4289)	-0.6049 (5.0467)
	β_7	$VIX*ECBI_{t-1}$	0.0051 (0.0041)*	0 .	0 .	0 (0.0198)	-0.3500 (0.5752)	0.0086 (0.0322)
		Constant	0.0839 (0.0598)	0.0107 (0.0524)	-0.2699 (0.1553)*	0.0237 (0.1301	-1.0116 (2.0622)	0.2601 (0.4648)
	R^2		0.2504	0.0732	0.3825	0.6443	-0.1046	0.4537
	Observations		135	27	27	27	27	27
	P-Value		0.0000	0.1981	0.0082	0.0002	0.7115	0.0068

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.9. Additional Credit Growth Regression Domestic Credit by Deposit Money Banks and Other Financial Institutions (No Corrections)

Table J9 - Results of Additional Credit Growth Regression Domestic Credit by Deposit Money Banks and Other Financial Institutions (No Corrections)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.1537 (0.0859)*	0.4730 (0.2152)**	-0.2397 (0.1877)	0.7767 (0.1414)***	-0.33837 (0.2855)	0.4444 (0.1616)**
	β_3	$ECBI_{t-1}$	0.0126 (0.0610)	0 .	0.1819 (0.2088)	0.0917 (0.0725)	-0.3073 (0.5414)	-0.0542 (0.0637)
	β_4	GDP_Growth_{t-1}	0.9931 (0.2687)***	0.4502 (0.5287)	2.3557 (0.9361)**	0.7982 (0.3950)*	-0.5478 (0.4483)	0.9698 (0.4373)**
	β_5	VIX_{t-1}	0.0023 (0.0011)**	-0.0017 (0.0027)	0.0055 (0.0037)	-0.0019 (0.0014)	0.0019 (0.0012)	0.0026 (0.0019)
		Constant	-0.0576 (0.0404)	0.0272 (0.0674)	-0.2910 (0.1814)	-0.0022 (0.0307)	0.0843 (0.1694)	-0.0023 (0.0545)
	R^2		0.0818	0.0790	0.1294	0.5817	0.0519	0.4557
	Observations		134	27	27	27	26	27
	P-Value		0.0010	0.1861	0.1352	0.0001	0.2875	0.0014
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1459 (0.1189)	0.6485 (0.2951)**	-0.2780 (0.2439)	2.4945 (0.3544)***	-1.1134 (0.8955)	0.4890 (0.2023)**
	β_4	GDP_Growth_{t-1}	-0.3806 (0.7427)	0.4502 (0.5287)	-24.3496 (19.2086)	-0.4740 (0.9188)	-11.7972 (10.8562)	-1.8782 (2.5431)
	β_5	VIX_{t-1}	0.0016 (0.0020)	-0.0017 (0.0027)	0.0413 (0.0320)	-0.0014 (0.0021)	0.0194 (0.0187)	0.0095 (0.0055)*
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.1506 (1.0911)*	0 .	35.6245 (25.6021)	4.8515 (2.8976)	35.6034 (34.1383)	3.4724 (3.1607)
	β_7	$VIX*ECBI_{t-1}$	0.0011 (0.0026)	0 .	-0.0460 (0.0412)	-0.0007 (0.0045)	-0.0524 (0.0555)	-0.0077 (0.0051)
		Constant	-0.0472 (0.0248)*	0.0271 0.0674)	-0.1833 (0.0956)*	0.0135 (0.0260)	-0.0269 (0.0297)	-0.0531 (0.0399)
	R^2		0.0986	0.0790	0.1675	0.6990	0.0495	0.4695
	Observations		134	27	27	27	26	27
	P-Value		0.0006	0.1861	0.1133	0.0000	0.3193	0.0020
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.5010 (0.3651)	0.4730 (0.2153)**	-4.3560 (2.9110)	-1.5223 (0.8191)*	4.6499 (8.5268)	-1.0278 (1.7566)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.5525 (0.5059)	0 .	5.4762 (3.8650)	6.9060 (2.3901)***	-15.0988 (26.0809)	1.6484 (1.9979)
	β_3	$ECBI_{t-1}$	-0.1679 (0.1077)	0 .	0.3653 (0.2418)	-0.1426 (0.2805)	-2.5628 (2.7807)	-0.2380 (0.5269)
	β_4	GDP_Growth_{t-1}	-0.6959 (0.8054)	0.4502 (0.5287)	2.6182 (0.9339)**	-0.0474 (1.0645)	-5.9850 (11.3383)	-0.8774 (3.5659)
	β_5	VIX_{t-1}	-0.0022 (0.0029)	-0.0017 (0.0027)	0.0064 (0.0037)*	-0.0025 (0.0046)	-0.0382 (0.0537)	-0.0022 (0.0274)
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.7585 (1.1974)**	0 .	0 .	4.4604 (3.3574)	18.5777 (35.4182)	2.3276 (4.2130)
	β_7	$VIX*ECBI_{t-1}$	0.0077 (0.0046)*	0 .	0 .	0.0052 (0.0139)	0.1277 (0.1665)	0.0055 (0.0313)
		Constant	0.0466 (0.0653)*	0.0272 (0.0674)	-0.4598 (0.2137)*	0.0355 (0.0890)	0.7799 (0.8892)	0.1587 (0.4572)
	R^2		0.1101	0.0790	0.1675	0.7422	0.0793	0.4240
	Observations		134	27	27	27	26	27
	P-Value		0.0007	0.1861	0.1133	0.0000	0.3023	0.0104

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.10 Additional Credit Growth Regression: Domestic Credit to Private Sector, VIX excluded (No Corrections)

Regression equations (4) to (6) do not include the level of the VIX index in an effort to extend the sample period while regression equations (1) to (3) include the level of the VIX index and hence, the sample for regression equations (1) to (3) covers the period between 1990 and 2017 while, the sample for regression equations (4) to (6) covers the period between 1962 and 2017. Table J10 shows the results of regressing domestic credit to the private sector growth on its lagged value, the lagged value of the ECBI index and lagged GDP growth (with country fixed effects). When domestic credit to the private sector is regression on the interaction term between domestic credit growth and ECBI, the coefficient has a positive and statistically significant sign in the cases of the panel, Chile, Japan and Portugal in the second regression.

Table J11 shows the results of regressing domestic credit by deposit banks and other financial institutions growth on its lagged value, the lagged value of the ECBI index and lagged GDP growth (with country fixed effects). The coefficient on the interaction term between domestic credit growth and ECBI is positive and statistically significant in the second regression equation in the cases of the UK and Portugal. This result is in line with the results of Table J9 where the same credit measure is included in regression equations (1) to (3) with the lagged level of VIX included. In these cases, the inclusion (or exclusion) of the lagged level of the volatility index does not affect the regression results.

The regression equations are as follows:

$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_1\text{Credit\_Growth}_{it-1} + \beta_3\text{ECBI}_{it-1} + \beta_4 y_{it-1} + \varepsilon_{it} \quad (4)$$

$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_2\text{Credit\_Growth}_{it-1}*\text{ECBI}_{it-1} + \beta_4 y_{it-1} + \beta_6 y_{it-1}*\text{ECBI}_{it-1} + \varepsilon_{it} \quad (5)$$

$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_1\text{Credit\_Growth}_{it-1} + \beta_2\text{Credit\_Growth}_{it-1}*\text{ECBI}_{it-1} + \beta_3\text{ECBI}_{it-1} + \beta_4 y_{it-1} + \beta_6 y_{it-1}*\text{ECBI}_{it-1} + \varepsilon_{it} \quad (6)$$

Table J10 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector, VIX excluded (No Corrections)

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2963 (0.0576)***	0.4004 (0.1287)***	0.0199 (0.1359)	0.1658 (0.1352)	0.2287 (0.1146)*	0.3656 (0.1247)***
	β_3	$ECBI_{t-1}$	-0.0076 (0.0502)	-0.0396 (0.1537)	0.1036 (0.0959)	-0.1064 (0.1968)	-0.4582 (0.7096)	0.0527 (0.0562)
	β_4	GDP_Growth_{t-1}	0.3693 (0.2150)*	-0.1677 (0.5276)	1.6253 (0.7567)**	1.4905 (0.8467)*	0.3541 (0.2706)	0.8416 (0.3297)**
		Constant	0.0117 (0.0267)	0.0611 (0.0938)	-0.1084 (0.0705)	0.0253 (0.0556)	0.1394 (0.2238)	-0.0471 (0.0424)
	R^2		0.0759	0.1201	0.0417	0.0624	0.1232	0.1821
	Observations		275	55	55	55	55	55
	P-Value		0.0000	0.0230	0.1622	0.0996	0.0212	0.0040
Type II	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.6134 (0.1242)***	0.7679 (0.2685)***	-0.0428 (0.2500)	1.0149 (0.6758)	0.7753 (0.3744)**	0.5439 (0.1940)***
	β_4	GDP_Growth_{t-1}	0.2024 (0.4844)	-1.5920 (1.5748)	-0.5710 (1.3545)	2.1813 (1.6054)	6.2570 (7.0807)	-0.1744 (0.8332)
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.4383 (0.9718)	2.6059 (2.6964)	3.7211 (2.1237)*	-3.0771 (6.6834)	-19.58692 (23.8952)	1.7569 (1.6425)
		Constant	0.0074 (0.0106)	0.0269 (0.0354)	-0.0430 (0.0337)	-0.0013 (0.0263)	-0.0037 (0.0116)	-0.0103 (0.0136)
	R^2		0.0710	0.1041	0.0763	0.0731	0.1285	0.2279
	Observations		275	55	55	55	55	55
	P-Value		0.0000	0.0350	0.0710	0.0768	0.0184	0.0010
Type III	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2288 (0.1488)	1.0474 (0.6083)*	0.1530 (0.4687)	-0.5615 (0.5661)	-0.6265 (3.5084)	-0.2031 (0.4246)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1646 (0.3204)	-1.2843 (1.2546)	-0.3472 (0.8678)	3.7556 (2.8362)	2.8431 (11.7387)	0.8415 (0.6511)
	β_3	$ECBI_{t-1}$	-0.0504 (0.0604)	-0.3099 (0.2236)	-0.2205 (0.2098)	-0.1680 (0.2934)	-0.2821 (0.8162)	-0.0008 (0.0651)
	β_4	GDP_Growth_{t-1}	-0.2453 (0.5909)	-4.0789 (2.0788)*	-3.3855 (2.9648)	1.7711 (2.3664)	4.6312 (8.4985)	-0.0622 (1.0562)
	β_6	$GDP\_Growth*ECBI_{t-1}$	1.3271 (1.1790)	7.2177 (3.8395)*	8.2792 (4.7253)*	-0.9757 (10.0333)	-14.2986 (28.4110)	1.4900 (1.9409)
		Constant	0.0314 (0.0309)	0.2018 (0.1213)	0.0912 (0.1378)	0.0371 (0.0743)	0.0851 (0.2568)	-0.0089 (0.0481)
	R^2		0.0751	0.1658	0.0613	0.0578	0.0953	0.2002
	Observations		275	55	55	55	55	55
	P-Value		0.0000	0.0153	0.1509	0.1612	0.0764	0.0064

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.11. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions, VIX excluded (No Corrections)

Table J11 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions, VIX excluded (No Corrections)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.0706 (0.0608)	-0.0115 (0.1492)	-0.0376 (0.1382)	0.3059 (0.1256)**	0.1473 (0.1303)	0.2384 (0.1369)*
	β_3	$ECBI_{t-1}$	0.0094 (0.0532)	-0.1898 (0.1861)	0.0957 (0.0957)	0.0594 (0.1540)	0.2078 (0.8418)	0.0422 (0.0578)
	β_4	GDP_Growth_{t-1}	0.5027 (0.2330)**	0.5745 (0.6870)	0.7293 (0.7512)	0.6544 (0.6565)	0.5131 (0.3211)	0.3828 (0.3409)
		Constant	0.0045 (0.0286)	0.1381 (0.1162)	-0.0682 (0.0700)	-0.0140 (0.0435)	-0.0570 (0.2661)	-0.0202 (0.0436)
	R^2		-0.0066	-0.0258	-0.0249	0.0767	0.0256	0.0195
	Observations		274	55	55	55	54	55
	P-Value		0.1605	0.6522	0.6425	0.0703	0.2356	0.2659
Type II	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1672 (0.1331)	0.0586 (0.3342)	-0.1508 (0.2388)	1.9083 (0.6563)***	0.4008 (0.4292)	0.4028 (0.2149)*
	β_4	GDP_Growth_{t-1}	0.5650 (0.5113)	2.9146 (1.8712)	-1.3573 (1.3693)	0.2647 (1.2336)	4.9582 (8.3375)	-0.8161 (0.8528)
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.1177 (1.2040)	-4.2920 (3.2009)	3.4628 (2.0712)	2.3732 (5.1801)	-15.1692 (28.1560)	2.2394 (1.6550)
		Constant	0.0085 (0.0117)	0.0373 (0.0459)	-0.0058 (0.0340)	-0.0066 (0.0207)	0.0099 (0.0145)	0.0071 (0.0142)
	R^2		-0.0057	-0.0091	0.0104	0.1151	0.0298	0.0969
	Observations		274	55	55	55	54	55
	P-Value		0.1446	0.4797	0.3229	0.0263	0.2149	0.0423
Type III	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.0008 (0.1553)	-0.5989 (0.5569)	0.2171 (0.4714)	-0.3685 (0.4222)	4.2967 (5.7189)	-0.6333 (0.4369)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1641 (0.3401)	1.3698 (1.2635)	-0.5222 (0.8210)	3.8708 (2.2696)*	-14.0484 (19.3096)	1.3558 (0.6912)*
	β_3	$ECBI_{t-1}$	0.0105 (0.0650)	-0.1591 (0.3031)	-0.1816 (0.2119)	-0.1730 (0.2434)	0.6974 (0.9799)	-0.0486 (0.0667)
	β_4	GDP_Growth_{t-1}	0.6214 (0.6189)	2.0197 (2.6605)	-3.6453 (2.9593)	-0.3285 (1.8504)	12.0277 (11.4628)	-0.8739 (1.0417)
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.2299 (1.2368)	-2.1998 (5.0574)	7.1158 (4.5921)	5.5438 (7.9369)	-38.7766 (38.5360)	1.9874 (1.8942)
		Constant	0.0034 (0.0332)	0.1118 (0.1619)	0.1097 (0.1401)	0.0293 (0.0592)	-0.2050 (0.3069)	0.0426 (0.0492)
	R^2		-0.0132	-0.0260	-0.0076	0.0970	0.0066	0.1002
	Observations		274	55	55	55	54	55
	P-Value		0.3680	0.6072	0.4766	0.0738	0.3886	0.0690

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.12. Additional Credit Growth Regression: Domestic Credit to Private Sector (Heteroskedasticity and Serial Correlation Controlled For)

Table J12 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (Heteroskedasticity and Serial Correlation Controlled For)

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2604 (0.1795)	0.2024 .	-0.2080 .	0.7874 .	0.2638 .	0.4309 .
	β_3	$ECBI_{t-1}$	-0.0520 (0.0671)	0 .	0.1101 .	0.7777 .	-0.4861 .	-0.1213 .
	β_4	GDP_Growth_{t-1}	1.2096 (0.4668)*	0.6531 .	3.0691 .	0.6896 .	0.0360 .	1.2234 .
	β_5	VIX_{t-1}	0.0005 (0.0006)	-0.0006 .	0.0007 .	-0.0023 .	-0.0002 .	0.0014 .
		Constant	0.0049 (0.0380)	0.0107 .	-0.1687 .	0.0165 .	0.1553 .	0.0709 .
	R^2		0.2479	0.0732	0.2964	0.6537	-0.0421	0.5057
	Observations		135	27	27	27	27	27
	P-Value		0.0018	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.2870 (0.2659)	0.2775 .	-0.1865 .	2.2637 .	0.6624 .	0.5383 .
	β_4	GDP_Growth_{t-1}	0.0292 (0.7732)	0.6531 .	-29.9643 .	-0.2951 .	10.6374 .	-0.1299 .
	β_5	VIX_{t-1}	0.0016 (0.0019)	-0.0006 .	0.0489 .	-0.0018 .	-0.0062 .	0.0095 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	1.8957 (1.6035)	0 .	43.9307 .	3.7190 .	-33.6296 .	1.5278 .
	β_7	$VIX*ECBI_{t-1}$	-0.0020 (0.0026)	0 .	-0.0620 .	-0.0004 .	0.0161 .	-0.0097 .
		Constant	-0.0222 (0.0200)	0.0107 .	-0.1221 .	0.0243 .	0.0167 .	-0.0261 .
	R^2		0.2463	0.0732	0.3825	0.6766	-0.0689	0.4940
	Observations		135	27	27	27	27	27
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.5727 (0.4921)	0.2024 .	-3.5543 .	-0.3379 .	-27.2467 .	-0.9403 .
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.5191 (0.0633)	0 .	4.5088 .	3.2258 .	84.5016 .	1.5892 .
	β_3	$ECBI_{t-1}$	-0.1886 (0.0633)**	0 .	0.1953 .	-0.0141 .	3.1350 .	-0.3269 .
	β_4	GDP_Growth_{t-1}	-0.5553 (0.8028)	0.6531 .	3.2913 .	-0.2222 .	-14.5514 .	1.8034 .
	β_5	VIX_{t-1}	-0.0025 (0.0013)	-0.0006 .	0.0020 .	-0.0018 .	0.1129 .	-0.0066 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.9086 (1.7325)	0 .	0 .	3.6340 .	44.1001 .	-0.6049 .
	β_7	$VIX*ECBI_{t-1}$	0.0051 (0.0022)*	0 .	0 .	0 .	-0.3500 .	0.0086 .
		Constant	0.0839 (0.0308)*	0.0107 .	-0.2699 .	0.0237 .	-1.0116 .	0.2601 .
	R^2		0.2740	0.0732	0.3825	0.6443	-0.1046	0.4537
	Observations		135	27	27	27	27	27
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.13. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For)

Table J13 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.1537 (0.2235)	0.4730 .	-0.2397 .	0.7767 .	-0.33837 .	0.4444 .
	β_3	$ECBI_{t-1}$	0.0126 (0.0583)	0 .	0.1819 .	0.0917 .	-0.3073 .	-0.0542 .
	β4	GDP_Growtht-1	0.9931 (0.3779)*	0.4502 .	2.3557 .	0.7982 .	-0.5478 .	0.9698 .
	β5	VIXt-1	0.0023 (0.0013)	-0.0017 .	0.0055 .	-0.0019 .	0.0019 .	0.0026 .
		Constant	-0.0576 (0.0455)	0.0272 .	-0.2910 .	-0.0022 .	0.0843 .	-0.0023 .
	R^2		0.1102	0.0790	0.1294	0.5817	0.0519	0.4557
	Observations		134	27	27	27	26	27
	P-Value		0.0009	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1459 (0.3151)	0.6485 .	-0.2780 .	2.4945 .	-1.1134 .	0.4890 .
	β4	GDP_Growtht-1	-0.3806 (0.6578)	0.4502 .	-24.3496 .	-0.4740 .	-11.7972 .	-1.8782 .
	β5	VIXt-1	0.0016 (0.0017)	-0.0017 .	0.0413 .	-0.0014 .	0.0194 .	0.0095 .
	β6	$GDP\_Growth*ECBI_{t-1}$	2.1506 (1.2622)	0 .	35.6245 .	4.8515 .	35.6034 .	3.4724 .
	β7	$VIX*ECBI_{t-1}$	0.0011 (0.0271)	0 .	-0.0460 .	-0.0007 .	-0.0524 .	-0.0077 .
		Constant	-0.0472 (0.0271)	0.0271 .	-0.1833 .	0.0135 .	-0.0269 .	-0.0531 .
	R^2		0.1267	0.0790	0.1675	0.6990	0.0495	0.4695
	Observations		134	27	27	27	26	27
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.5010 (0.6139)	0.4730 .	-4.3560 .	-1.5223 .	4.6499 .	-1.0278 .
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.5525 (0.8772)	0 .	5.4762 .	6.9060 .	-15.0988 .	1.6484 .
	β_3	$ECBI_{t-1}$	-0.1679 (0.0934)	0 .	0.3653 .	-0.1426 .	-2.5628 .	-0.2380 .
	β4	GDP_Growtht-1	-0.6959 (0.8814)	0.4502 .	2.6182 .	-0.0474 .	-5.9850 .	-0.8774 .
	β5	VIXt-1	-0.0022 (0.0026)	-0.0017 .	0.0064 .	-0.0025 .	-0.0382 .	-0.0022 .
	β6	$GDP\_Growth*ECBI_{t-1}$	2.7585 (1.6271)	0 .	0 .	4.4604 .	18.5777 .	2.3276 .
	β7	$VIX*ECBI_{t-1}$	0.0077 (0.0005)*	0 .	0 .	0.0052 .	0.1277 .	0.0055 .
		Constant	0.0466 (0.0380)*	0.0272 .	-0.4598 .	0.0355 .	0.7799 .	0.1587 .
	R^2		0.1383	0.0790	0.1675	0.7422	0.0793	0.4240
	Observations		134	27	27	27	26	27
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.14. Additional Credit Growth Regression: Domestic Credit to Private Sector (Heteroskedasticity and Serial Correlation Controlled For), VIX excluded

Table J14 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (Heteroskedasticity and Serial Correlation Controlled For), VIX excluded

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2963 (0.0791)**	0.4004 .	0.0199 .	0.1658 .	0.2287 .	0.3656 .
	β_3	$ECBI_{t-1}$	-0.0076 (0.0372)	-0.0396 .	0.1036 .	-0.1064 .	-0.4582 .	0.0527 .
	β_4	GDP_Growth_{t-1}	0.3693 (0.3120)	-0.1677 .	1.6253 .	1.4905 .	0.3541 .	0.8416 .
		Constant	0.0117 (0.0251)	0.0611 .	-0.1084 .	0.0253 .	0.1394 .	-0.0471 .
	R^2		0.0895	0.1201	0.0417	0.0624	0.1232	0.1821
	Observations		275	55	55	55	55	55
	P-Value		0.0020	.	.	.	.	.
Type II	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.6134 (0.1740)**	0.7679 .	-0.0428 .	1.0149 .	0.7753 .	0.5439 .
	β_4	GDP_Growth_{t-1}	0.2024 (0.5540)	-1.5920 .	-0.5710 .	2.1813 .	6.2570 .	-0.1744 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.4383 (0.9313)	2.6059 .	3.7211 .	-3.0771 .	-19.58692 .	1.7569 .
		Constant	0.0074 (0.0094)	0.0269 .	-0.0430 .	-0.0013 .	-0.0037 .	-0.0103 .
	R^2		0.0847	0.1041	0.0763	0.0731	0.1285	0.2279
	Observations		275	55	55	55	55	55
	P-Value		0.0014	.	.	.	.	.
Type III	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2288 (0.1511)	1.0474 .	0.1530 .	-0.5615 .	-0.6265 .	-0.2031 .
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1646 (0.2936)	-1.2843 .	-0.3472 .	3.7556 .	2.8431 .	0.8415 .
	β_3	$ECBI_{t-1}$	-0.0504 (0.0565)	-0.3099 .	-0.2205 .	-0.1680 .	-0.2821 .	-0.0008 .
	β_4	GDP_Growth_{t-1}	-0.2453 (0.9171)	-4.0789 .	-3.3855 .	1.7711 .	4.6312 .	-0.0622 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	1.3271 (1.4104)	7.2177 .	8.2792 .	-0.9757 .	-14.2986 .	1.4900 .
		Constant	0.0314 (0.0368)	0.2018 .	0.0912 .	0.0371 .	0.0851 .	-0.0089 .
	R^2		0.0888	0.1658	0.0613	0.0578	0.0953	0.2002
	Observations		275	55	55	55	55	55
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.15. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For), VIX excluded

Table J15 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For), VIX excluded

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.0706 (0.0631)	-0.0115 .	-0.0376 .	0.3059 .	0.1473 .	0.2384 .
	β_3	$ECBI_{t-1}$	0.0094 (0.0587)	-0.1898 .	0.0957 .	0.0594 .	0.2078 .	0.0422 .
	β4	GDP_Growtht-1	0.5027 (0.0750)***	0.5745 .	0.7293 .	0.6544 .	0.5131 .	0.3828 .
		Constant	0.0045 (0.0293)	0.1381 .	-0.0682 .	-0.0140 .	-0.0570 .	-0.0202 .
	R^2		0.0083	-0.0258	-0.0249	0.0767	0.0256	0.0195
	Observations		274	55	55	55	54	55
	P-Value		0..92	.	.	.	.	.
Type II	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1672 (0.1131)	0.0586 .	-0.1508 .	1.9083 .	0.4008 .	0.4028 .
	β4	GDP_Growtht-1	0.5650 (0.7338)	2.9146 .	-1.3573 .	0.2647 .	4.9582 .	-0.8161 .
	β6	$GDP\_Growth*ECBI_{t-1}$	-0.1177 (1.5019)	-4.2920 .	3.4628 .	2.3732 .	-15.1692 .	2.2394 .
		Constant	0.0085 (0.0026)**	0.0373 .	-0.0058 .	-0.0066 .	0.0099 .	0.0071 .
	R^2		0.0092	-0.0091	0.0104	0.1151	0.0298	0.0969
	Observations		274	55	55	55	54	55
	P-Value		0.0030	.	.	.	.	.
Type III	Coefficient	Variable	Full 1962-2017	Chile 1962-2017	Colombia 1962-2017	The UK 1962-2017	Japan 1962-2017	Portugal 1962-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.0008 (0.2700)	-0.5989 .	0.2171 .	-0.3685 .	4.2967 .	-0.6333 .
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.1641 (0.5217)	1.3698 .	-0.5222 .	3.8708 .	-14.0484 .	1.3558 .
	β_3	$ECBI_{t-1}$	0.0105 (0.0338)	-0.1591 .	-0.1816 .	-0.1730 .	0.6974 .	-0.0486 .
	β4	GDP_Growtht-1	0.6214 (0.6638)	2.0197 .	-3.6453 .	-0.3285 .	12.0277 .	-0.8739 .
	β6	$GDP\_Growth*ECBI_{t-1}$	-0.2299 (1.3649)	-2.1998 .	7.1158 .	5.5438 .	-38.7766 .	1.9874 .
		Constant	0.0034 (0.0174)	0.1118 .	0.1097 .	0.0293 .	-0.2050 .	0.0426 .
	R^2		0.0019	-0.0260	-0.0076	0.0970	0.0066	0.1002
	Observations		274	55	55	55	54	55
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.16. Additional Credit Growth Regression: Domestic Credit to Private Sector (xtregar with Fixed Effects)

Table J16 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (xtregar with Fixed Effects)

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	-0.0051	-0.0832	-0.1897	0.8629	0.2008	0.3928
			(0.0817)	(0.2041)	(0.1725)	(0.0924)***	(0.2391)	(0.1927)*
	β_3	$ECBI_{t-1}$	-0.1199	0	-0.2669	0.0492	-0.6915	-0.1156
			(0.0894)	.	(0.2849)	(0.0554)	(0.7134)	(0.0980)
	β4	GDP_Growtht-1	1.3292	0.8445	3.2483	0.9013	0.1691	1.2085
			(0.2733)***	(0.4206)*	(0.8256)***	(0.3200)***	(0.5342)	(0.5917)*
	β5	VIXt-1	0.0014	0.0001	0.0018	-0.0023	0.0005	0.0015
			(0.0012)	(0.0023)	(0.0034)	(0.0010)**	(0.0019)	(0.0025)
		Constant	0.0332	0.0015	0.0894	0.0145	0.2069	0.0644
			(0.0365)	(0.0424)	(0.1823)	(0.0318)	(0.1844)	(0.0667)
	R^2		0.1205	0.0789	0.3462	0.8162	-0.1010	0.4144
	Observations		130	26	26	26	26	26
	P-Value		0.0001	0.1934	0.0106	0.0000	0.7876	0.0037
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.1858	-0.1141	-0.2330	2.4554	0.7706	0.4964
			(0.1118)*	(0.2798)	(0.2263)	(0.2328)***	(0.7329)	(0.2188)**
	β4	GDP_Growtht-1	-0.5081	0.8445	-3568.189	-0.3826	13.6759	-0.2222
			(0.7718)	(0.4206)*	(2539.674)	(0.7653)	(15.2934)	(3.0806)
	β5	VIXt-1	0.0015	0.0001	3.6828	-0.0003	-0.0035	0.0102
			(0.0028)	(0.0023)	(2.6092)	(0.0019)	(0.0233)	(0.0077)
	β6	$GDP\_Growth*ECBI_{t-1}$	2.8083	0	4718.0180	4.9194	-42.4787	1.6858
			(1.1430)**	.	(3354.9820)	(2.4410)**	(48.1164)	(3.7942)
	β7	$VIX*ECBI_{t-1}$	-0.0011	0	-4.8616	-0.0038	0.0097	-0.0102
			(0.0039)	.	(3.4462)	(0.0039)	(0.0687)	(0.0071)
		Constant	-0.0229	0.0015	-0.1384	0.0079	0.0026	-0.0316
			(0.0160)	(0.0424)	(0.0765)	(0.0321)	(0.0404)	(0.0492)
	R^2		0.1433	0.0789	0.3870	0.8572	-0.0561	0.4144
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.1934	0.0094	0.0000	0.6061	0.0047
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2047	-0.0832	-423.7574	1.0667	-29.2837	-2.0599
			(0.3274)	(0.2041)	(301.5617)	(1.5769)	(41.4204)	(2.4385)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.4076	0	559.5522	-0.5800	90.7997	2.7406
			(0.4557)	.	(398.3494)	(4.5080)	(127.2757)	(2.7674)
	β_3	$ECBI_{t-1}$	-0.2480	0	59.2604	-0.1199	3.3437	-0.2589
			(0.1311)*	.	(42.3696)	(0.3694)	(7.0069)	(0.6353)
	β4	GDP_Growtht-1	-0.8296	0.8445	3.3509	-0.9269	16.1568)	2.0848
			(0.8140)	(0.4206)*	(0.8055)***	(1.2970)	(46.7221)	(4.4346)
	β5	VIXt-1	-0.0018	0.0001	0.0026	-0.0025	0.1200	0.0040
			(0.0033)	(0.0023)	(0.0032)	(0.0064)	(0.2175)	(0.0389)
	β6	$GDP\_Growth*ECBI_{t-1}$	3.4230	0	0	6.4257	48.9462	-0.8025
			(1.2205)***	.	.	(4.0258)	(143.7697)	(5.1918)
	β7	$VIX*ECBI_{t-1}$	0.0049	0	0	0.0019	-0.3719	0.0026
			(0.0051)	.	.	(0.0186)	(0.6716)	(0.0443)
		Constant	0.1141	0.0015	-44.9986	0.0555	-1.0771	0.1883
			(0.0489)**	(0.0424)	(30.1573)	(0.1868)	(2.3336)	0.4684
	R^2		0.1510	0.0789	0.3870	0.8524	-0.0983	0.3189
	Observations		130	26	26	26	26	26
	P-Value		0.0001	0.1934	0.0094	0.0000	0.6868	0.0439

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.17. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (xtregar with Fixed Effects)

Table J17 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (xtregar with Fixed Effects)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	-0.2501 (0.0816)***	-0.1629 (0.1942)	-0.3404 (.1715)*	0.8757 (0.1149)***	-0.3098 (0.2878)	0.3102 (0.1916)
	β_3	$ECBI_{t-1}$	-0.0079 (0.1080)	0 .	-0.1573 (0.3585)	0.0542 (0.0606)	-0.4633 (0.5236)	-0.0009 (0.1099)
	β4	GDP_Growthr-1	1.1474 (0.2868)***	1.0207 (0.4768)**	2.7993 (0.9625)***	0.8624 (0.3336)**	-0.4524 (0.5016)	0.7169 (0.5068)
	β5	VIXr-1	0.0038 (0.0013)***	-0.0003 (0.0032)	0.0068 (0.0041)	-0.0019 (0.0011)	0.0021 (0.0013)	0.0034 (0.0023)
		Constant	-0.0649 (0.0368)*	0.0044 (0.0280)	-0.0712 (0.2059)	0.0058 (0.0315)	0.1283 (0.1790)	-0.0549 (0.0529)
	R^2		0.1348	0.1301	0.2721	0.7331	0.0514	0.1802
	Observations		129	26	26	26	25	26
	P-Value		0.0000	0.1113	0.0290	0.0000	0.2949	0.0850
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.3881 (0.1089)***	-0.2233 (0.2663)	-0.4520 (0.2285)*	2.6841 (0.2717)***	-1.2181 (0.9237)	0.3490 (0.2174)
	β4	GDP_Growthr-1	-0.6137 (0.8063)	1.0207 (0.4768)**	-125.1545 (157.3821)	-0.5485 (0.7589)	-11.5192 (12.1935)	-2.1789 (2.5648)
	β5	VIXr-1	0.0012 (0.0030)	-0.0003 (0.0032)	0.1186 (0.1275)	-0.0002 (0.0019)	0.0186 (0.0202)	0.0066 (0.0077)
	β6	$GDP\_Growth*ECBI_{t-1}$	2.7828 (1.1915)**	0 .	169.0861 (207.9783)	5.3809 (2.4136)**	35.0320 (38.0618)	3.6660 (3.1682)
	β7	$VIX*ECBI_{t-1}$	0.0036 (0.0041)	0 .	-0.1468 (0.1673)	-0.0038 (0.0040)	-0.0491 (0.0598)	-0.0033 (0.0074)
		Constant	-0.0598 (0.0164)***	0.0044 (0.0280)	-0.2083 (0.0813)**	0.0065 (0.0277)	-0.0331 (0.0296)	-0.0612 (0.0310)*
	R^2		0.1801	0.1301	0.2596	0.8247	0.0430	0.2155
	Observations		129	26	26	26	25	26
	P-Value		0.0000	0.1113	0.0475	0.0000	0.3399	0.0761
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.0509 (0.3927)	-0.1629 (0.1942)	-23.1237 (28.9530)	-1.7536 (1.1219)	-11.7698 (9.8710)	-0.8034 (1.7569)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.3103 (0.5375)	0 .	30.0945 (38.2449)	7.6700 (3.2356)**	35.3967 (30.3233)	1.1262 (2.0078)
	β_3	$ECBI_{t-1}$	-0.1928 (0.1461)	0 .	3.3278 (4.4440)	-0.0790 (0.2770)	-10.2984 (3.8233)**	-0.7142 (0.5715)
	β4	GDP_Growthr-1	-0.9580 (0.8590)	1.0207 (0.4768)**	2.8437 (0.9732)***	0.3120 (1.1770)	-20.9044 (13.7899)	0.3623 (3.3572)
	β5	VIXr-1	-0.0012 (0.0037)	-0.0003 (0.0032)	0.0074 (0.0042)*	-0.0019 (0.0048)	-0.1782 (0.0709)**	-0.0348 (0.0295)
	β6	$GDP\_Growth*ECBI_{t-1}$	3.3685 (1.2836)***	0 .	0 .	3.4623 (3.5718)	65.4450 (42.6885)	0.7237 (3.9774)
	β7	$VIX*ECBI_{t-1}$	0.0080 (0.0056)	0 .	0 .	0.0027 (0.0143)	0.5633 (0.2193)**	0.0444 (0.0336)
		Constant	0.0478 (0.0490)	0.0044 (0.0280)	-2.7274 (2.5737)	0.0175 (0.1062)	3.2594 (0.7231)***	0.5519 (0.2392)**
	R^2		0.1719	0.1301	0.2596	0.8032	0.3713	0.1310
	Observations		129	26	26	26	26	26
	P-Value		0.0000	0.1113	0.0475	0.0000	0.0294	0.2171

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.18. Additional Credit Growth Regression: Domestic Credit to Private Sector (Dummy Included for Post Crisis Period)

Table J18 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (Dummy Included for Post Crisis Period)

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.4633 (0.0759)***	-0.1031 (0.1144)	-0.2024 (0.1891)	0.7891 (0.2151)***	-0.1738 (0.4511)	1.0917 (0.8248)
	β_3	$ECBI_{t-1}$	-0.0375 (0.0149)**	0.0304 (0.0127)**	-0.1497 (0.0642)**	-0.0858 (0.1838)	0.1422 (0.0909)	0.0331 (0.1568)
	β_4	GDP_Growth_{t-1}	0.6617 (0.1342)***	0.5301 (0.0871)***	0.1755 (0.5989)	0.9207 (0.7224)	0.0291 (0.4916)	1.2550 (0.6340)*
	β_5	VIX_{t-1}	0.0002 (0.0004)	-0.0013 (0.0004)***	0.0070 (0.0019)***	0.0005 (0.0029)	-0.0023 (0.0013)*	-0.0020 (0.0055)
		Constant	0.0013 (0.0022)	0.0011 (0.0013)	0.0029 (0.0066)	0.0004 (0.0040)	0.0022 (0.0028)	0.0028 (0.0034)
	R^2		0.3046	0.7844	0.3425	0.6464	0.2422	0.7948
	Observations		135	27	27	27	27	27
	P-Value		0.0000	0.0000	0.0093	0.0000	0.0373	0.0000
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.6148 (0.1115)***	0.0122 (0.1572)	-0.1232 (0.2642)	2.8290 (0.6214)***	0.9929 (1.0187)	1.0265 (0.1328)***
	β_4	GDP_Growth_{t-1}	-0.0179 (0.4147)	0 .	0 .	34.3751 (13.0106)**	0 .	0 .
	β_5	VIX_{t-1}	-0.0010 (0.0006)*	0 .	0 .	-0.0393 (0.01792)**	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.7464 (0.6154)	0.8925 (0.1069)***	-0.9295 (0.6708)	-92.1928 (35.4292)**	2.0688 (0.8577)**	1.2697 (0.3289)***
	β_7	$VIX*ECBI_{t-1}$	0.0004 (0.0009)	-0.0008 (0.0002)***	0.0042 (0.0015)***	-0.0393 (0.0179)**	-0.0010 (0.0008)	-0.0009 (0.0004)**
		Constant	0.0010 (0.0023)	0.0015 (0.0014)	0.0008 (0.0071)	-0.0001 (0.0035)	0.0027 (0.0029)	0.0028 (0.0033)
	R^2		0.2385	0.7399	0.2159	0.7197	0.1946	0.8033
	Observations		135	27	27	27	27	27
	P-Value		0.0000	0.0000	0.0353	0.0000	0.0468	0.0000
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	1.2078 (0.3249)***	-0.1031 (0.1144)	-0.2024 (0.1891)	12.5597 (1.2995)***	-0.1738 (0.4511)	1.0917 (0.8248)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-1.2286 (0.4555)***	0 .	0 .	-34.1856 (3.8539)***	0 .	0 .
	β_3	$ECBI_{t-1}$	-0.1159 (0.0243)***	0.0304 (0.0127)**	-0.1497 (0.0642)**	-1.2400 (0.0761)***	0.1422 (0.0909)	0.0331 (0.1568)
	β_4	GDP_Growth_{t-1}	1.4456 (0.5146)***	0 .	0 .	82.4085 (3.3044)***	0 .	0 .
	β_5	VIX_{t-1}	-0.0003 (0.0006)	0 .	0 .	0.0158 (0.0042)***	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.7793 (0.7121)	0.7267 (0.1194)***	0.2319 (0.7911)	-220.2756 (9.1052)***	0.0896 (1.5149)	1.4015 (0.7079)*
	β_7	$VIX*ECBI_{t-1}$	0.0043 (0.0013)***	-0.0018 (0.0005)***	0.0092 (0.0026)***	-0.0009 (0.0106)	-0.0072 (0.0041)*	-0.0022 (0.0061)
		Constant	0.0020 (0.0021)	0.0011 (0.0013)	0.0029 (0.0066)	0.0003 (0.0007)	0.0022 (0.0028)	0.0028 (0.0034)
	R^2		0.3726	0.7844	0.3425	0.9897	0.2422	0.7948
	Observations		135	27	27	27	27	27
	P-Value		0.0000	0.0000	0.0093	0.0000	0.0373	0.0000

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.19. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Dummy Included for Post Crisis Period)

Table J19 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Dummy Included for Post Crisis Period)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.1654 (0.0940)*	-0.4208 (0.1597)**	-0.2368 (0.2054)	0.6933 (0.3015)**	0.1315 (0.5485)	-0.1190 (0.3247)
	β_3	$ECBI_{t-1}$	-0.0529 (0.0234)**	0.0563 (0.0182)***	-0.2326 (0.1262)*	-0.2765 (0.2325)	-0.0711 (0.1173)	-0.2320 (0.0812)***
	β_4	GDP_Growth_{t-1}	0.3090 (0.2087)	0.4205 (0.1133)***	-0.6596 (1.1222)	1.6837 (1.0093)	0.6634 (0.6192)	0.5358 (0.3949)
	β_5	VIX_{t-1}	0.0011 (0.0007)	-0.0010 (0.0005)**	0.0096 (0.0038)**	0.0029 (0.0036)	0.0013 (0.0017)	0.0090 (0.0036)**
		Constant	0.0031 (0.0034)	0.0014 (0.0017)	0.0060 (0.0126)	0.0039 (0.0050)	0.0047 (0.0045)	0.0050 (0.0048)
	R^2		0.0197	0.7695	0.1199	0.3392	-0.0222	0.6004
	Observations		134	27	27	27	26	27
	P-Value		0.0353	0.0000	0.1487	0.0098	0.5016	0.0001
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.2783 (0.1270)**	-0.2168 (0.2177)	0.1488 (0.2693)	2.6174 (0.9918)**	0.1231 (1.6015)	0.8155 (0.1677)***
	β_4	GDP_Growth_{t-1}	0.2364 (0.6268)	0 .	0 .	28.5145 (18.5873)	0 .	0 .
	β_5	VIX_{t-1}	-0.0006 (0.0009)	0 .	0 .	-0.0426 (0.0257)	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.2348 (0.9273)	0.8461 (0.1510)***	-2.4503 (1.2712)*	-74.4684 (50.3729)	1.3534 (1.5082)	0.0226 (0.4493)
	β_7	$VIX*ECBI_{t-1}$	0.0005 (0.9273)	0.0004 (0.0004)	0.0046 (0.0027)	0.1128 (0.0705)	0.0011 (0.0025)	-0.0012 (0.0006)**
		Constant	0.0025 (0.0035)	0.0021 (0.0020)	0.0029 (0.0132)	0.0035 (0.0050)	0.0044 (0.0044)	0.0040 (0.0055)
	R^2		-0.0288	0.6831	0.0282	0.3406	0.0072	0.4758
	Observations		134	27	27	27	26	27
	P-Value		0.3889	0.0000	0.3142	0.0150	0.3861	0.0004
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	1.0340 (0.4997)**	-0.4208 (0.1597)**	-0.2368 (0.2054)	9.5248 (10.3127)	0.1315 (0.5485)	-0.1190 (0.3247)
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-1.3400 (0.6762)**	0 .	0 .	-25.5013 (30.6851)	0 .	0 .
	β_3	$ECBI_{t-1}$	-0.1675 (0.0368)***	0.0563 (0.0182)***	0.2326 (0.1262)*	-1.2133 (0.4736)**	-0.0711 (0.1173)	-0.2320 (0.0812)***
	β_4	GDP_Growth_{t-1}	1.7778 (0.8524)**	0 .	0 .	74.2679 (24.8874)***	0 .	0 .
	β_5	VIX_{t-1}	-0.0012 (0.0009)	0 .	0 .	-0.0051 (0.0275)	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	-1.6670 (1.1530)	0.5764 (0.1554)***	-0.8714 (1.4824)**	-196.6127 (70.6308)	2.0445 (1.9082)	0.5984 (0.4410)
	β_7	$VIX*ECBI_{t-1}$	0.0087 (0.0022)***	-0.0014 (0.0007)**	0.0126 (0.0051)**	0.0577 (0.0657)	0.0039 (0.0053)	0.0100 (0.0040)**
		Constant	0.0043 (0.0033)	0.0014 (0.0017)	0.0060 (0.0126)	0.0039 (0.0042)	0.0047 (0.0045)	0.0050 (0.0048)
	R^2		0.1114	0.7695	0.1199	0.5330	-0.0222	0.6004
	Observations		134	27	27	27	26	27
	P-Value		0.0006	0.0000	0.1487	0.0019	0.5016	0.0001

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.20. Additional Credit Growth Regression: Domestic Credit to Private Sector (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Table J20 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Regression Results: Domestic Credit to Private Sector								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.4633 (0.2124)*	-0.1031	-0.2024	0.7891	-0.1738	1.0917
	β_3	$ECBI_{t-1}$	-0.0375 (0.0251)	0.0304	-0.1497	-0.0858	0.1422	0.0331
	β_4	GDP_Growth_{t-1}	0.6617 (0.1084)***	0.5301	0.1755	0.9207	0.0291	1.2550
	β_5	VIX_{t-1}	0.0002 (0.0010)	-0.0013	0.0070	0.0005	-0.0023	-0.0020
		Constant	0.0013 (0.0020)	0.0011	0.0029	0.0004	0.0022	0.0028
	R^2		0.3260	0.7844	0.3425	0.6464	0.2422	0.7948
	Observations		135	27	27	27	27	27
	P-Value		0.0087	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.6148 (0.3152)	0.0122	-0.1232	2.8290	0.9929	1.0265
	β_4	GDP_Growth_{t-1}	-0.0179 (0.4917)	0	0	34.3731	0	0
	β_5	VIX_{t-1}	-0.0010 (0.0010)	0	0	-0.0393	0	0
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.7464 (0.6870)	0.8925	-0.9295	-92.1928	2.0688	1.2697
	β_7	$VIX*ECBI_{t-1}$	0.0004 (0.0017)	-0.0008	0.0042	-0.0393	-0.0010	-0.0009
		Constant	0.0010 (0.0023)	0.0015	0.0008	-0.0001	0.0027	0.0028
	R^2		0.2621	0.7399	0.2159	0.7197	0.1946	0.8033
	Observations		135	27	27	27	27	27
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2017	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	1.2078 (0.3072)**	-0.1031	-0.2024	12.5597	-0.1738	1.0917
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-1.2286 (0.6930)	0	0	-34.1856	0	0
	β_3	$ECBI_{t-1}$	-0.1159 (0.07)	0.0304	-0.1497	-1.2400	0.1422	0.0331
	β_4	GDP_Growth_{t-1}	1.4456 (0.3525)**	0	0	82.4085	0	0
	β_5	VIX_{t-1}	-0.0003 (0.0004)	0	0	0.0158	0	0
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.7793 (0.3563)*	0.7267	0.2319	-220.2756	0.0896	1.4015
	β_7	$VIX*ECBI_{t-1}$	0.0043 (0.0034)	-0.0018	0.0092	-0.0009	-0.0072	-0.0022
		Constant	0.0020 (0.0015)	0.0011	0.0029	0.0003	0.0022	0.0028
	R^2		0.3923	0.7844	0.3425	0.9897	0.2422	0.7948
	Observations		135	27	27	27	27	27
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.21. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Table J21 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.1654 (0.2327)	-0.4208 .	-0.2368 .	0.6933 .	0.1315 .	-0.1190 .
	β_3	$ECBI_{t-1}$	-0.0529 (0.0429)	0.0563 .	-0.2326 .	-0.2765 .	-0.0711 .	-0.2320 .
	β_4	GDP_Growth_{t-1}	0.3090 (0.2491)	0.4205 .	-0.6596 .	1.6837 .	0.6634 .	0.5358 .
	β_5	VIX_{t-1}	0.0011 (0.0017)	-0.0010 .	0.0096 .	0.0029 .	0.0013 .	0.0090 .
		Constant	0.0031 (0.0026)	0.0014 .	0.0060 .	0.0039 .	0.0047 .	0.0050 .
	R^2		0.0501	0.7695	0.1199	0.3392	-0.0222	0.6004
	Observations		134	27	27	27	26	27
	P-Value		0.0340	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	0.2783 (0.3104)	-0.2168 .	0.1488 .	2.6174 .	0.1231 .	0.8155 .
	β_4	GDP_Growth_{t-1}	0.2364 (0.5041)	0 .	0 .	28.5145 .	0 .	0 .
	β_5	VIX_{t-1}	-0.0006 (0.0012)	0 .	0 .	-0.0426 .	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.2348 (0.8663)	0.8461 .	-2.4503 .	-74.4684 .	1.3534 .	0.0226 .
	β_7	$VIX*ECBI_{t-1}$	0.0005 (0.0018)	0.0004 .	0.0046 .	0.1128 .	0.0011 .	-0.0012 .
		Constant	0.0025 (0.0025)	0.0021 .	0.0029 .	0.0035 .	0.0044 .	0.0040 .
	R^2		0.0033	0.6831	0.0282	0.3406	0.0072	0.4758
	Observations		134	27	27	27	26	27
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2017	Chile 1990-2017	Colombia 1990-2017	The UK 1990-2017	Japan 1990-2016	Portugal 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	1.0340 (0.3607)**	-0.4208 .	-0.2368 .	9.5248 .	0.1315 .	-0.1190 .
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-1.3400 (0.6614)	0 .	0 .	-25.5013 .	0 .	0 .
	β_3	$ECBI_{t-1}$	-0.1675 (0.0926)	0.0563 .	0.2326 .	-1.2133 .	-0.0711 .	-0.2320 .
	β_4	GDP_Growth_{t-1}	1.7778 (0.5080)**	0 .	0 .	74.2679 .	0 .	0 .
	β_5	VIX_{t-1}	-0.0012 (0.0009)	0 .	0 .	-0.0051 .	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	-1.6670 (0.8654)	0.5764 .	-0.8714 .	-196.6127 .	2.0445 .	0.5984 .
	β_7	$VIX*ECBI_{t-1}$	0.0087 (0.0044)	-0.0014 .	0.0126 .	0.0577 .	0.0039 .	0.0100 .
		Constant	0.0043 (0.0024)	0.0014 .	0.0060 .	0.0039 .	0.0047 .	0.0050 .
	R^2		0.1114	0.7695	0.1199	0.5330	-0.0222	0.6004
	Observations		134	27	27	27	26	27
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.22. Additional Credit Growth Regression: Private Credit by Deposit Banks

Table J22 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks

Regression Results: Private Credit by Deposit Money Banks								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.5139 (0.0626)***	0.2516 (0.1615)	0.0302 (0.0858)	0.9324 (0.1554)***	0.5757 (0.1802)***	0.5508 (0.1290)***
	β_3	$ECBI_{t-1}$	0.0146 (0.0453)	0 .	0.1147 (0.0552)**	0.0961 (0.0663)	-0.0855 (1.0083)	-0.0713 (0.0547)
	β_4	GDP_Growtht-1	1.2771 (0.2026)***	1.2084 (0.4261)***	2.1428 (0.2768)***	1.1234 (.03596)***	0.2080 (0.7409)	1.3583 (0.3673)***
	β_5	VIXt-1	-0.0010 (0.0008)	-0.0020 (0.0019)	-0.0041 (0.0011)***	-0.0029 (0.0013)**	-0.0013 (0.0026)	0.0008 (0.0016)
		Constant	-0.0123 (0.0296)	0.0020 (0.0537)	-0.0468 (0.0486)	0.0050 (0.0279)	0.0444 (0.3126)	0.0400 (0.0450)
	R^2		0.4998	0.3627	0.8731	0.7432	0.2586	0.6903
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0047	0.0000	0.0000	0.0344	0.0000
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	PrivateCredit_Growth*ECBIt-1	0.6494 (0.1049)***	0.3449 (0.2214)	0.1111 (0.1132)	2.8164 (0.2883)***	1.6963 (0.5836)***	0.6772 (0.1750)***
	β_4	GDP_Growtht-1	-0.1532 (0.5788)	1.2084 (0.4261)***	-5.7116 (5.0437)	-0.6751 (0.8295)	13.7597 (24.1699)	0.6033 (2.2527)
	β_5	VIXt-1	-0.0001 (0.0015)	-0.0020 (0.0019)	0.0044 (0.0085)	-0.0004 (0.0020)	-0.0180 (0.0385)	0.0055 (0.0050)
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.1585 (1.8601)**	0 .	10.4279 (6.7042)	6.4336 (2.6101)**	-42.8506 (76.3343)	0.7819 (2.8112)
	β_7	$VIX*ECBI_{t-1}$	-0.0018 (0.0020)	0 .	-0.0104 (0.0108)	-0.0046 (0.0041)	0.0485 (0.1137)	-0.0061 (0.0046)
		Constant	0.0005 (0.0195)	0.0020 (0.0537)	0.0249 (0.0266)	0.0079 (0.0248)	0.0373 (0.0672)	-0.0082 (0.0357)
	R^2		0.4580	0.3627	0.8869	0.8151	0.2346	0.6642
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0047	0.0000	0.0000	0.0623	0.0000
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.7538 (0.1702)***	0.2516 (0.1615)	-0.9427 (0.5211)*	0.4393 (0.8622)	-3.9095 (41.7198)	0.1233 (1.1300)
	β_2	PrivateCredit_Growth*ECBIt-1	-0.4691 (0.2698)*	0 .	1.3565 (0.7177)	4.0803 (2.4952)	13.7580 (128.6547)	0.4714 (1.3179)
	β_3	$ECBI_{t-1}$	-0.0594 (0.0773)	0 .	0.0531 (0.0615)	0.0272 (0.3955)	-0.3632 (7.4564)	-0.2713 (0.3778)
	β_4	GDP_Growtht-1	-0.2432 (0.5860)	1.2084 (0.0019)	2.1824 (0.2612)***	-0.8974 (0.9462)	11.2852 (44.9208)	2.0088 (2.7631)
	β_5	VIXt-1	-0.0024 (0.0020)	-0.0020 .	-0.0035 (0.0010)***	0.0015 (0.0082)	-0.0179 (0.2127)	-0.0090 (0.0191)
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.5459 (0.8869)***	0 .	0 .	7.2909 (3.1263)**	-35.2235 (139.6419)	-0.6940 (3.2972)
	β_7	$VIX*ECBI_{t-1}$	0.0024 (0.0032)	0 .	0 .	-0.0088 (0.0233)	0.0490 (0.6560)	0.0112 (0.0220)
		Constant	0.0303 (0.0470)	0.0020 (0.0537)	-0.0153 (0.0488)	-0.0119 (0.1338)	0.1483 (2.3974)	0.2135 (0.3250)
	R^2		0.5282	0.3627	0.8869	0.7999	0.1513	0.6446
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0047	0.0000	0.0000	0.1885	0.0003

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.23. Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions

Table J23 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions

Regression Results: Private Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.5666 (0.0608)***	0.3595 (0.1781)*	0.3671 (0.1479)**	0.9324 (0.1154)***	0.5666 (0.2127)**	0.5508 (0.1290)***
	β_3	$ECBI_{t-1}$	-0.0036 (0.0361)	0 .	0.1384 (0.1064)	0.0961 (0.0663)	0.0594 (0.3475)	-0.0713 (0.0547)
	β_4	GDP_Growtht-1	1.1973 (0.1624)***	0.9339 (0.3100)***	1.8767 (0.5295)***	1.1234 (0.3596)***	0.7096 (0.2656)**	1.3583 (0.3673)***
	β_5	VIXt-1	0.0004 (0.0006)	0.0005 (0.0014)	0.0013 (0.0020)	-0.0029 (0.0013)**	0.0005 (0.0008)	0.0008 (0.0016)
		Constant	-0.0289 (0.0236)	-0.0332 (0.0391)	-0.1759 (0.0926)*	0.0050 (0.0279)	-0.0379 (0.1074)	0.0400 (0.0450)
	R^2		0.5589	0.2800	0.5617	0.7432	0.2192	0.6903
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0165	0.0002	0.0000	0.0551	0.0000
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	PrivateCredit_Growth*ECBIt-1	0.7149 (0.0925)***	0.4928 (0.2441)*	0.5883 (0.1875)***	2.8164 (0.2883)***	2.0223 (0.7053)***	0.6772 (0.1750)***
	β_4	GDP_Growtht-1	0.3460 (0.4595)	0.9339 (0.3100)***	-13.0459 (9.4687)	-0.6751 (0.8295)	-3.8965 (7.8629)	0.6033 (2.2527)
	β_5	VIXt-1	0.0018 (0.0012)	0.0005 (0.0014)	0.0209 (0.0158)	-0.0004 (0.0020)	0.0030 (0.0121)	0.0055 (0.0050)
	β_6	GDP_Growth*$ECBI_{t-1}$	1.2601 (0.6843)	0 .	19.8716 (12.6021)	6.4336 (2.6101)**	14.7949 (24.9519)	0.7819 (2.8112)
	β_7	VIX*$ECBI_{t-1}$	-0.0019 (0.0016)	0 .	-0.0247 (0.0203)	-0.0046 (0.0041)	-0.0070 (0.0357)	-0.0061 (0.0046)
		Constant	-0.0315 (0.0156)**	-0.0332 (0.0391)	-0.0959 (0.0488)*	0.0079 (0.0248)	-0.0238 (0.0206)	-0.0082 (0.0357)
	R^2		0.5243	0.2800	0.6238	0.8151	0.2131	0.6642
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0165	0.0001	0.0000	0.0779	0.0000
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.7643 (0.2058)***	0.3595 (0.1781)*	-1.09e-09 .	0.4393 (0.8622)	-11.3450 (13.0596)	0.1233 (1.1300)
	β_2	PrivateCredit_Growth*ECBIt-1	-0.3451 (0.2960)	0 .	1.3210 .	4.0803 (2.4952)	37.1480 (40.5492)	0.4714 (1.3179)
	β_3	$ECBI_{t-1}$	-0.0919 (0.0638)	0 .	-0.0331 .	0.0272 (0.3955)	-0.9227 (2.3061)	-0.2713 (0.3778)
	β_4	GDP_Growtht-1	0.2550 (0.4760)	0.9339 (0.3100)***	1.2503 .	-0.8974 (0.9462)	-11.2852 (14.6521)	2.0088 (2.7631)
	β_5	VIXt-1	-0.0019 (0.0018)	0.0005 (0.0014)	-9.52e-11 .	0.0015 (0.0082)	0.0058 (0.0668)	-0.0090 (0.0191)
	β_6	GDP_Growth*$ECBI_{t-1}$	1.5853 (0.7222)**	0 .	1.6516 .	7.2909 (3.1263)**	38.1535 (45.7511)	-0.6940 (3.2972)
	β_7	VIX*$ECBI_{t-1}$	0.0039 (0.0028)	0 .	0 .	-0.0088 (0.0233)	-0.0134 (0.2059)	0.0112 (0.0220)
		Constant	0.0223 (0.0386)	-0.0332 (0.0391)	0.0250 .	-0.0119 (0.1338)	0.2572 (0.7428)	0.2135 (0.3250)
	R^2		0.5691	0.2800	1	0.7999	0.2646	0.6446
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0165	.	0.0000	0.0748	0.0003

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.24. Additional Credit Growth Regression: Private Credit by Deposit Banks (Heteroskedasticity and Serial Correlation Controlled For)

Table J24 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks (Heteroskedasticity and Serial Correlation Controlled For)

Regression Results: Private Credit by Deposit Money Banks								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.5139 (0.1077)***	0.2516	0.0302	0.9324	0.5757	0.5508
	β_3	$ECBI_{t-1}$	0.0146 (0.0640)	0	0.1147	0.0961	-0.0855	-0.0713
	β_4	GDP_Growths-1	1.2771 (0.2469)***	1.2084	2.1428	1.1234	0.2080	1.3583
	β_5	VIXt-1	-0.0010 (0.0007)	-0.0020	-0.0041	-0.0029	-0.0013	0.0008
		Constant	-0.0123 (0.0326)	0.0020	-0.0468	0.0050	0.0444	0.0400
	R^2		0.5158	0.3627	0.8731	0.7432	0.2586	0.6903
	Observations		130	26	26	26	26	26
	P-Value		0.0000	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	PrivateCredit_Growth*ECBIt-1	0.6494 (0.1909)**	0.3449	0.1111	2.8164	1.6963	0.6772
	β_4	GDP_Growths-1	-0.1532 (0.6331)	1.2084	-5.7116	-0.6751	13.7597	0.6033
	β_5	VIXt-1	-0.0001 (0.0014)	-0.0020	0.0044	-0.0004	-0.0180	0.0055
	β_6	GDP_Growth*$ECBI_{t-1}$	2.1585 (1.0103)*	0	10.4279	6.4336	-42.8506	0.7819
	β_7	VIX*$ECBI_{t-1}$	-0.0018 (0.0013)	0	-0.0104	-0.0046	0.0485	-0.0061
		Constant	0.0005 (0.0190)	0.0020	0.0249	0.0079	0.0373	-0.0082
	R^2		0.4755	0.3627	0.8869	0.8151	0.2346	0.6642
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.7538 (0.1844)**	0.2516	-0.9427	-0.4393	-3.9095	0.1233
	β_2	PrivateCredit_Growth*ECBIt-1	-0.4691 (0.2839)	0	1.3565	4.0803	13.7580	0.4714
	β_3	$ECBI_{t-1}$	-0.0594 (0.0771)*	0	0.0531	0.0272	-0.3632	-0.2713
	β_4	GDP_Growths-1	-0.2432 (0.6697)	1.2084	2.1824	-0.8974	11.2852	2.0088
	β_5	VIXt-1	-0.0024 (0.0008)**	-0.0020	-0.0035	0.0015	-0.0179	-0.0090
	β_6	GDP_Growth*$ECBI_{t-1}$	2.5459 (0.9791)**	0	0	7.2909	-35.2235	-0.6940
	β_7	VIX*$ECBI_{t-1}$	0.0024 (0.0016)	0	0	-0.0088	0.0490	0.0112
		Constant	0.0303 (0.0359)	0.0020	-0.0153	-0.0119	0.1483	0.2135
	R^2		0.5437	0.3627	0.8869	0.7999	0.1513	0.6446
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.25. Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For)

Table J25 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For)

Regression Results: Private Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.5666 (0.0840)***	0.3595 .	0.3671 .	0.9324 .	0.5666 .	0.5508 .
	β_3	$ECBI_{t-1}$	-0.0036 (0.0596)	0 .	0.1384 .	0.0961 .	0.0594 .	-0.0713 .
	β_4	GDP_Growtht-1	1.1973 (0.1748)***	0.9339 .	1.8767 .	1.1234 .	0.7096 .	1.3583 .
	β_5	VIX_{t-1}	0.0004 (0.0005)	0.0005 .	0.0013 .	-0.0029 .	0.0005 .	0.0008 .
		Constant	-0.0289 (0.0326)	-0.0332 .	-0.1759 .	0.0050 .	-0.0379 .	0.0400 .
	R^2		0.5730	0.2800	0.5617	0.7432	0.2192	0.6903
	Observations		130	26	26	26	26	26
	P-Value		0.0001	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	PrivateCredit_Growth*ECBIt-1	0.7149 (0.1179)***	0.4928 .	0.5883 .	2.8164 .	2.0223 .	0.6772 .
	β_4	GDP_Growtht-1	0.3460 (0.4047)	0.9339 .	-13.0459 .	-0.6751 .	-3.8965 .	0.6033 .
	β_5	VIX_{t-1}	0.0018 (0.0013)	0.0005 .	0.0209 .	-0.0004 .	0.0030 .	0.0055 .
	β_6	GDP_Growth*$ECBI_{t-1}$	1.2601 (0.7778)	0 .	19.8716 .	6.4336 .	14.7949 .	0.7819 .
	β_7	VIX*$ECBI_{t-1}$	0.0019 (0.0023)	0 .	-0.0247 .	-0.0046 .	-0.0070 .	-0.0061 .
		Constant	-0.0315 (0.0070)**	-0.0332 .	-0.0959 .	0.0079 .	-0.0238 .	-0.0082 .
	R^2		0.5397	0.2800	0.6238	0.8151	0.2131	0.6642
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.7643 (0.3252)*	0.3595 .	-1.09e-09 .	0.4393 .	-11.3450 .	0.1233 .
	β_2	PrivateCredit_Growth*ECBIt-1	-0.3451 (0.3944)	0 .	1.3210 .	4.0803 .	37.1480 .	0.4714 .
	β_3	$ECBI_{t-1}$	-0.0919 (0.0336)*	0 .	-0.0331 .	0.0272 .	-0.9227 .	-0.2713 .
	β_4	GDP_Growtht-1	0.2550 (0.5064)	0.9339 .	-1.2503 .	-0.8974 .	11.2852 .	2.0088 .
	β_5	VIX_{t-1}	-0.0019 (0.0021)	0.0005 .	-9.52e-11 .	0.0015 .	0.0058 .	-0.0090 .
	β_6	GDP_Growth*$ECBI_{t-1}$	1.5853 (0.8597)	0 .	1.6516 .	7.2909 .	38.1535 .	-0.6940 .
	β_7	VIX*$ECBI_{t-1}$	0.0039 (0.0030)	0 .	0 .	-0.0119 .	-0.0134 .	0.0112 .
		Constant	0.0223 (0.0230)	-0.0332 .	0.0250 .	-0.0119 .	0.2572 .	0.2135 .
	R^2		0.5833	0.2800	1	0.7999	0.2646	0.6446
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error. * Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.26. Additional Credit Growth Regression: Private Credit by Deposit Banks (Dummy Included for Post Crisis Period)

Table J26 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks (Dummy Included for Post Crisis Period)

Regression Results: Private Credit by Deposit Money Banks								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	$PrivateCredit\_Growth_{t-1}$	0.6097 (0.0555)***	0.1335 (0.0735)*	0.0690 (0.0634)	1.1282 (0.8179)	0.0127 (0.5379)	0.9848 (0.4482)**
	β_3	$ECBI_{t-1}$	-0.0147 (0.0134)	0.0547 (0.0280)*	0.0246 (0.0218)	-0.1328 (0.2696)	-0.0133 (0.0874)	-0.0034 (0.0942)
	β_4	GDP_Growth$_{t-1}$	1.2651 (0.1171)***	1.7306 (0.1680)***	2.1184 (0.1509)***	2.4553 (1.7791)	0.4889 (0.5754)	1.6295 (0.5259)***
	β_5	VIX$_{t-1}$	-0.0009 (0.0004)**	-0.0042 (0.0008)***	-0.0026 (0.0006)***	0.0002 (0.0039)	-0.0001 (0.0012)	-0.0004 (0.0035)
		Constant	0.0012 (0.0019)	-0.0005 (0.0023)	-0.0012 (0.0015)	0.0046 (0.0046)	0.0028 (0.0028)	0.0035 (0.0038)
	R^2		0.6295	0.9049	0.9667	0.6423	0.1794	0.7539
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0857	0.0000
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	$PrivateCredit\_Growth*ECBI_{t-1}$	0.7164 (0.0804)***	0.2882 (0.0904)***	0.1513 (0.0649)**	6.5401 (3.0556)**	-0.141 (1.2876)	1.1172 (0.1384)***
	β_4	GDP_Growth$_{t-1}$	-0.4547 (0.3493)	0 .	0 .	-16.0312 (18.2725)	0 .	0 .
	β_5	VIX$_{t-1}$	-0.0018 (0.0005)***	0 .	0 .	0.0321 (0.0311)	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.3633 (0.5193)***	2.6576 (0.1892)***	2.9119 (0.1731)***	57.1563 (53.7547)	1.30003 (1.1173)	1.8352 (0.3916)***
	β_7	$VIX*ECBI_{t-1}$	0.0009 (0.0008)	-0.0037 (0.0004)***	-0.0026 (0.0003)***	-0.0914 (0.0841)	-0.0010 (0.0009)	-0.0006 (0.0004)
		Constant	0.0013 (0.0019)	-5.91e-06 (0.0025)	-0.0010 (0.0015)	0.0043 (.0046)	0.0028 (0.0027)	0.0035 (0.0038)
	R^2		0.6280	0.8928	0.9663	0.6434	0.2158	0.7651
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0000	0.0000	0.0001	0.0395	0.0000
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	$PrivateCredit\_Growth_{t-1}$	0.8769 (0.3041)***	0.1335 (0.0735)*	0.0690 (0.0634)	-24.8366 (37.4819)	0.0127 (0.5379)	0.9848 (0.4482)**
	β_2	$PrivateCredit\_Growth*ECBI_{t-1}$	-0.4493 (0.4083)	0 .	0 .	78.4908 (110.6087)	0 .	0 .
	β_3	$ECBI_{t-1}$	-0.0556 (0.0197)***	0.0547 (0.0280)*	0.0246 (0.0218)	-1.0571 (0.6182)	-0.0133 (0.0874)	-0.0034 (0.0942)
	β_4	GDP_Growth$_{t-1}$	1.0142 (0.5797)*	0 .	0 .	-41.5925 (76.5127)	0 .	0 .
	β_5	VIX$_{t-1}$	-0.0016 (0.0005)***	0 .	0 .	0.0357 (0.0366)	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.6207 (0.7817)	2.3723 (0.2303)***	2.7984 (0.1993)***	142.1892 (229.5683)	1.5068 (1.7733)	1.8196 (0.5873)***
	β_7	$VIX*ECBI_{t-1}$	0.0028 (0.0011)***	-0.0058 (0.0011)***	-0.0034 (0.0008)***	-0.0585 (0.1054)	-0.0004 (0.0037)	-0.0004 (0.0039)
		Constant	0.0018 (0.0018)	-0.0005 (0.0023)	-0.0019 (0.0015)	0.0045 (0.0045)	0.0028 (0.0028)	0.0035 (0.0038)
	R^2		0.6590	0.9049	0.9667	0.6611	0.1794	0.7539
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.0000	0.0000	0.0002	0.0857	0.0000

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.27. Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions (Dummy Included for Post Crisis Period)

Table J27 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions (Dummy Included for Post Crisis Period)

Regression Results: Private Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	$PrivateCredit\_Growth_{t-1}$	0.6520 (0.0735)***	-0.1058 (0.4748)	0.5321 (0.3122)	1.1282 (0.8179)	-0.3047 (0.7178)	0.9848 (0.4482)**
	β_3	$ECBI_{t-1}$	-0.0324 (0.0162)**	0.0265 (0.0494)	-0.2185 (0.0824)**	-0.1328 (0.2696)	0.1008 (0.1018)	-0.0034 (0.0942)
	β_4	GDP_Growth-1	0.7936 (0.1415)***	0.2820 (0.4790)	1.2504 (0.7634)	2.4553 (1.7791)	0.0034 (0.6916)	1.6295 (0.5259)***
	β_5	VIX_{t-1}	-0.0005 (0.0005)	-0.0005 (0.0017)	0.0054 (0.0026)*	0.0002 (0.0039)	-0.0021 (0.0016)	-0.0004 (0.0035)
		Constant	0.0039 (0.0023)*	0.0050 (0.0048)	0.0071 (0.0074)	0.0046 (0.0046)	0.0016 (0.0016)	0.0035 (0.0038)
	R^2		0.4208	0.0366	0.3829	0.6423	0.5978	0.7539
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.3253	0.0061	0.0000	0.0001	0.0000
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	$PrivateCredit\_Growth*ECBI_{t-1}$	0.8795 (0.1113)***	-0.0638 (0.6227)	0.7137 (0.4654)	6.5401 (3.0556)**	1.0758 (0.8701)	1.1172 (0.1384)***
	β_4	GDP_Growth-1	-0.0506 (0.4339)	0 .	0 .	-16.0312 (18.2725)	0 .	0 .
	β_5	VIX_{t-1}	-0.0017 (0.0006)***	0 .	0 .	0.0321 (0.0311)	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.9252 (0.6417)	0.5812 (0.5383)	-0.1525 (0.8395)	57.1563 (53.7547)	2.0207 (0.6520)***	1.8352 (0.3916)***
	β_7	$VIX*ECBI_{t-1}$	0.0006 (0.0010)	0.0001 (0.0017)	0.0005 (0.0027)	-0.0914 (0.0841)	-0.0017 (0.0005)***	-0.0006 (0.0004)
		Constant	0.0036 (0.0024)	0.0053 (0.0046)	0.0047 (0.0083)	0.0043 (0.0046)	0.0017 (0.0016)	0.0035 (0.0038)
	R^2		0.3869	0.0678	0.2140	0.6434	0.5982	0.7651
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.2165	0.0405	0.0001	0.0000	0.0000
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	$PrivateCredit\_Growth_{t-1}$	0.8761 (0.3786)**	-0.1058 (0.4748)	-7.73e-10 .	-24.8366 (37.4819)	-0.3047 (0.7178)	0.9848 (0.4482)**
	β_2	$PrivateCredit\_Growth*ECBI_{t-1}$	-0.5007 (0.5204)	0 .	1.3210 .	78.4908 (110.6087)	0 .	0 .
	β_3	$ECBI_{t-1}$	-0.1003 (0.0282)***	0.0265 (0.0494)	1.34e-09 .	-1.0571 (0.6182)	0.1008 (0.1018)	-0.0034 (0.0942)
	β_4	GDP_Growth-1	1.3371 (0.6911)*	0 .	-5.50e-08 .	-41.5925 (76.5127)	0 .	0 .
	β_5	VIX_{t-1}	-0.0014 (0.0006)**	0 .	1.24e-10 .	0.0357 (0.0366)	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	(0.9392) (0.5763)	0.3866 (0.6566)	0 .	142.1892 (229.5683)	0.0106 (2.1312)	1.8196 (0.5873)***
	β_7	$VIX*ECBI_{t-1}$	0.0046 (0.0016)**	-0.0007 (0.0023)	0 .	-0.0585 (0.1054)	-0.0065 (0.0049)	-0.0004 (0.0039)
		Constant	0.0044 (0.0023)*	0.0050 (0.0048)	-4.92e-11 .	0.0045 (0.0366)	0.0016 (0.0016)	0.0035 (0.0038)
	R^2		0.4474	0.0366	1	0.6611	0.5978	0.7539
	Observations		130	26	26	26	26	26
	P-Value		0.0000	0.3253	.	0.0002	0.0001	0.0000

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.28. Additional Credit Growth Regression: Private Credit by Deposit Banks (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Table J28 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Regression Results: Private Credit by Deposit Money Banks								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.6097 (0.1380)**	0.1335	0.0690	1.1282	0.0127	0.9848
	β_2	$ECBI_{t-1}$	-0.0147 (0.0161)	0.0547	0.0246	-0.1328	-0.0133	-0.0034
	β_4	GDP_Growtht-1	1.2651 (0.1685)***	1.7306	2.1184	2.4553	0.4889	1.6295
	β_5	VIX_{t-1}	-0.0009 (0.0008)	-0.0042	-0.0026	0.0002	-0.0001	-0.0004
		Constant	0.0012 (0.0017)	-0.0005	-0.0012	0.0046	0.0028	0.0035
	R^2		0.6414	0.9049	0.9667	0.6423	0.1794	0.7539
	Observations		130	26	26	26	26	26
	P-Value		0.0000	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	PrivateCredit_Growth*ECBIt-1	0.7164 (0.2350)**	0.2882	0.1513	6.5401	-0.141	1.1172
	β_4	GDP_Growtht-1	-0.4547 (0.6743)	0	0	16.0312	0	0
	β_5	VIX_{t-1}	-0.0018 (0.0014)	0	0	0.0321	0	0
	β_6	GDP_Growth*$ECBI_{t-1}$	2.3633 (1.1159)	2.6576	2.9119	57.1563	1.30003	1.8352
	β_7	VIX*$ECBI_{t-1}$	0.0009 (0.0019)	-0.0037	-0.0026	-0.0914	-0.0010	-0.0006
		Constant	0.0013 (0.0022)	-5.91e-06	-0.0010	0.0043	0.0028	0.0035
	R^2		0.6400	0.8928	0.9663	0.6434	0.2158	0.7651
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.8769 (0.3210)*	0.1335	0.0690	-24.8366	0.0127	0.9848
	β_2	PrivateCredit_Growth*ECBIt-1	-0.4493 (0.4919)	0	0	78.4908	0	0
	β_3	$ECBI_{t-1}$	-0.0556 (0.0237)*	0.0547	0.0246	-1.0571	-0.0133	-0.0034
	β_4	GDP_Growtht-1	1.0142 (0.4624)*	0	0	-41.5925	0	0
	β_5	VIX_{t-1}	-0.0016 (0.0011)	0	0	0.0357	0	0
	β_6	GDP_Growth*$ECBI_{t-1}$	0.6207 (0.7792)	2.3723	2.7984	142.1892	1.5068	1.8196
	β_7	VIX*$ECBI_{t-1}$	0.0028 (0.0024)	-0.0058	-0.0034	-0.0585	-0.0004	-0.0004
		Constant	0.0018 (0.0015)	-0.0005	-0.0019	0.0045	0.0028	0.0035
	R^2		0.6702	0.9049	0.9667	0.6611	0.1794	0.7539
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.29. Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Table J29 - Results of Additional Credit Growth Regression: Private Credit by Deposit Banks and Other Financial Institutions (Heteroskedasticity and Serial Correlation Controlled For, Dummy Included for Post Crisis Period)

Regression Results: Private Credit by Deposit Money Banks and Other Financial Institutions								
Type I	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.6520 (0.0594)***	-0.1058 .	0.5321 .	1.1282 .	-0.3047 .	0.9848 .
	β_3	$ECBI_{t-1}$	-0.0324 (0.0279)	0.0265 .	-0.2185 .	-0.1328 .	0.1008 .	-0.0034 .
	β_4	GDP_Growtht-1	0.7936 (0.0664)***	0.2820 .	1.2504 .	2.4553 .	0.0034 .	1.6295 .
	β_5	VIX_{t-1}	-0.0005 (0.0010)	-0.0005 .	0.0054 .	0.0002 .	-0.0021 .	-0.0004 .
		Constant	0.0039 (0.0017)*	0.0050 .	0.0071 .	0.0046 .	0.0016 .	0.0035 .
	R^2		0.4394	0.0366	0.3829	0.6423	0.5978	0.7539
	Observations		130	26	26	26	26	26
	P-Value		0.0001	.	.	.	.	.
Type II	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_2	PrivateCredit_Growth*ECBIt-1	0.8795 (0.0639)***	-0.0638 .	0.7137 .	6.5401 .	1.0758 .	1.1172 .
	β_4	GDP_Growtht-1	-0.0506 (0.4799)	0 .	0 .	-16.0312 .	0 .	0 .
	β_5	VIX_{t-1}	-0.0017 (0.0012)	0 .	0 .	0.0321 .	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	0.9252 (0.7582)	0.5812 .	-0.1525 .	57.1563 .	2.0207 .	1.8352 .
	β_7	$VIX*ECBI_{t-1}$	0.0006 (0.0015)	0.0001 .	0.0005 .	-0.0914 .	-0.0017 .	-0.0006 .
		Constant	0.0036 (0.0018)	0.0053 .	0.0047 .	0.0043 .	0.0017 .	0.0035 .
	R^2		0.4067	0.0678	0.2140	0.6434	0.5982	0.7651
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.
Type III	Coefficient	Variable	Full 1990-2016	Chile 1990-2016	Colombia 1990-2016	The UK 1990-2016	Japan 1990-2016	Portugal 1990-2016
	β_1	PrivateCredit_Growtht-1	0.8761 (0.2362)**	-0.1058 .	-7.73e-10 .	-24.8366 .	-0.3047 .	0.9848 .
	β_2	PrivateCredit_Growth*ECBIt-1	-0.5007 (0.3752)	0 .	1.3210 .	78.4908 .	0 .	0 .
	β_3	$ECBI_{t-1}$	-0.1003 (0.0566)	0.0265 .	1.34e-09 .	-1.0571 .	0.1008 .	-0.0034 .
	β_4	GDP_Growtht-1	1.3371 (0.4683)**	0 .	-5.50e-08 .	-41.5925 .	0 .	0 .
	β_5	VIX_{t-1}	-0.0014 (0.0011)	0 .	1.24e-10 .	0.0357 .	0 .	0 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	-0.5807 (0.5763)	0.3866 .	0 .	142.1892 .	0.0106 .	1.8196 .
	β_7	$VIX*ECBI_{t-1}$	0.0046 (0.0030)	-0.0007 .	0 .	-0.0585 .	-0.0065 .	-0.0004 .
		Constant	0.0044 (0.0044)**	0.0050 .	-4.92e-11 .	0.0045 .	0.0016 .	0.0035 .
	R^2		0.4655	0.0366	1	0.6611	0.5978	0.7539
	Observations		130	26	26	26	26	26
	P-Value		.	.	.	.	.	.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.30. Additional Credit Growth Regression: Domestic Credit to Private Sector (xtlsdvc)

Table J30 - Results of Additional Credit Growth Regression: Domestic Credit to Private Sector (xtlsdvc)

Regression Results: Domestic Credit to Private Sector			
Type I	Coefficient	Variable	Full 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.4431 .
	β_3	$ECBI_{t-1}$	-0.1194 .
	β_4	GDP_Growth_{t-1}	1.1834 .
	β_5	VIX_{t-1}	0.0001 .
	R^2		.
	Observations		125
	P-Value		.
Type III	Coefficient	Variable	Full 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.6485 .
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.6162 .
	β_3	$ECBI_{t-1}$	-0.2018 .
	β_4	GDP_Growth_{t-1}	-0.1529 .
	β_5	VIX_{t-1}	-0.0013 .
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.3092 .
	β_7	$VIX*ECBI_{t-1}$	0.0037 .
	R^2		.
	Observations		125
	P-Value		.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.31. Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (xtlsdvc)

Table J31 - Results of Additional Credit Growth Regression: Domestic Credit by Deposit Banks and Other Financial Institutions (xtlsdvc)

Regression Results: Domestic Credit by Deposit Money Banks and Other Financial Institutions			
Type I	Coefficient	Variable	Full 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.2614
			.
	β_3	$ECBI_{t-1}$	-0.0659
			.
	β_4	GDP_Growth_{t-1}	1.0006
			.
	β_5	VIX_{t-1}	0.0026
			.
	R^2		.
	Observations		124
	P-Value		.
Type III	Coefficient	Variable	Full 1990-2017
	β_1	$DomesticCredit\_Growth_{t-1}$	0.5211
			.
	β_2	$DomesticCredit\_Growth*ECBI_{t-1}$	-0.5994
			.
	β_3	$ECBI_{t-1}$	-0.1800
			.
	β_4	GDP_Growth_{t-1}	-0.3893
			.
	β_5	VIX_{t-1}	-0.0012
			.
	β_6	$GDP\_Growth*ECBI_{t-1}$	2.2920
			.
	β_7	$VIX*ECBI_{t-1}$	0.0067
			.
	R^2		.
	Observations		124
	P-Value		.

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

J.32. Detailed Description of the Romelli (2018) ECBI Index

Table J32 - Table Summarizing the Set of Information Collected in the GMT, CWN and ECBI Indices

Criteria	GMT	CWN	ECBI
Governor and central bank board			
Who appoints the governor	*	*	*
Term of office of the governor	*	*	*
Reappointment option for the governor			*
Dismissal of governor		*	*
Governor allowed to hold another office in government		*	*
Qualification requirements for governor			*
Who appoints the board members	*		*
Term of office of board members	*		*
Reappointment option for board members			*
Dismissal of board members			*
Board members allowed to hold another office in government			*
Qualification requirements for board members			*
Staggering term of office for board members			*
Government representatives in the board	*		*
Monetary policy and conflicts resolution			
Who formulates monetary policy	*	*	*
Central bank responsible to fix key policy rates	*		*
Banking sector supervision	*		*
Central bank role in government's budget and/or debt	*		*
Final authority in monetary policy	*	*	*
Objectives			
Central bank's statutory goals	*	*	*
Limitations on lending to the government			
Direct credit: not automatic	*	*	*
Direct credit: market for lending		*	*
Who decides financing conditions to government		*	*
Beneficiaries of central bank lending		*	*
Direct credit: type of limit	*	*	*
Direct credit: maturity of loans	*	*	*
Direct credit: interest rates	*	*	*
Prohibition from buying government securities in primary market	*	*	*
Financial independence			
Payment of the initial capital of the central bank			*
Authorized capital of the central bank			*
Central bank financial autonomy			*
Arrangements for automatic recapitalization			*
Transfers of money from the treasury			*
Central bank approves its annual budget			*
Central bank adopt its annual balance sheet			*
Auditing agency			*
Allocation of net profits			*
Allocation of profits to a general reserve fund			*
Partial payments of dividends before the end of the fiscal year			*
Unrealized profits included in the calculation of distributable profits			*
Reporting and accountability			
Central bank reporting			*
Central bank financial statements			*

Note: This table summarizes the set of information collected in the GMT (Grilli et al., 1991), CWN (Cukierman et al., 1992) and ECBI indices of central bank independence.

Source: Romelli (2018).

Reference List

Aiyar, S. 2011: How did the crisis in international funding markets affect bank lending? Balance sheet evidence from the UK. Bank of England Working Paper 424, Bank of England, Threadneedle Street: London, United Kingdom.

Berman, S and McNamara, KR. 1999: Bank on Democracy: Why Central Banks Need Public Oversight. Foreign Affairs 78 (March/April): 2-8.

Bernhard, W. 1998: A Political Explanation of Variations in Central Bank Independence. American Political Science Review 92 (June): 311-327.

Bernhard, W. 2002: Banking on Reform: Political Parties and Central Bank Independence in the Industrial Democracies. University of Michigan Press: Ann Arbor, Michigan, U.S.

Bernhard, W and Leblang, D. 2002: Political Parties and Monetary Commitments. International Organization 56:803-30.

Birch, K. 2017: What exactly is neoliberalism? November 2, 2017, https://theconversation.com/what-exactly-is-neoliberalism-84755, accessed on: 19 April 2019.

Bodea, C and Hicks, R. 2015: International Finance and Central Bank Independence: Institutional Diffusion and the Flow and Cost of Capital. Journal of Politics 77:268 -284.

Borio, C. 2018: The financial cycle and recession risk. BIS Quarterly Review (December), Bank of International Settlements: Basel, Switzerland.

Brewer, E (III), Genay, H, Hunter, WC and Kaufman, GG. 2003: The Value of Banking Relationships during a Financial Crisis: Evidence from Failures of Japanese Banks. Journal of the Japanese and International Economies 17(3): 233-226.

Campos, N and Coricelli, F. 2015: Why did Britain join the EU? A new insight from economic history. VOX CEPR Policy Portal, 3 February 2015,

https://voxeu.org/article/britain-s-eu-membership-new-insight-economic-history, accessed on: 18 May 2019.

Carrasquilla, A, A, AG and Vasquez, DM. 2000: El gran apreton crediticio en colombia: una interpretacion. Coyuntura Economica 30: 107-115.

Centeno, M and Coelho, MC. 2018: The turnaround of the Portuguese economy: Two decades of structural changes. VOX CEPR Policy Portal, 6 June 2018, https://voxeu.org/article/turnaround-portuguese-economy, accessed on: 9 May 2019.

Chen, R, Milesi-Ferretti, G and Tressel, T. 2012: External imbalances in the euro area. IMF Working Paper WP/12/236, Interntaional Monetary Fund: Washington, D.C.

Clark, WR, Reichert, U, Lomas, S and Parker, K. 1998: International and domestic constraints on political business cycles in OECD countries. International Organization 52(1): 87-120.

Clark, WR, Golder, SN, and Poast, P. 2013: Monetary Institutions and the Political Survival of Democratic Leaders. International Studies Quarterly 57:556-67.

Corrado, C, Haskel, J, Cecilia, JL and Massimiliano, I. 2016: Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth. EIB Working Paper 2016/08, European Investment Bank: Luxembourg.

Crowe, C, and Meade, EE. 2007: The Evolution of Central Bank Governance around the World. Journal of Economic Perspectives 21:69-90.

Cukierman, A. 1992: Central Bank strategy, credibility, and independence: theory and evidence. The MIT Press: Cambridge, U.S.

Cukierman, A. 2008: Central Bank Independence and Monetary Policymaking Institutions - Past, Present and Future. European Journal of Political Economy 24:722-236.

Cukierman, A, Miller, GP and Neyapti, B. 2002: Central Bank Reform, Liberalization, and Inflation in Transition Economies. An International Perspective. Journal of Monetary Economics 49:237–264.

Cukierman, A, Webb, SB and Neyapti, B. 1992: Measuring the Independence of Central Banks and Its Effect on Policy Outcome. The World Bank Economic Review 6:353-398.

Debelle, G and Fischer, S. 1995: How Independent Should a Central Bank Be? Conference Series [Proceedings] 38: 195-225,

https://EconPapers.repec.org/RePEc:fip:fedbcp:y:1994:p:195-225:n:38, accessed on: 10 April 2020.

De Haas, R, Korniyenko, Y, Loukoianova, E and Pivovarsky, A. 2011: Foreign Banks during the Crisis: Saints or Sinners? IMF Working Paper WP/12/117, International Monetary Fund: Washington, D.C.

De Haas, R and Van Lelyveld, I. 2006: Foreign Banks and Credit Stability in Central and Eastern Europe: Friends or Foes? Journal of Banking and Finance 30 (7): 1927-1952.

Dekle, R and Kletzer, K. 2003: The Japanese Banking Crisis and Economic Growth: Theoretical and Empirical Implications of Deposit Guarantees and Weak Financial Regulation. Journal of the Japanese and International Economies 17(3): 305-335, Elsevier: Amsterdam, The Netherlands.

European Commission. 2016: Ex post evaluation of the economic adjustment programme Portugal, 2011–2016: European Commission Institutional Paper 040(November), European Commission: Brussels, Belgium.

Eijffinger, SCW and de Haan, J. 1996: The political economy of central-bank independence. Princeton Studies in International Economics, International Economics Section, Department of Economics, Princeton University: Princeton, U.S.

ESM. 2017: EFSF/ESM Financial Assistance – Evaluation Report. European Stability Mechanism: Luxembourg, https://www.esm.europa.eu/sites/default/files/ti_pubpdf_dw0616055enn_pdfweb_20 70607111409.pdf, accessed on: 11 April 2020.

Fernández-Albertos, J. 2015: The Politics of Central Bank Independence. Annual Review of Political Science 18: 217-237.

Garriga, AC. 2016: Central Bank Independence in the World: A New Data Set. International Interactions 42 (5): 849-868.

Gouveia, A and Coelho, MC. 2018: The Portuguese economy: Short essays on structural changes. Gabinete de Planeamento, Estratégia, Avaliação e Relações Internacionais, Ministry of Finance: Lisbon, Portugal.

Grilli, V, Masciandaro, D, and Tabellini, G. 1991: Political and monetary institutions and public financial policies in the industrial countries. Economic Policy 6 (13): 342-392.

Grubb, M. 2019: Brexit Has Turned From A Major National Decision To A Crisis That Risks The UK's Political Stability. The Blog, Huffington Post,

https://www.huffingtonpost.co.uk/entry/brexit-political crisis_uk_5c3dbdbde4b0922a21d87ce7?guccounter=1&guce_referrer=aHR0cHM6L93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAJu2pti741RovVTVLfkqu0I4LDZX4yLffq8qkhCYnqkL8qCWzdw82BBKhOkqL8r509OqOgXb4pF_2m8uYqMtwO1j4t40z8tQKLME0VbW71NzpLZoGHF6pGWRB7_5EoIkD9N9vxhDB7t6LUVoQ3KVS0nGDY2CNxhGYc1EptBr8, accessed 7 June 2020.

Hansard. 1993: Parliamentary Papers 1993/94 – Debate on BoE (Amendment) Bill. HMSO: London, United Kingdom.

Hennart, JF. 1988: A transaction costs theory of equity joint ventures. Strategic Management Journal 9(4): 361–374.

Hoshi, T and Okazaki, T. 2002: Bank Management in the 1980s: In: Studies of the Heisei Bubble, Muramatsu and Okuno (eds.), Toyo-Keizai Shinpo-Sha: Tokyo, Japan.

IMF. 2017: Portugal - Fifth Post Program Monitoring Discussions - Press Release; Staff Report; and Statement by the Executive Director for Portugal. 22 February, European Department, International Monetary Fund: Washington, D.C.

Ito, T. 1990: The Timing of Elections and Political Business Cycles in Japan. Journal of Asian Economics 1: 135-146.

Kamil, H and Rai, K. 2010: The Global Credit Crunch and Foreign Banks' lending to EMs: Why did Latin America fare better? IMF Working Paper WP/10/102, International Monetary Fund: Washington, D.C.

Kanaya, A and Woo, D. 2000: The Japanese Banking Crisis of the 1990s: Sources and Lessons. IMF Working Paper WP/00/7, International Monetary Fund: Washington, D.C.

Keohane, RO and Milner, HV. 1996: Internationalization and domestic politics. Cambridge University Press: Cambridge, United Kingdom.

Kim, WC and Hwang, P. 1992: Global strategy and multinationals' entry mode choice. Journal of International Business Studies 3(1): 29–53.

King, MR. 2003: Distributional Politics and Central Bank Independence: New Labour's Reform of the Bank of England. March 2003, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.202.6248&rep=rep1 type=pdf, accessed on: 19 April 2019.

Kushida, KE and Shimizu, K. 2013: Overview: Japan's Political and Economic Transformations Since the 1990s. In: Kushida, KE, Shimizu, K and Oi, JC. Syncretism: the politics of economic restructuring and system reform in Japan, The Walter H. Shorenstein Asia-Pacific Research Center: Stanford. CA: Chapter 2.

Laeven, L and Valencia, F. 2012: Systematic Banking Crises Database: An Update. IMF Working Paper WP/12/163, Washington, D.C.

Lauderdale, B. 2015: A Brief Political History of the United Kingdom. FiveThirtyEight, 25 March 2015, https://fivethirtyeight.com/features/a-brief-political history-of-the-united kingdom/, accessed on: 18 May 2019.

Lawson, N. 1992: The view from no.11: memoirs of a Tory radical. Bantam Press: London.

Marshall, J. 2003: Fiscal Rule and Central Bank Issues in Chile. In: Fiscal Issues and Central Banking in EMEs: 98-106. BIS Papers No. 20, Bank for International Settlements: Basel, Switzerland.

Maxfield, S. 1997: Gatekeepers of growth: the international political economy of Central Banking in developing countries. Princeton University Press: Princeton, N.J.

Mosley, L. 2000: Room to Move: International Financial Markets and National Welfare States. International Organization 54 (4): 737-773.

Navaretti, GB, Calzolari, G, Pozzolo, AF and Levi, M. 2010: Multinational Banking in Europe: Financial Stability and Regulatory Implications and Lessons from the Financial Crisis. Economic Policy 25 (64), 703–753.

Persson, T and Tabellini, G. 1990: Macroeconomic Policy, Credibility and Politics. Harwood Publishers: London.

Rawdanowicz, L, Bouis, R, Kei-Ichiro, I and Christensen, A. 2014: Secular Stagnation: Evidence and Implications for Economic Policy. OECD Economics Department Working Papers 1169: OECD Publishing.

Rodriguez-Delgado JD, Arregui, N and Wu, Y. 2013: Chile – Selected Issues. IMF Country Report 13/199: International Monetary Fund, July 2013.

Rogoff, KS. 1985: The Optimal Degree of Commitment to an Intermediate Monetary Target. Quarterly Journal of Economics 100:1169-1189.

Romelli, D. 2018: The political economy of reforms in Central Bank design: evidence from a new dataset**.** BAFFI CAREFIN Centre Research Paper No. 2018-87, BAFFI CAREFIN, Bocconi University: Milan, Italy.

Rose, A and Wieladek, T. 2011: Financial protectionism: the first tests. External MPV Unit Discussion Paper (32): Bank of England, London.

Rosenbluth, FM and Thies, MF. 2010: Japan Transformed: Political Change and Economic Restructuring. Princeton University Press: Princeton, U.S.

Shan, W. 1991: Environmental risks and joint venture sharing arrangements. Journal of International Business Studies 22(4): 555–578.

Sušec, M. 2019: The Portuguese economy: a long-term creditor's perspective. Keynote speech, Fitch Credit Outlook: Lisbon, 24 January 2019, https://www.esm.europa.eu/speeches-and-presentations/portuguese-economy long-term-creditor's-perspective-speech-matjaž-sušec, accessed: 21 May 2019.

Tenjo, F and Lopez, E. 2002: Globalization of Equity Markets and the Cost of Capital. Revista del Banco de la República 75(898): 26-73, Agosto 2002.

Uribe, JD. 2012: How can macro-prudential policies or frameworks for financial stability be designed to preserve the credibility of monetary policy to keep inflation low? Reflections from a commodity exporting, small open economy. Participation notes for the High-Level Conference on "Macroprudential Policies to Achieve Financial Stability", Organized by the Banco Central del Uruguay and the IMF, https://www.imf.org/external/np/seminars/eng/2012/macro/pdf/uribe.pdf, accessed: 9 April 2020.

Vernon, R. 1983: Organizational and institutional responses to international risk. In R. J. Herring (ed.), Managing International Risk. Cambridge University Press, Cambridge, U.K.

Villar Gómez, L, Salamanca Rojas, DM and Murcia Pabón, A. 2005: Crédito, repression financiera y flujos de capitales en Colombia: 1974-2003. Revista Desarrollo y Sociedad, 55 (January 2005): 167-209.

Chapter 4

Macroprudential Policy Under Uncertainty[37]

4.1. Introduction

The deregulation of the US financial system in the time leading up to the Global Financial Crisis (GFC) and the subsequent growth of the 'Shadow Banking' system resulted in the spurred use of complex derivatives such as credit default swaps (CDSs) and collateralised debt obligations (CDOs) as well as the rapid growth of both the US housing market and the market for subprime mortgages. When extremely high home prices were no longer supported, prices plummeted and a severe credit freeze ensued in both the US and in the global economy. European banks had substantial balance sheet exposures to the US housing market and both public and private debt in many European countries skyrocketed, Latin American commodity exporting countries were affected by the weaker US dollar and the drop in external demand severely impacted the Japanese economy. The unexpected interconnectedness, vulnerabilities and the general contagion that encompassed the GFC confirmed the notion that an alternative policy framework needed to be implemented in an effort to manage financial instability and the ideal solution was the implementation of a comprehensive macroprudential policy framework.

Crockett (2000), FSB/IMF/BIS (2011) and IMF (2013) state that macroprudential policy is the use of prudential tools in an effort to limit systematic risk and although macroprudential policy

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tools were included in the policy frameworks of emerging economies well before the crisis, macroprudential policy use is now broader as the crisis experience prompted its inclusion in policy frameworks. In 2017, Vítor Constâncio[38] said that "macroprudential policy emerged from the crisis as a new tool to deal with systemic risk in the financial sector… A new authority was needed to be accountable and responsible for monitoring and preventing the build-up of endogenous systemic risk in the financial sector." The recognition that the system was not fortified by the micro-supervision of individual institutions and instead was exposed to back door weaknesses such as financial stability led to the emergence of a new realm of policy. Galati and Moessner (2011) identify two main ingredients for the implementation of a successful macroprudential policy framework. Firstly, the financial system "must be robust to external shocks" (Allen and Wood, 2006) and secondly, the financial system must be "resilient to shocks originating within the financial system" (Houben et. al., 2004).

The purpose of this paper is to study the impact of macroprudential policy through three veins of financial stability for both an EU panel as well as a Latin American panel. A case study is also considered focusing on Japan, Portugal and the UK. An index of domestic macroprudential policy tools is constructed and the effectiveness of these tools in controlling credit growth, GDP growth and inflation growth is studied using a dynamic panel data model for the period between 2000 and 2017. A monthly index, iMaPP database constructed by Alam et al. (2019), of macroprudential policy tools implemented in the relevant countries is used as a starting point. This index is coded through 2016:Q4, and is then cross checked using the Cerutti et al. (2017) index and extended using both the 2017 IMF Macroprudential Survey and the IMF Macroprudential Data Query report. The monthly index is cumulated to create the quarterly database used in this paper. This index is used to analyse the ability of macroprudential policy tools to bridle excessive credit growth, the impact of policy tools on GDP growth and lastly, the effect that macroprudential policy tools have on inflation growth in an effort to fully capture the impact of macroprudential policy tools on financial stability. A measure of market risk sentiment is included in an effort to add to the existing literature and to highlight our results in times of global pandemics or financial crises.

[38] Vice-President of the ECB between June 2010 and May 2018.

We find that a tighter overall macroprudential policy stance would result in lower credit growth as well as lower GDP growth while, a tighter overall macroprudential policy tool stance would lead to higher inflation in the majority of cases. Additionally, our results show that capital openness plays a more fundamental role in Latin American countries. This makes intuitive sense as Latin American countries have a larger dependence on foreign capital flows and exchange rate movements. Finally, higher levels of perceived market volatility results in an increased flow of assets from riskier markets, such as Latin America, to safer markets, such as the EU. Our results show that, higher levels of the volatility index lead to lower inflation, lower credit growth and higher GDP growth in the EU panel. Lower, steadier inflation is often associated with economic stability and growth. In the other cases, higher levels of perceived volatility lead to higher inflation, higher credit growth and lower GDP growth. The macroprudential stance of a country depends on both the geographic location and the specific policy tool implemented as factors such as capital openness and the influence of global market sentiment play an important role in the necessity to implement these tools as well as the success or failure of these tools.

The rest of the paper is as follows: Section 2 surveys existing literature; Section 3 discusses the methodology and the data used; Section 4 discusses the empirical results; and Section 5 concludes.

4.2. Literature Review

The widespread use of macroprudential policy tools emerged in the aftermath of the GFC when Central Bankers and policy makers realised that a policy framework with a focus on constraining systematic risk was needed. Allen and Gale (2007), Schularick and Taylor (2012) and Gourinchas and Obstfeld (2012) point out that systematic crises usually occur after periods of rapid and strong credit growth instead of being random, exogenously caused events. Caruana (2010)[39] states that the aim of macroprudential policy is "to reduce systemic risk by explicitly addressing the interconnections between financial institutions and their common exposures and the pro-cyclicality of the financial system". The reduction of the procyclicality of the financial system and systematic risk through the use of macroprudential policy tools is studied by Lim et al. (2011) using a dynamic panel data model covering 49 countries over the period between 2000 and 2010. They find that reserve requirements are indeed effective in reducing the

[39] See Borio (2003).

procyclical behaviour of credit growth. Akinci and Olmstead-Rumsey (2015)[40] analyse the impact of macroprudential policy tool implementation on the real domestic credit growth rate while controlling for the level of the VIX index. They find that targeted macroprudential policy tools are able to mitigate fluctuations in real domestic credit growth in 57 emerging and advanced economies.

The role of the housing market in the GFC has made it pertinent to study the impact of macroprudential policy implementation on both credit growth and housing prices. Borio and Drehman (2009) and IMF (2014) note that rising home prices combined with increases in credit supply may signal a procyclical build-up of risks in the housing market. Kuttner and Shim (2013)[41] find that both the level of housing prices and the level of credit were effectively lowered after the implementation of macroprudential policy tools in 57 countries between 1980 and 2011. Ahmed and Zlate (2013)[42] focus on both the pre and post-crisis periods and by considering capital flows to emerging markets, they find that capital controls implemented in these countries were able to manage capital flows.

Lopez and Bruni (2019) note that the macroprudential policy framework implemented needs to be "an adaptable and flexible global network" and they define both the objectives and levels of impact of each of the different policy frameworks implemented by Central Banks and policy makers (see Table 1). Peydró (2016) points out that financial crises are often followed by credit crunches, the same is noted by Reinhart and Rogoff (2009)[43] who note that long-lasting recessions with falling aggregate welfare and employment are often preceded by financial crises. Gupta et al. (2009) find that countercyclical macroprudential policy tools are able to shorten the duration of crises. Dell'Ariccia et al. (2012) find that macroprudential policy tool implementation has both the ability to mitigate credit booms as well as the ability to reduce the likelihood of booms leading to financial catastrophes.

[40] Tovar et al. (2012) and Habermeier et al. (2011).
[41] See Vandenbussche et al. (2012), Ahuja and Nabar (2011), The Hong Kong Monetary Authority (2011), Kim (2014), Zhang and Zoli (2014), Crowe et al. (2011) and Cerutti et al. (2015).
[42] Baba and Kokenyne (2011) find that capital controls that do not cover the majority of inflows may not have the macroeconomic impact that is expected even if they are successful at reducing targeted flows.
[43] See Peydró (2016).

Table 10 - Objectives and Impact of Policy Frameworks

Policy	Objective	Level of Impact
Monetary	Price stability	Macro: stable economic growth
Macroprudential	Stability of financial sector	Both macro and micro
Microprudential	Stability of financial institutions	Micro: protection of consumers

Source: Lopez and Bruni (2019).

Cerutti et al. (2017) make use of a manually coded index of the macroprudential instruments, based on an IMF survey and earlier studies, implemented in 119 countries between 2000 and 2013. The authors find that a tighter macroprudential policy stance does indeed have a mitigating effect on developments in real credit growth. Cerutti et al. (2017) also find that macroprudential policy tools are used more frequently in emerging economies and that the success of these policies is largely dependent on the instrument choice as well as the country in question. Claessens (2017) notes that globalisation has resulted in a reduced ability to control domestic finance and the author shows that macroprudential policy tool implementation is less effective in developed markets.

The Committee on Global Financial Systems (2010) states that macroprudential policy "complements the micro-prudential focus on the safety and soundness of individual institutions". Agénor et al. (2012) make use of a DSGE model to show that macroprudential policy in a small open economy may help with the policy tensions attached to shifts in capital flows. Bruno et al. (2014) look at 12 Asia-Pacific countries and find that policies targeting the banking sector and bond market capital flows effectively manage bank inflows and bond inflows respectively. The authors also find that, in some cases, macroprudential policy implementation may be more successful when policies are implemented in such a way that they complement tighter monetary policy instead of competing policy frameworks being implemented. Agur and Demertzis (2015) find that monetary policy still has the ability to affect financial stability in the presence of macroprudential policy tools.

Our paper adds to the existing literature in a number of ways. Firstly, although our country set is not as extensive as that used in Cerutti et al. (2017), Alam et al. (2019) or Belkhir et al.

(2020), our paper includes a longer period with a higher number of observations, due to the use of quarterly data, than that used in Cerutti et al. (2017) by making use of the iMapp index of macroprudential policy choice changes created by Alam et al. (2019), extending this iMapp index through 2017Q4 and then cross checking this extended index with the Cerutti et al. (2017) index. The index used in our paper therefore includes 17 policy choices in line with Alam et al. (2019). This is more than the 12 included in the Cerutti et al. (2017) index. Secondly, in the spirit of Belkhir et al. (2020) and Kim and Mehrotra (2017), we use three veins to study the impact of macroprudential policy tool implementation. We first look at the ability of macroprudential policy to curb fluctuations in credit supply, we then look at the impact on the real economy by studying the effect on GDP and finally, we look at the impact on inflation. By looking at these three factors individually, we hope to understand the ability of macroprudential policy to achieve financial stability in times of uncertainty. By including a factor which captures the level of global risk aversion in our analysis, namely VIX, we hope to capture the level of uncertainty in international markets which may deem the study relevant in times such as those in the face of global pandemics or financial crises. Finally, our paper includes a number of case studies which allows us to deviate from the existing literature as we focus on the implementation of policy tools in these countries.

4.3. Methodology and Data

4.3.1. Methodology

An index of domestic macroprudential policy tools is constructed and the effectiveness of these tools in controlling credit growth is studied using a dynamic panel data model. A dummy variable with value +1 is assigned in the presence of a tightening of macroprudential policy, -1 is assigned when macroprudential policy is loosened and 0 is assigned when there is no change to the macroprudential stance. A cumulative index of the macroprudential policy stance is also included. When two or three macroprudential policy tools are implemented or tightened, the cumulative index takes a corresponding value of +2 or +3. In the case where a number of policy tools are loosened, the cumulative index takes a corresponding value of -2 or -3. The impact of macroprudential policy implementation on credit growth is measured while controlling for the business cycle, the level of global risk aversion and interest rate changes.

The regression equations are as follows:

$$\text{Credit\_Growth}_{it} = \varphi_i + \beta_1\text{Credit\_Growth}_{it-1} + \beta_2 i_{it-1} + \beta_3\text{VIX}_{it-1} + \beta_4\text{Macroprudential\_Index}_{it-1} + \beta_5 y_{it-1} + \beta_6\text{Capital\_Openness}_{it-1} + \varepsilon_{it}, \quad (1)$$

$$y_{it} = \varphi_i + \beta_1 y_{it-1} + \beta_2 i_{it-1} + \beta_3\text{VIX}_{it-1} + \beta_4\text{Macroprudential\_Index}_{it-1} + \beta_5\text{Capital\_Openness}_{it-1} + \varepsilon_{it}, \quad (2)$$

$$\pi_{it} = \varphi_i + \beta_1\pi_{it-1} + \beta_2 i_{it-1} + \beta_3\text{VIX}_{it-1} + \beta_4\text{Macroprudential\_Index}_{it-1} + \beta_5 y_{it-1} + \beta_6\text{Capital\_Openness}_{it-1} + \varepsilon_{it}, \quad (3)$$

where, Credit_Growth_t is the quarterly year-on-year growth in the level of credit, VIX_t is the quarterly year-on-year growth in the level of the VIX index, i_t is the quarterly year-on-year growth in the interest rate, $\text{Macrorudential\_Index}_{it}$ is the value of the macroprudential policy index, y_{it} is the quarterly year-on-year GDP growth rate, π_{it} is the quarterly year-on-year growth in inflation, $\text{Capital\_Openness}_t$ is the level of the Chinn Ito capital openness index, φ_i are country fixed effects to account for unobserved cross-country heterogeneity and ε_{it} is a disturbance term satisfying standard conditions of zero mean and constant variance.

Four panel unit root tests are run to test for the presence of panel unit roots in both the panels as well as the individual country cases (three unit root tests for the country cases). Firstly, three first-generation panel unit root tests (Maddala and Wu test, the Fisher-Type Phillips-Perron test and the Fisher-Type Augmented Dickey-Fuller test) are included which assume that cross sectional units are independent while the second-generation panel unit root test (Pesaran test) allows for cross sectional dependence. The first-generation Maddala and Wu test (Table L1 in Appendix L) tests for the presence of panel unit roots, and we fail to reject the null hypothesis of panel unit roots when considering the lagged capital openness for the EU panel, Portugal and the UK as well as lagged credit growth for the Portuguese case. The null hypothesis of all panels containing unit roots is rejected for the Latin American panel, the remaining variables in the EU panel and the full sample. The first-generation Fisher-Type test (Phillips-Perron test, Table L2 in Appendix L) tests for the presence of a unit root and shows that we reject the null hypothesis of a unit root for all variables in the Latin American panel, the EU panel (except the capital openness in this case) and the full sample. We also reject the null hypothesis of a unit

root for the majority of variables in the three country cases with the exception of the interest rate in all three country cases, both GDP growth and growth in inflation in the Portuguese case and capital openness in the cases of the United Kingdom and Portugal. The first-generation Fisher-Type unit root tests therefore show that the lagged first-differenced variables have an order of integration of I(0) implying that, the lagged first differenced variables are stationary for the majority of cases with the exception of the lagged first differenced interest rate for all three country cases, the GDP growth and inflation growth for the case of Portugal and capital openness for the cases of Portugal and the UK. Although, the Phillips-Perron test for the presence of a unit root indicates that seven of the series contain a unit root, when considering the Augmented Dickey-Fuller test, this result changes. The results of the ADF test indicate that the null hypothesis of a unit root is rejected in all but three cases (the interest rate for the Portuguese case and the capital openness for both the UK and Portugal) and hence, only three of the series contain a unit root. The Phillips-Perron test corrects for the presence of serial correlation and heteroskedasticity in the errors and it is shown that the first and second regressions in the case of Japan, the second and third regressions in the case of Portugal and the second regression in the case of the UK, in this case, the use of the unit root test that specifically corrects for serial correlation is the most appropriate.

One should proceed with caution when analysing the results of unit root tests with small, finite samples as the results of both the Phillips-Perron unit root test as well as the results of the Augmented Dickey-Fuller test may be severely size distorted. These unit root tests may not have the ability to distinguish between persistent stationary processes and nonstationary processes although, our test regressions exclude trends and instead, only include a constant term which may improve the reliability of the above tests.

The second-generation Pesaran test (Table L3 in Appendix L) tests for the presence of panel unit roots allowing for cross sectional dependence, we fail to reject the null hypothesis of all panels containing unit roots when considering both the lagged growth in VIX for the Latin American panel, the EU panel and the full sample as well as the capital openness for the EU panel and the full sample.

The problem of endogeneity may also present itself in the analysis as one may assume that the macroprudential policy stance of Central Banks and hence, the macroprudential policy tool

index studied in this paper may be subject to some cross-correlation between the index and the error term or a reverse causality. A reverse causality is evident in many empirical analyses dealing with financial development, output growth and financial stability with an example being the relationship between banking sector development and output growth as discussed by Peia and Roszbach (2015), a reverse causality between inequality and financial development is also discussed by Bazillier and Hericourt (2017).

Therefore, in this paper, a reverse causality may exist between the macroprudential policy tool index and level of credit growth, GDP growth and growth in inflation. It is highly likely that the level of credit growth would influence the macroprudential policy stance of policy makers and Central Banks as the macroprudential policy stance is directly related to the policy makers' view of the financial stability (as proxied by credit growth, GDP growth and growth in inflation in this paper) of the system at any given point in time. The macroprudential policy tool index is indeed cointegrated with our three proxies for financial stability and a post-regression estimation test indicates that granger causality does indeed exist between variables. In Nier et al. (2012), it is proposed that lagged variables should be included in the empirical analysis in an effort to mitigate the endogeneity problem and the lagged regression results should then be compared with those of the unlagged variables in an effort to identify any issues caused by the relationship between the potentially affected variable and the error term. Further work could be conducted in an effort to identify a measure of financial stability that does not exhibit a reverse causality with the macroprudential policy tool index. However, the chance of identifying such a variable is slim.

Endogeneity may lead to biased and inconsistent coefficient estimates and the issue of endogeneity usually presents itself because of a reverse causality between the dependent and independent variables. Endogeneity is also more likely to be an issue when considering macro analyses (in comparison to micro analyses) as it is more difficult to isolate the individual effects of the observable variables. To account for endogeneity in the model, one would need to include an IV estimator that is correlated with the endogenous variable but uncorrelated with the error term. It is unlikely that one would find a variable that meets these requirements when focusing on the macroprudential policy tool index. Hence, the macroprudential policy tool index is lagged by one period which should mitigate the effect of endogeneity as discussed in Nier et al. (2012). To err on the side of caution and in line with Nier et al. (2012), the estimated

coefficients are interpreted based on significance and sign instead of the value thereof. Bruno and Shin (2013) lag all quarterly variables in the analysis by one quarter in an effort to mitigate endogeneity issues that may present themselves in this paper, all variables are also lagged by one quarter. The lagging of all of the explanatory variables should mitigate any other endogeneity issues that may arise in the analysis.

To add to the robustness of this paper, an additional regression is run (Table M1 in Appendix M) that includes an IV estimator. Regulatory quality, which "reflects perceptions of the government to formulate and implement sound policies and regulations that permit and promote private sector development" (Kaufmann et al., 2010), is included as an IV estimator to account for any endogeneity in the model caused by the potentially endogenous variable, the macroprudential policy tool index. Regulatory quality is chosen as an appropriate IV estimator due to the likely correlation with the macroprudential policy tool index as the quality of regulation undoubtedly has an influence on the level of macroprudential policy intervention. Regulatory quality is unlikely to directly impact credit growth, GDP growth or inflation growth and instead, impacts these variables through the macroprudential policy tool index while being uncorrelated with the error term.

The Wooldridge test for autocorrelation (Table L4 in Appendix L) in panel data shows that the Latin American panel, the EU panel and the full sample do indeed suffer from serial correlation, the Modified Wald test for heteroskedasticity (Table L5 in Appendix L) shows that both panels as well as the full sample also suffer from the presence of heteroskedasticity, the main results (Table 12 to Table 16) therefore include regression results with corrections for both heteroskedasticity and serial correlation. The sum of macroprudential policy choices is the relevant variable for the statistical tests. The results also hold for capital conservation buffers, countercyclical capital buffers, loan-to-value ratios and reserve requirements.

The Modified Wald test for heteroskedasticity shows that heteroskedasticity is not an issue in the individual country cases, the Durbin-Watson test for autocorrelation shows (Table L4 in Appendix L) that there is no first-order autocorrelation for the first regression in the case of Japan, the third regression in the case of Portugal and the first and third regressions in the case of the UK. For the first and second regressions for the case of Japan, the test statistic lies within the bounds and hence, the results of the Durbin-Watson test are inconclusive, this is also true

in the case of Portugal when considering the second and third regressions. The correction for serial correlation is therefore included for the main results (Tables 12 to 16) for the first and second regressions for Japan, the second and third regressions for Portugal and the second regression for the UK. The remaining results for the country cases only include country fixed effects.

4.3.2. Data

Allen and Gale (2007), Schularick and Taylor (2012), Gourinchas and Obstfeld (2012) and Borio (2018) note that credit growth is often a precursor of financial crises. Credit growth is thus included as a proxy for financial stability. A monthly index, iMaPP database constructed by Alam et al. (2019), of macroprudential policy tools implemented in the relevant countries is used as a starting point. This index is coded through 2016:Q4, this index is then cross checked using the Cerutti et al. (2017) index and extended using the 2017 IMF Macroprudential Survey. The extension through 2017:Q4 is cross checked using the IMF Macroprudential Data Query Report. The 2017 IMF survey is used as the deciding source and hence, when policy choices are reflected in the Data Query Report but not in the 2017 IMF Survey, these policy choices are not included. The monthly iMaPP index is cumulated to create the quarterly database used in this paper. The impact of macroprudential policy tool implementation on credit growth is studied for the period 2000:Q1 to 2017:Q4. The relevant countries are identified in Table 11.

The relevant variables are as follows:

- Credit growth as a proxy for financial depth (BIS total credit statistics and IMF);
- The growth in the level of the VIX index is included as a proxy for the level of global risk aversion (Federal Reserve Economic Data);
- The GDP growth is included as a proxy for the business cycle (Federal Reserve Economic Data and OECD Stats);
- The interest rate growth is included as a proxy for the cost of borrowing (World Development Indicators, International Financial Statistics and Central Bank of Argentina);
- The growth in the rate of inflation is included as a proxy for instability in the economy (it serves both as a broad measure of the standard of living within an economy as well as the willingness to consume);

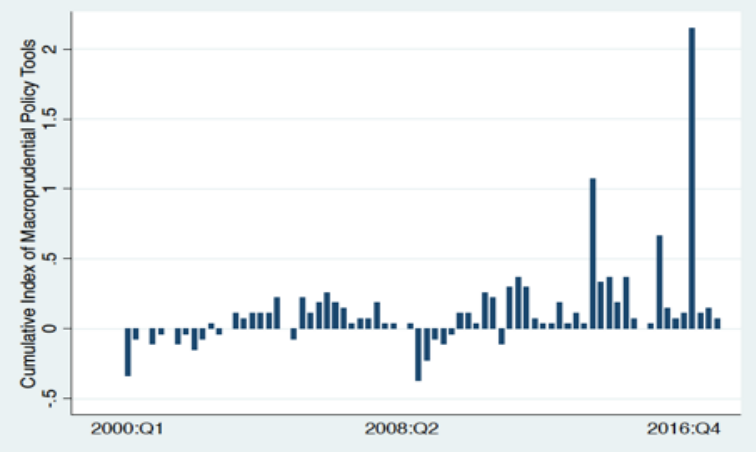
- The level of the Chinn Ito Capital Openness Index is included as a proxy for the level of cross-border capital flows;

Table 11 - Countries Included in the Analysis

Countries			
EU Panel	Latin American Panel	Full Sample	Country Cases
Austria	Argentina	Austria	Japan
Belgium	Brazil	Belgium	Portugal
Bulgaria	Chile	Bulgaria	The UK
Croatia	Colombia	Croatia	
CzechRepublic	Mexico	CzechRepublic	
Denmark	Peru	Denmark	
Estonia	Uruguay	Estonia	
Finland		Finland	
France		France	
Germany		Germany	
Greece		Greece	
Hungary		Hungary	
Ireland		Ireland	
Italy		Italy	
Latvia		Latvia	
Lithuania		Lithuania	
Luxembourg		Luxembourg	
Malta		Malta	
Netherlands		Netherlands	
Poland		Poland	
Portugal		Portugal	
Romania		Romania	
SlovakRepublic		SlovakRepublic	
Slovenia		Slovenia	
Spain		Spain	
Sweden		Sweden	
The UK		The UK	
		Argentina	
		Brazil	
		Chile	
		Colombia	
		Mexico	
		Peru	
		Uruguay	
		Japan	

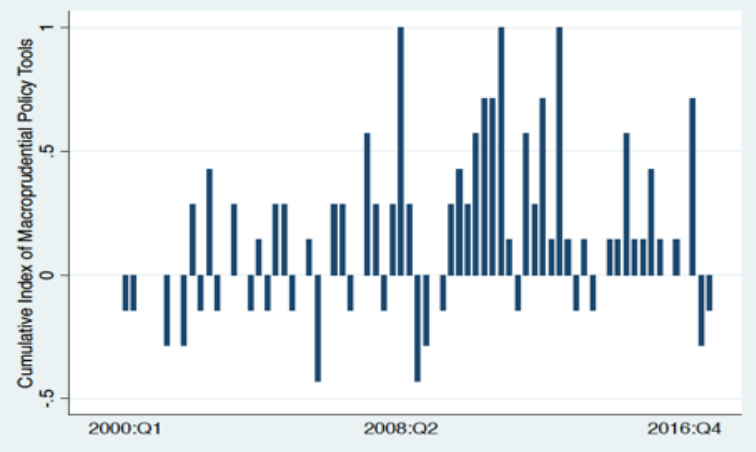
Figure 4 shows the cumulative index of macroprudential policy tools implemented in 27 European countries between 2000:Q1 and 2017:Q4 while Figure 5 shows the cumulative index of macroprudential policy tools implemented in 7 Latin American countries between 2000:Q1 and 2017:Q4. The graphs below show that the number of instances where macroprudential policy tools were implemented or the stance was tightened increased between 2000:Q1 and 2017:Q4 in the European panel, in the case of the Latin American panel, it is evident that the number of instances where macroprudential policy tools were either implemented or tightened increased in the time around the GFC. The macroprudential stance of Latin American countries became more active in the time around the GFC.

Figure 4 - Cumulative Index of Macroprudential Policy Tools Implemented in 27 European Countries



Source: Author's Index based on Alam et al. (2019), Cerutti et al. (2017) and IMF (2018, 2019).

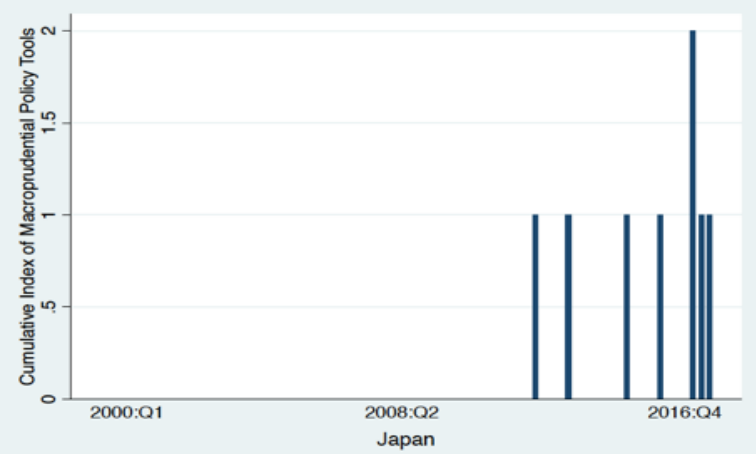
Figure 5 - Cumulative Index of Macroprudential Policy Tools Implemented in 7 Latin American Countries



Source: Author's Index based on Alam et al. (2019), Cerutti et al. (2017) and IMF (2018, 2019).

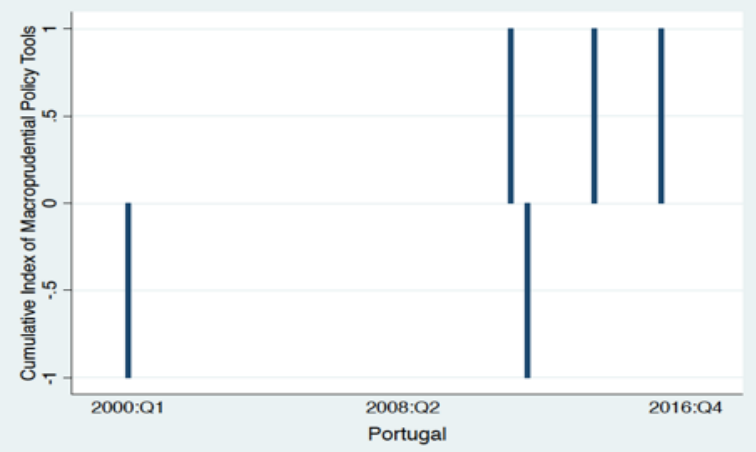
Figure 6 shows the cumulative index of macroprudential policy tools implemented in Japan between 2000:Q1 and 2017:Q4. Figure 7 shows the cumulative index of macroprudential policy tools implemented in Portugal between 2000:Q1 and 2017:Q4 while Figure 8 shows the cumulative index of macroprudential policy tools implemented in the UK between 2000:Q1 and 2017:Q4. The macroprudential policy stance in Japan has become more active in recent years and the same applies to Portugal. Lastly, Figure 8 shows that the macroprudential policy stance became more active in the case of the UK in the period after the GFC while, the policy stance has once again been active since 2016.

Figure 6 - Cumulative Index of Macroprudential Policy Tools Implemented in Japan



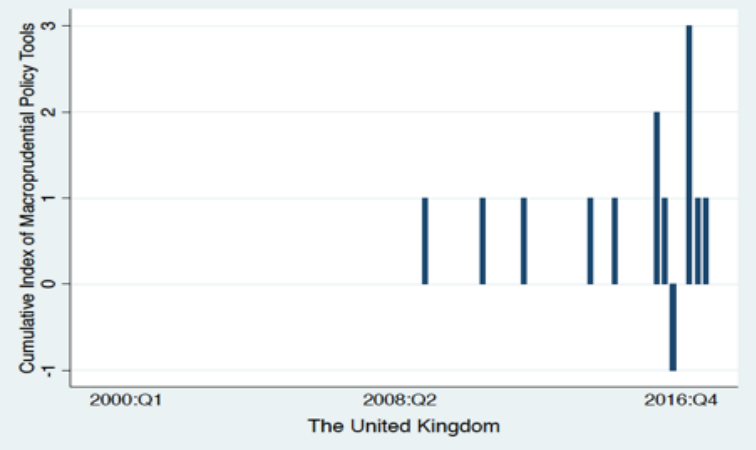
Source: Author's Index based on Alam et al. (2019), Cerutti et al. (2017) and IMF (2018, 2019).

Figure 7 - Cumulative Index of Macroprudential Policy Tools Implemented in Portugal



Source: Author's Index based on Alam et al. (2019), Cerutti et al. (2017) and IMF (2018, 2019).

Figure 8 - Cumulative Index of Macroprudential Policy Tools Implemented in The United Kingdom



Source: Author's Index based on Alam et al. (2019), Cerutti et al. (2017) and IMF (2018, 2019).

4.4. Results

4.4.1. Regression Results: Capital Conservation Buffer

Table 12 focuses on the capital conservation buffer and the value of the macroprudential policy choice index is therefore indicative thereof. When considering the first regression, the coefficient on the lagged credit growth is positive in all cases, this result is statistically significant when considering the Latin American panel as well as the three country cases. Capital openness is statistically significant in the Latin American panel and the negative sign on the coefficient indicates that a higher degree of capital openness in Latin America may result in lower levels of domestic credit. The negative adjusted R^2 in the case of the EU panel and the full sample indicates that the model may not be useful in explaining movements in credit growth. For the second regression, we once again find that capital openness is statistically significant in the Latin American panel. The positive sign on the coefficient indicates that GDP growth increases as capital openness increases. The lagged level of GDP growth is statistically significant and positive in all cases except Portugal where convergence was not possible in the regression. In the final regression, the lagged inflation growth is positive and statistically significant in all cases. The lagged level of the macroprudential policy tool index is negative in all cases except the UK and is statistically significant in both the EU panel as well as the full sample. The capital conservation buffer may therefore play an important role in the macroprudential policy tool stance of European countries, the negative relationship indicates that a higher capital conservation buffer may lead to decreased inflation.

Table 12 - Regression Results for Capital Conservation Buffer

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0065375	0.7831422	0.0067027	0.8096306	0.7777548	0.8299538
			(0.0046985)	(0.051586)***	(0.0045731)	(0.0640256)***	(0.0802734)***	(0.0769713)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0579553	-0.0035591	0.0420196	-0.0003769	0.0046494	0.0172262
			(0.0721966)	(0.0032107)	(0.0547064)	(0.001402)	(0.0065452)	(0.0080543)**
	β_3	VIX_Growth_{t-1}	-0.0021165	0.0002072	-0.0016911	0.0000436	0.0000605	0.000152
			(0.0028876)	(0.0000872)*	(0.0023731)	(0.0000316)	(0.0000675)	(0.0000579)**
	β_4	$Macroprudential\_Index_{t-1}$	-0.2838622	-0.0124058	-0.2085602	0.0013284	-0.0319857	0.012814
			(0.27294245)	(0.0144999)	(0.1934586)	(0.0053757)	(0.0225043)	(0.0130674)
	β_5	GDP_Growth_{t-1}	-0.0002027	-0.0001208	-0.004833	-0.0033021	-0.0031527	-0.0026719
			(0.0078815)	(0.0014536)	(0.0086602)	(0.000583)***	(0.0014248)**	(0.0014153)*
	β_6	$Capital\_Openness_{t-1}$	0.2662676	-0.0119869	0.1996947	0	0	0
			(0.3392003)	(0.0058918)*	(0.2610926)	-	-	-
		Constant	-0.2930213	0.0135684	-0.1492504	0.0050546	0.0105549	0.0106795
			(0.6290912)	0.0095313)	(0.424672)	(0.0012932)***	(0.0048597)**	(0.004638)**
	R^2		-0.00298609	0.66957914	-0.00243726	0.82383881	0.72021668	0.69928016
	Observations		1,695	347	2100	57	62	70
	P-Value		0.0022	0.0000	0.0013	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7241609	0.8900488	0.7950346	0.4729177		0.7211905
			(0.0251472)***	(0.0468207)***	(0.0393152)***	(0.0986848)***		(0.0922807)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0739517	-0.3042023	-0.0050507	0.148488		-0.131749
			(0.069103)	(0.2119944)	(0.0505826)	(0.2337002)		(0.4973949)
	β_3	VIX_Growth_{t-1}	0.00324	-0.0140548	-0.0006706	-0.0228711		-0.0030768
			(0.0010862)***	(0.0034445)***	(0.0016377)	(0.0050825)***		(0.0025031)
	β_4	$Macroprudential\_Index_{t-1}$	0.2320268	-1.868539	-0.0985853	0.2260875		0.000592
			(0.1639107)	(1.2725)	(0.2686242)	(0.8309153)		(0.382466)
	β_5	$Capital\_Openness_{t-1}$	0.0468555	0.265331	0.095493	0		0
			(0.0728683)	(0.1072694)**	(0.0815492)	-		-
		Constant	0.7894215	0.3116144	0.4944774	0.4712085		0.4273976
			(0.1319767)***	(0.1297768)*	(0.1616354)***	(0.1772696)**		(0.1043619)***
	R^2		0.54276986	0.83268289	0.63775856	0.49825105		0.52544934
	Observations		1723	347	2128	57		70
	P-Value		0.0000	0.0000	0.0000	0.0000		0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.7972926	0.8844929	0.8170737	0.8224898	0.7461757	-0.1649571
			(0.0748921)***	(0.0210253)***	(0.0598243)***	(0.0746803)***	(0.0751547)***	(0.1194538)
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2604764	0.1295552	0.2239975	-0.0446203	0.4315722	0.0011498
			(0.0866038)***	(0.1333052)	(0.0603414)***	(0.0743073)	(0.2458752)*	(0.2071897)
	β_3	VIX_Growth_{t-1}	-0.0007977	0.0011576	-0.0007139	0.0004565	-0.0010223	-0.0002514
			(0.0015487)	(0.0026473)	(0.0014127)	(0.0021368)	(0.0019848)	(0.0015163)
	β_4	$Macroprudential\_Index_{t-1}$	-0.3400802	-0.2430496	-0.3117656	-0.1203079	-0.1593716	0.4328935
			(0.1206034)***	(0.487018)	(0.118057)**	(0.4194932)	(0.5512014)	(0.3349991)
	β_5	GDP_Growth_{t-1}	0.0043975	0.0581023	0.0164088	0.1036991	0.1078295	-0.0014318
			(0.0150561)	(0.0361523)	(0.0136582)	(0.0367171)***	(0.0465964)**	(0.0362167)
	β_6	$Capital\_Openness_{t-1}$	-0.7276128	-0.0628567	-0.521521	0	0	0
			(0.6549957)	(0.0990617)	(0.487755)	-	-	-
		Constant	2.031645	0.3998079	1.468293	-0.0294992	0.5699298	0.6001957
			(1.519452)	(0.1915944)*	(1.088312)	(0.0855902)	(0.1448786)***	(0.120647)***
	R^2		0.77999174	0.77121717	0.77575878	0.70292929	0.76108717	-0.01558634
	Observations		1674	272	2004	58	61	71
	P-Value		0.0000		0.0000	0.0000	0.0000	0.5641

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

4.4.2. Regression Results: Countercyclical Capital Buffer

Table 13 focuses on the countercyclical capital buffer and the value of the macroprudential policy choice index is therefore indicative thereof. The results are similar to those in Table 12 where, in the first regression, the coefficient of the lagged value of credit growth is positive in all cases and statistically significant in the Latin American panel as well as the three country cases. Capital openness has a negative and statistically significant relationship with credit growth in the Latin American panel whereas, in the second regression, we once again see a

positive relationship between GDP growth and the level of capital openness. We see a positive and statistically significant coefficient on lagged GDP growth for all cases in the second regression and a positive and statistically significant coefficient on lagged inflation growth in the third regression.

Table 13 - Regression Results for Countercyclical Capital Buffer

Regression Results: Countercyclical Capital Buffers								
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0065603	0.783894	0.0067187	0.8071296	0.8059976	0.8326424
			(0.0046815)	(0.0511037)***	(0.0045622)	(0.0627774)***	(0.078468)***	(0.0719265)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0574961	-0.0035475	0.0419324	-0.0004053	0.0071951	0.0119544
			(0.0715856)	(0.0031961)	(0.0545445)	(0.0013857)	(0.0063515)	(0.0076078)
	β_3	VIX_Growth_{t-1}	-0.0020615	0.0002094	-0.0016507	0.0000436	0.0000582	0.0001557
			(0.0028325)	(0.0000866)*	(0.0023347)	(0.0000313)	(0.000068)	(0.0000554)***
	β_4	$Macroprudential\_Index_{t-1}$	-0.0659942	0	-0.0564431	0	0	-0.031709
			(0.0651153)	-	(0.0526184)	-	-	(0.0118269)***
	β_5	GDP_Growth_{t-1}	0.0000142	-0.0001334	-0.0048039	-0.0033036	-0.0033096	-0.0021655
			(0.0077098)	(0.0014712)	(0.0086675)	(0.000578)***	(0.0014331)**	(0.0013392)
	β_6	$Capital\_Openness_{t-1}$	0.2647261	-0.0117578	0.1995211	0	0	0
			(0.3383387)	(0.005594)*	(0.2612475)	-	-	-
		Constant	-0.293797	0.0132575	-0.1515521	0.0051363	0.0092594	0.0090194
			(0.6305676)	(0.0093095)	(0.4271038)	(0.0012601)***	(0.0048159)*	(0.004305)**
	R^2		-0.00300992	0.6702099	-0.00245381	0.82660772	0.71520933	0.72558328
	Observations		1695	347	2100	57	62	70
	P-Value		0.0025	0.0000	0.0014	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7239111	0.8878295	0.7950276	0.4730792	0.7258825	0.7194677
			(0.025171)***	(0.0486714)***	(0.0393249)***	(0.0978146)***	(0.0933732)***	(0.0921401)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0744121	-0.3037753	-0.0050253	0.1477859	0.0670281	-0.1270511
			(0.0692087)	(0.2154767)	(0.0505992)	(0.2316201)	(0.4149983)	(0.496151)
	β_3	VIX_Growth_{t-1}	0.0032206	-0.01372	-0.0006313	-0.0228297	-0.0096115	-0.003216
			(0.0010884)***	(0.0032255)***	(0.0016115)	(0.0046936)***	(0.0038664)**	(0.0025053)
	β_4	$Macroprudential\_Index_{t-1}$	0.7348846	0	0.6624878	0	0	0.247655
			(0.3425158)**	-	(0.3207869)**	-	-	(0.3820864)
	β_5	$Capital\_Openness_{t-1}$	0.0477345	0.295453	0.0949819	0	0	0
			(0.072057)	(0.1112751)**	(0.0818239)	-	-	-
		Constant	0.7893615	0.2719193	0.4928897	0.479093	0.1791736	0.4310191
			(0.1304728)***	(0.1264347)*	(0.1635208)***	(0.1748629)**	(0.1395075)	(0.1037109)***
	R^2		0.54297416	0.83037027	0.63790434	0.50706099	0.56390666	0.5262162
	Observations		1723	347	2128	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.7983499	0.8851244	0.8180146	0.822435	0.7474099	-0.1698476
			(0.0748323)***	(0.0211534)***	(0.0597157)***	(0.0740306)***	(0.0743844)***	(0.1219567)
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2590587	0.1286576	0.2230825	-0.0431987	0.4455292	-0.0773321
			(0.0860589)***	(0.1322135)	(0.0599621)***	(0.0734971)	(0.2385579)*	(0.2040972)
	β_3	VIX_Growth_{t-1}	-0.0007422	0.0012007	-0.0006638	0.0004549	-0.001083	-0.0003141
			(0.0015633)	(0.0027181)	(0.0014274)	(0.0021182)	(0.0019604)	(0.0015365)
	β_4	$Macroprudential\_Index_{t-1}$	-0.0538196	0	-0.0598393	0	0	-0.0325918
			(0.0713274)	-	(0.0622701)	-	-	(0.3312621)
	β_5	GDP_Growth_{t-1}	0.0046134	0.0583838	0.0166375	0.1034785	0.1057564	0.0044356
			(0.0151617)	(0.0363588)	(0.013737)	(0.0363898)***	(0.0456)**	(0.0366225)
	β_6	$Capital\_Openness_{t-1}$	-0.7260016	-0.0609317	-0.5197883	0	0	0
			(0.654367)	(0.0945346)	(0.4872077)	-	-	-
		Constant	2.020885	0.3916185	1.457858	-0.033703	0.5664614	0.5825156
			(1.517697)	(0.1878526)*	(1.086441)	(0.0835925)	(0.1437417)***	(0.1231006)***
	R^2		0.77975303	0.77190802	0.7755385	0.70807337	0.7659621	-0.04152149
	Observations		1674	272	2004	58	61	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.8176

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

4.4.3. Regression Results: Limits on Loan-to-Value Ratios

Table 14 focuses on limits on loan-to-value ratios and the value of the macroprudential policy choice index is therefore indicative thereof. The coefficient on the lagged value of credit

growth is once again both positive and statistically significant for the Latin American panel as well as the three country cases in the first regression. Capital openness once again has a negative and statistically significant relationship with credit growth in the Latin American panel. In the second regression, the coefficient on lagged GDP growth is once again positive and statistically significant in all cases, the macroprudential policy tool index once again has a negative and statistically significant relationship with GDP growth in the Latin American panel and finally, capital openness has a positive and statistically significant relationship with GDP growth in the Latin American panel. This implies that increases in the LTV ratio and lower levels of capital openness may result in lower GDP growth. In the third regression, lagged inflation growth has a positive and statistically significant coefficient in all cases except the UK.

Table 14 - Regression Results for Limits on Loan-to-Value Ratios

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.006558 (0.0046821)	0.7840378 (00508633)***	0.0067166 (0.0045625)	0.8071296 (0.0627774)***	0.8059976 (0.078468)***	0.8464953 (0.075078)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0577645 (0.0717317)	-0.0036222 (0.0031895)	0.0422048 (0.0547137)	-0.0004053 (0.0013857)	0.0071951 (0.0063515)	0.0154444 (0.0078443)*
	β_3	VIX_Growth_{t-1}	-0.0020752 (0.0028433)	0.0002102 (0.0000869)*	-0.0016618 (0.0023428)	0.0000436 (0.0000313)	0.0000582 (0.000068)	0.0001518 (0.0000579)**
	β_4	$Macroprudential\_Index_{t-1}$	-0.0711087 (0.0665545)	0.0096741 (0.0107684)	-0.0620206 (0.0544015)	0 -	0 -	0 -
	β_5	GDP_Growth_{t-1}	-0.0001789 (0.0078116)	-0.0001337 (0.0014799)	-0.0049097 (0.0087267)	-0.0033036 (0.000578)***	-0.0033096 (0.0014331)**	-0.0024518 (0.001397)*
	β_6	$Capital\_Openness_{t-1}$	0.2652351 (0.3387284)	-0.0117333 (0.0056634)*	0.1998684 (0.2614948)	0 -	0 -	0 -
		Constant	0.2652351 (0.6302226)	0.0132157 (0.0093151)	-0.1511818 (0.4268265)	0.0051363 (0.0012601)***	0.0092594 (0.0048159)*	0.0095833 (0.0044999)**
	R^2		-0.00300723	0.6693669	-0.00245161	0.82660772	0.71520933	0.69945785
	Observations		1695	347	2100	57	62	70
	P-Value		0.0024	0.0000	0.0010	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7230545 (0.0249083)***	0.8879322 (0.0477513)***	0.7943442 (0.0392768)***	0.4730792 (0.0978146)***	0.7258825 (0.0933732)***	0.7211954 (0.091554)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0755758 (0.0692356)	-0.2932409 (0.2146736)	-0.0032802 (0.050736)	0.1477859 (0.2316201)	0.0670281 (0.4149983)	-0.131787 (0.4929537)
	β_3	VIX_Growth_{t-1}	0.0031113 (0.0010572)***	-0.0138289 (0.003221)***	-0.0007384 (0.0015971)	-0.0228297 (0.0050356)***	-0.0096115 (0.0038664)**	-0.0030769 (0.0024833)
	β_4	$Macroprudential\_Index_{t-1}$	-0.3634675 (0.3514618)	-1.334159 (0.5766527)*	-0.4267645 (0.3426079)	0 -	0 -	0 -
	β_5	$Capital\_Openness_{t-1}$	0.0510373 (0.0724749)	0.2928431 (0.1136926)**	0.0980184 (0.081616)	0 -	0 -	0 -
		Constant	0.7925505 (0.1279011)***	0.2764366 (0.1220752)*	0.4961493 (0.1621412)***	0.479093 (0.1748629)***	0.1791736 (0.1395075)	0.4273841 (0.1035388)***
	R^2		0.54328995	0.83075347	0.63831363	0.50706099	0.56390666	0.53264273
	Observations		1723	347	2128	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.7983971 (0.0750287)***	0.8837636 (0.0207984)***	0.8180873 (0.0598702)***	0.822435 (0.0740306)***	0.7474099 (0.0743844)***	-0.1714513 (0.1199522)
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2589169 (0.0856428)***	0.1273314 (0.1342943)	0.2227748 (0.0596539)***	-0.0431987 (0.0734971)	0.4455292 (0.2385579)*	-0.0740604 (0.1998534)
	β_3	VIX_Growth_{t-1}	-0.0007334 (0.0015467)	0.0012365 (0.0026548)	-0.0006495 (0.0014117)	0.0004549 (0.0021182)	-0.001083 (0.0019604)	-0.0003216 (0.001523)
	β_4	$Macroprudential\_Index_{t-1}$	0.0328256 (0.1561707)	0.26413 (0.4645522)	0.0630082 (0.1483725)	0 -	0 -	0 -
	β_5	GDP_Growth_{t-1}	0.0046914 (0.0150768)	0.0578171 (0.0355098)	0.0167403 (0.013677)	0.1034785 (0.0363898)***	0.1057564 (0.0456)**	0.0040598 (0.0361486)
	β_6	$Capital\_Openness_{t-1}$	-0.7262175 (0.6539855)	-0.0600554 (0.0961885)	-0.5201067 (0.4869124)	0 -	0 -	0 -
		Constant	2.02034 (1.519343)	0.3983284 (0.1777823)*	1.457021 (1.087729)	-0.033703 (0.0835925)	0.5664614 (0.1437417)***	0.5844309 (0.1206362)***
	R^2		0.77975588	0.77124851	0.77555243	0.70807337	0.7659621	-0.02589362
	Observations		1674	272	2004	58	61	71
	P-Value		0.0000		0.0000	0.0000	0.0000	0.6937

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

4.4.4. Regression Results: Reserve Requirements

Table 15 focuses on reserve requirements and the value of the macroprudential policy choice index is therefore indicative thereof. The results are once again in line with those in Table 12, 13 and 14 with the exception of the lagged credit growth in the first regression no longer being statistically significant in the EU panel and the full sample. Nonetheless, the sign remains positive. Additionally, the macroprudential index in both the first and second regressions becomes statistically significant in the case of Portugal and the macroprudential index in the third regression becomes statistically significant in both the EU panel as well as the full sample.

This result implies that higher reserve requirements may result in higher inflation in the full sample as well as in Europe. At the same time, higher reserve requirements may result in lower credit growth and higher GDP growth in Portugal.

Table 15 - Regression Results for Reserve Requirements

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0063944	0.7819387	0.0066581	0.8071296	0.8157083	0.8464953
			(0.0050523)	(0.0544037)***	(0.0047872)	(0.0627774)***	(0.0740222)***	(0.075078)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0854914	-0.0036545	0.06798	-0.0004053	0.0054789	0.0154444
			(0.0917407)	(0.0033367)	(0.0781145)	(0.0013857)	(0.0060153)	(0.0078443)*
	β_3	VIX_Growth_{t-1}	-0.0040994	0.0002117	-0.0030756	4.36E-05	0.000072	0.0001518
			(0.0048055)	(0.0000906)*	(0.003727)	(0.0000313)	(0.0000643)	(0.0000579)**
	β_4	$Macroprudential\_Index_{t-1}$	-3.142259	0.0023873	-2.034809	0	-0.040592	0
			(3.265483)	(0.0061569)	(2.115334)	-	(0.0141863)***	-
	β_5	GDP_Growth_{t-1}	0.0260192	-0.0001903	0.0215166	-0.0033036	-0.0031167	-0.0024518
			(0.0225036)	(0.0015328)	(0.0206291)	(0.000578)***	(0.0013522)**	(0.001397)*
	β_6	$Capital\_Openness_{t-1}$	0.4148793	-0.0117894	0.2701306	0	0	0
			(0.4820977)	(0.0056057)*	(0.3283137)	-	-	-
		Constant	-0.746284	0.013466	-0.3871117	0.0051363	0.0071403	0.0095833
			(01.067805)	(0.009543)	(0.655941)	(0.0012601)***	(0.0045983)	(0.0044999)**
	R^2		0.00837281	0.66935978	0.00485824	0.82660772	0.74709875	0.69945785
	Observations		1695	347	2100	57	62	70
	P-Value		0.0042	0.0000	0.0031	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7238868	0.8959889	0.7955101	0.4730792	0.7300674	0.7211954
			(0.0248834)***	(0.0481253)***	(0.0392153)***	(0.0978146)***	(0.0891644)***	(0.091554)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0741693	-0.2903916	-0.0046315	0.1477859	0.0228154	-0.131787
			(0.0703474)	(0.2110176)	(0.0511566)	(0.2316201)	(0.3961344)	(0.4929537)
	β_3	VIX_Growth_{t-1}	0.0032053	-0.0140596	-0.0006782	-0.0228297	-0.0104705	-0.0030769
			(0.0010606)***	(0.0032203)***	(0.0016157)	(0.0050356)***	(0.0037748)***	(0.0024833)
	β_4	$Macroprudential\_Index_{t-1}$	0.0211648	-0.3796931	-0.0426591	0	1.610054	0
			(0.2010533)	(0.1662135)*	(0.1607084)	-	(0.9019373)*	-
	β_5	$Capital\_Openness_{t-1}$	0.0473042	0.2884353	0.096704	0	0	0
			(0.0773475)	(0.1043407)**	(0.0848367)	-	-	-
		Constant	0.7926723	0.2583417	0.4888284	0.479093	0.1836862	0.4273841
			(0.1426601)***	(0.1294335)*	(0.1711221)***	(0.1748629)***	(0.137657)	(0.1035388)***
	R^2		0.54264079	0.83100901	0.63775723	0.50706099	0.60919245	0.53264273
	Observations		1723	347	2128	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.8001103	0.8760311	0.8196291	0.822435	0.7432371	-0.1714513
			(0.0748425)***	(0.0183417)***	(0.0594441)***	(0.0740306)***	(0.0766274)***	(0.1199522)
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2564182	0.1283258	0.2197911	-0.0431987	0.4461681	-0.0740604
			(0.0882838)***	(0.1233181)	(0.0612997)***	(0.0734971)	(0.2430067)*	(0.1998534)
	β_3	VIX_Growth_{t-1}	-0.0006478	0.0015087	-0.0005345	0.0004549	0.1017823	-0.0003216
			(0.0015797)	(0.0030004)	(0.0014559)	(0.0021182)	(0.001998)	(0.001523)
	β_4	$Macroprudential\_Index_{t-1}$	0.2144647	0.2987416	0.2547971	0	-0.0010745	0
			(0.1049144)*	(0.2602976)	(0.1032181)**	-	(0.4769565)	-
	β_5	GDP_Growth_{t-1}	0.003566	0.0482925	0.0140067	0.1034785	0.3790821	0.0040598
			(0.0015797)	(0.0349649)	(0.0133063)	(0.0363898)***	(0.0472901)**	(0.0361486)
	β_6	$Capital\_Openness_{t-1}$	-0.7332581	-0.0580311	-0.5271937	0	0	0
			(0.653904)	(0.0837664)	(0.4877448)	-	-	-
		Constant	2.040285	0.4551455	1.480431	-0.033703	0.5791774	0.5844309
			(1.515753)	(0.1891266)*	(01.085943)	(0.0835925)	(0.1421559)***	(0.1206362)***
	R^2		0.78012304	0.77389666	0.77619776	0.70807337	0.74973434	-0.02589362
	Observations		1674	272	2004	58	61	71
	P-Value		0.0000		0.0000	0.0000	0.0000	0.6937

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

4.4.5. Regression Results: Sum of Macroprudential Policy Choices

Table 16 focuses on the sum of macroprudential policy choices and the value of the macroprudential policy choice index is therefore indicative thereof. The results are in line with those of the regressions using the individual policy choices. Lagged credit growth in the first regression, lagged GDP growth in the second and lagged inflation growth in the third all have positive and statistically significant coefficients. One notable result in all the regression equations is the negative sign on lagged inflation in the UK in the third regression as this stays consistent throughout. This result is opposite to the other cases.

Table 16 - Regression Results for Sum of Macroprudential Policy Changes

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0059189 (0.0052025)	0.7823114 (0.0504681)***	0.006312 (000489591)	0.8071 (0.0629277)***	0.7766441 (0.0749115)***	0.8520598 (0.077977)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0946064 (0.1088356)	-0.0037244 (0.0033032)	0.0717589 (0.085447)	-0.0005191 (0.0013954)	0.0061151 (0.006016)	0.0164257 (0.0085853)*
	β_3	VIX_Growth_{t-1}	-0.003789 (0.0044298)	0.0002128 (0.000088)*	-0.0029388 (0.0035434)	0.0000426 (0.0000314)	0.0000717 (0.0000645)	0.0001522 (0.0000584)**
	β_4	$Macroprudential\_Index_{t-1}$	-1.010256 (01.025082)	0.0014113 (0.0016785)	-0.6894186 (0.7034781)	-0.0022817 (0.0026833)	-0.0279864 (0.0100226)***	0.0012489 (0.0042777)
	β_5	GDP_Growth_{t-1}	0.000966 (.0091515)	-0.0001761 (0.0014666)	0.0026166 (0.007133)	-0.003274 (0.0005805)***	-0.0035456 (0.0013573)**	-0.0024881 (0.0014124)*
	β_6	$Capital\_Openness_{t-1}$	0.4023289 (0.4699396)	-0.0117602 (0.0055587)*	0.2680623 (0.3265332)	0 -	0 -	0 -
		Constant	-0.4530667 (0.7810681)	0.0131741 (0.0091235)	-0.2063507 (0.4782596)	0.0054692 (0.0012939)***	0.0104075 (0.0045707)**	0.0093935 (0.0045783)**
	R^2		0.00483951	0.66947539	0.00286043	0.82579227	0.74555149	0.72558328
	Observations		1695	347	2100	57	62	70
	P-Value		0.0299	0.0000	0.0031	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7238014 (0.0251099)***	0.8901103 (0.050121)***	0.7954908 (0.0396531)***	0.4720355 (0.0987679)***	0.7295806 (0.0930466)***	0.7213979 (0.0921264)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0765058 (0.0703834)	-0.2943094 (0.2141572)	-0.0029561 (0.0513425)	0.1535347 (0.2341916)	0.0502553 (0.4136299)	-0.1377188 (0.4966202)
	β_3	VIX_Growth_{t-1}	0.0030874 (0.0010658)***	-0.0139152 (0.0033281)***	-0.0007448 (0.0016069)	-0.0227976 (0.0050802)***	-0.0100192 (0.0039166)**	-0.0031169 (0.0025041)
	β_4	$Macroprudential\_Index_{t-1}$	-0.0656865 (0.0869803)	-0.0843304 (0.0850607)	-0.0522325 (0.0669946)	0.1246331 (0.4325313)	0.3609994 (0.5595399)	-0.0345607 (0.1319053)
	β_5	$Capital\_Openness_{t-1}$	0.0567047 (0.0764052)	0.2919294 (0.1096296)**	0.1004534 (0.0831149)	0 -	0 -	0 -
		Constant	0.7808545 (0.1355502)***	0.282858 (0.1292073)*	0.4895407 (0.1636873)***	0.4599378 (0.1806623)**	0.1632883 (0.1407042)	0.4334067 (0.1047723)***
	R^2		0.54291706	0.83018221	0.63789369	0.49931207	0.5689902	0.52714018
	Observations		1723	347	2128	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.7989028 (0.0755476)***	0.8833104 (0.77218634)***	0.8187899 (0.0602564)***	0.830779 (0.0747252)***	0.7487464 (0.0772812)***	-0.1572532 (0.1209746)
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2576169 (0.0846978)***	0.124691 (0.126212)	0.2209965 (0.0588114)***	-0.0527018 (0.0743644)	0.4307944 (0.2424432)*	-0.0058362 (0.2125575)
	β_3	VIX_Growth_{t-1}	-0.0007023 (0.001542)	0.0013333 (0.0027921)	-0.0006002 (0.0014099)	0.0002581 (0.0021329)	-0.001218 (0.0019923)	-0.0003125 (0.0015242)
	β_4	$Macroprudential\_Index_{t-1}$	0.0286936 (0.0466593)	0.075595 (0.0505478)	0.0433775 (0.0371122)	-0.1800057 (0.1986316)	0.4224756 (0.2880893)	0.1038853 (0.1095719)
	β_5	GDP_Growth_{t-1}	0.0046874 (0.0152029)	0.0551074 (0.0353442)	0.0163294 (0.0137041)	0.1050399 (0.036492)***	0.1023354 (0.0471756)**	-0.0000123 (0.0364303)
	β_6	$Capital\_Openness_{t-1}$	-0.729214 (0.651594)	-0.0603642 (0.0904158)	-0.5236985 (0.4855452)	0 -	0 -	0 -
		Constant	2.022422 (0.1.51678)***	0.3948352 (0.1852597)*	1.458545 (01.086981)	-0.0099613 (0.0877365)	0.5467249 (0.1405185)***	0.5753979 (0.121104)***
	R^2		0.7797948	0.76780531	0.77565977	0.70708549	0.74688054	-0.02746756
	Observations		1674	272	2004	58	61	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.6807

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

Although lagged inflation growth carries a positive sign in most of the cases, in the case of the UK this variable carries a negative and not statistically significant coefficient. The robustness checks conducted all focus on the sum of macroprudential policy tools with the first robustness check focusing on a case with an instrumental variable namely, Regulatory Quality (Appendix M1). The results are in line with the main results (Tables 12 to 16), one noticeable change is the change in the sign of the coefficient of lagged GDP growth in the second regression where the full sample now has a negative and statistically significant coefficient. The results of additional robustness checks[44] are similar to those of the main results discussed, noticeably, the coefficient on the lagged credit growth in the first regression remains positive in all cases and is statistically significant in the majority of cases. The sign on the coefficient of both lagged GDP growth and inflation growth, in the second and third regressions respectively, remains positive and statistically significant in the majority of cases with a few notable exceptions being that of the case of the EU panel when looking at a second robustness check which includes a post-crisis dummy. In this case, lagged inflation growth in the EU carries a negative and statistically significant sign.

When considering the statistical significance of the coefficients of the macroprudential policy tools we find that the capital conservation buffer carries a negative sign in many of the cases (first and third regressions) with the index having a negative and statistically significant sign in the case of the EU panel and the full sample for the third regression. The countercyclical capital buffer carries a negative and statistical sign in the first and third regressions while, in the second, the sign is positive and statistically significant. For loan to value ratios, this result seems to reverse with the first and third regressions carrying a positive sign on the index and the second regression having a negative sign on the index. For reserve requirements, the first and second regressions carry negative signs on the index with the exception of the case of Portugal where the sign is positive and statistically significant for the second regression. In the third regression, the index carries a positive and statistically significant sign. Finally, the summed index carries a negative sign in the first and second regressions while, in the third regression, the index carries a positive sign. These results are in line with those of the robustness checks where the sign of the coefficient is negative in the majority of cases when considering the first and second regressions while, the sign is positive when considering the third regression.

[44] Regression results of robustness checks available on request.

When considering the two factors that account for the influence of foreign markets namely, the lagged level of the volatility index and the lagged level of the capital openness index, we find that the level of capital openness carries a negative sign in the first and third regressions in the majority of cases. The level of capital openness carries a positive sign in the majority of cases when considering the second regression. Further, we find that the results are mainly statistically significant in the case of the Latin American panel. The statistical significance in the Latin American panel makes sense intuitively as Latin American countries have a greater dependence on foreign capital flows and exchange rate movements. The lagged level of the volatility index carries a negative sign in the majority of cases when considering the second regression equation while, this coefficient is positive in the majority of cases for first and third regressions. In the case of the EU panel, this result reverses in a number of cases where, the sign is positive in the second regression and negative in the first and third regressions. Where a higher level of capital openness results in higher GDP growth in the majority of cases, higher levels of capital openness are associated with lower growth in inflation and credit especially, in the case of Latin America. Higher levels of the volatility index[45] result in both higher credit growth as well as higher growth in inflation while, lower levels of the volatility index result in lower GDP growth. In times of higher market volatility, investors are prone to moving assets to safer markets which is in line with the results for the European panel where, higher volatility results in higher GDP growth and lower inflation as investors move their assets away from riskier markets such as Latin America.

When looking at the main results, we see that the adjusted R^2 is negative in a number of cases for the EU panel (first regression), the full panel (first regression) and the UK (third regression). A negative adjusted R^2 occurs when the model does not effectively explain movements in the dependent variable. When looking at a robustness check focusing on the period post crisis, we find that the adjusted R^2 becomes positive in each of these cases. European countries, including the UK, did not make use of macroprudential policy tools prior to the GFC and the level of capital openness does not play as significant a role in these cases as it does in the case of Latin American countries, this may explain the negative adjusted R^2 in these cases.

[45]Higher perceived volatility in the markets which hence, results in investors becoming more risk averse.

4.5. Conclusion

In the aftermath of the GFC, policy makers around the world came to the realization that traditional prudential policy frameworks with monetary policy as a prioritized policy tool lacked the scope to prevent financial crises and the financial turmoil that often accompanies these. The US housing bubble had severe effects on both the US economy as well as the global economy and although, the Federal Reserve and other Central Banks were unable to contain the turmoil, macroprudential policy frameworks emerged with the aim of achieving both financial and economic security and stability going forward as well as ensuring that bubbles never again grow to the disproportionately dangerous levels experienced prior to the GFC.

This paper studies the impact of macroprudential policy during uncertain times through three veins of financial stability for both an EU panel as well as a Latin American panel. A case study looking at the cases of Japan, Portugal and the UK is also included. A monthly index, iMaPP database constructed by Alam et al. (2019), of macroprudential policy tools implemented in the relevant countries is used as a starting point. This index is coded through 2016:Q4, this index is then cross checked using the Cerutti et al. (2017) index and extended using the 2017 IMF Macroprudential Survey and the IMF Macroprudential Data Query report. The monthly index is cumulated to create the quarterly database used in this paper. The extended and updated index is then used to study the effectiveness of macroprudential policy tools in taming credit growth, stabilising GDP growth and controlling inflation growth using a dynamic panel data model for the period between 2000:Q1 and 2017:Q4. Using this index, we look at the ability of macroprudential policy to curb fluctuations in credit supply, the impact of macroprudential policy on the real economy by studying the effect on GDP and finally, the impact on inflation. Further, we include a measure of market volatility in an effort to supplement existing literature and with the hope of bringing our results to the forefront in the face of global pandemics or financial crises. By looking at these three factors individually, we hope to understand the ability of macroprudential policy to achieve financial stability in times of uncertainty.

Our main results find that the coefficient of the summed macroprudential policy tool index carries a negative sign in the majority of cases when considering the first two regressions while, the summed index carries a positive sign in the majority of cases when considering the third regression. One could conclude that a tighter overall macroprudential policy stance would

result in lower credit growth as well as lower GDP growth while, a tighter overall macroprudential policy tool stance would lead to higher inflation in the majority of cases. Two noticeable exceptions are firstly, the case of Portugal when considering reserve requirements where, the coefficient of the policy tool in the second regression is positive and statistically significant. Secondly, the EU panel when considering the countercyclical capital buffer where, the coefficient of the policy tool in the second regression is positive and statistically significant. Our results further show that capital openness plays a bigger role in the case of Latin America which makes intuitive sense as Latin American countries have a larger dependence on foreign capital flows. Finally, higher levels of perceived market volatility result in an increased flow of assets into safer markets such as the EU. This is confirmed by our results where higher perceived volatility results in higher GDP growth and lower inflation in the EU panel whereas, in the other cases, higher levels of perceived volatility lead to higher inflation, higher credit growth and lower GDP growth. The macroprudential stance of a country depends on both the geographic location and the specific policy tool implemented as factors such as capital openness and the influence of global market sentiment play an important role in the success or failure of these tools.

4.6. Appendix K

K.1. Variable Sources

Table K1 - Sources of Variables

Data Sources						
Variable	**Countries**	**Code**	**Source**	**Frequency**	**Initial Date**	**End Date**
Credit		BIS_TC2	BIS total credit statistics	Quarterly	01/01/1999	31/12/2017
Credit	Peru, Uruguay, Malta, Bulgaria,	FS.AST.PRVT.GD.ZS	International Monetary Fund. International Financial Statistics estimates.	Annual	01/01/1999	31/12/2017
CreditGrowthYOY			Author's own calculations using Credit	Quarterly	01/01/2000	31/12/2017
PolicyRate			International Financial Statistics (IFS)	Quarterly		
PolicyRate	Argentina	BCRA_LEBAC	Central Bank of Argentina	Weekly	16/10/2002	19/09/2018
PolicyRate	Croatia	FR.INR.RINR	World Development Indicators	Annual	01/01/1999	31/12/2014
PolicyRate	Romania	FR.INR.RINR	World Development Indicators	Annual	01/01/1999	31/12/2017
PolicyRateGrowthYOY			Author's own calculations using Policy_Rate	Quarterly		
VIXYOY		VIXCLS_PC1	Federal Reserve Economic Data	Quarterly	01/01/1999	31/12/2017
GDP	Peru	MKTGDPPEA646NWDB	Federal Reserve Economic Data	Annual	01/01/1999	31/12/2017
GDP	Uruguay	RGDPNAUYA666NRUG	Federal Reserve Economic Data	Annual	01/01/1999	31/12/2017
GDP	Malta	MKTGDPMTA646NWDB	Federal Reserve Economic Data	Annual	01/01/1999	31/12/2017
GDP	Croatia	MKTGDPHRA646NWDB	Federal Reserve Economic Data	Annual	01/01/1999	31/12/2017
GDPYOY	Peru, Uruguay, Malta, Croatia		Author's own calculations using GDP	Quarterly	01/01/2000	31/12/2017
GDPYOY		GYSA	OECD Stat	Quarterly	01/01/1999	31/12/2017
InflationYOY		PCPI_PC_CP_A_PT	IMF	Quarterly	01/01/1999	31/12/2017
CapitalOpenness			Chinn, Menzie D. and Hiro Ito (2008). "A New Measure of Financial Openness". Journal of Comparative Policy Analysis, Volume 10, Issue 3, p. 309 – 322 (September).	Annual	01/01/1999	31/12/2017

K.2. Variable Definitions

Table K2 - Definitions of Variables

Variable	**Description**
Credit	Credit to Non financial sector from All sectors at Market value - Percentage of GDP - Adjusted for breaks
Credit	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations. such as through loans. purchases of nonequity securities. and trade credits and other accounts receivable. that establish a claim for repayment. For some countries these claims include credit to public enterprises. The financial corporations include monetary authorities and deposit money banks. as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies. money lenders. insurance corporations. pension funds. and foreign exchange companies.
CreditGrowthYOY	Growth Rate in Credit. Change from previous year.
PolicyRate	Financial, Interest Rates, Monetary Policy-Related Interest Rate, Percent per annum
PolicyRate	30-day LEBAC Interest Rates, % a.n.
PolicyRate	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. The terms and conditions attached to lending rates differ by country, however, limiting their comparability.
PolicyRate	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator. The terms and conditions attached to lending rates differ by country, however, limiting their comparability.
PolicyRateGrowthYOY	Growth Rate in the Policy Rate Change from previous year.
VIX_YOY	CBOE Volatility Index: VIX, Percent Change from Year Ago, Quarterly, Not Seasonally Adjusted
GDP	Gross Domestic Product for Peru, Current U,S, Dollars, Annual, Not Seasonally Adjusted
GDP	Real GDP at Constant National Prices for Uruguay, Millions of 2011 U,S, Dollars, Annual, Not Seasonally Adjusted
GDP	Gross Domestic Product for Malta, Current U,S, Dollars, Annual, Not Seasonally Adjusted
GDP	Gross Domestic Product for Croatia, Current U,S, Dollars, Annual, Not Seasonally Adjusted
GDPYOY	Growth Rate in GDP. Change from previous year.
GDPYOY	B1_GE: Gross domestic product - expenditure approach, Growth rate compared to the same quarter of previous year, seasonally adjusted
InflationYOY	Consumer Price Index, All items, Percentage change, Previous year
CapitalOpenness	The Chinn-Ito index (KAOPEN) is an index measuring a country's degree of capital account openness.

K.3. Summary Statistics

Table K3 - Summary Statistics for Japan, Portugal and the UK

Summary Statistics: Country Cases					
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
Japan					
credit_growth	72	0.010994	0.022135	-0.02242	0.089557
policyrate_growth	59	0.184037	1.045202	-0.66864	4.48511
vix_growth	72	1.816374	38.58624	-60.6284	165.984
gdp_growth	72	0.94471	2.222137	-8.67535	5.51386
sum_17	72	0.111111	0.358226	0	2
inflation_growth	72	0.03757	1.032074	-2.21328	3.601108
capital_openness	72	2.333585	0	2.333585	2.333585
Portugal					
credit_growth	72	0.032992	0.043781	-0.05832	0.130215
policyrate_growth	62	-0.14144	0.472961	-1	0.8
vix_growth	72	1.816374	38.58624	-60.6284	165.984
gdp_growth	72	0.7079	2.261377	-4.52805	4.3626
sum_17	72	0.013889	0.265004	-1	1
inflation_growth	72	2.016892	1.504777	-1.51295	4.793112
capital_openness	72	2.333585	0	2.333585	2.333585
The UK					
credit_growth	71	0.027788	0.031222	-0.0415	0.098347
policyrate_growth	71	-0.11577	0.329923	-1	0.357143
vix_growth	72	1.816374	38.58624	-60.6284	165.984
gdp_growth	72	1.901558	1.930302	-5.80664	4.80586
sum_17	72	0.166667	0.530745	-1	3
inflation_growth	72	0.504428	0.453511	-0.53351	1.853312
capital_openness	72	2.333585	0	2.333585	2.333585

Table K4 - Summary Statistics for the European Panel, the Latin American Panel and the Full Sample

Summary Statistics: Panels					
Variable	**Obs**	**Mean**	**Std. Dev**	**Min**	**Max**
EU Panel					
credit_growth	1,914	0.191729	6.450008	-1.799857	279.2292
policyrate_growth	1,743	-0.1334895	0.6516293	-15.30976	4
vix_growth	1,944	1.815278	38.32681	-60.6	166
gdp_growth	1,944	3.250558	2.842606	-0.1414702	29.17192
sum_17	1,944	0.1188272	0.6194443	-3	5
inflation_growth	1,892	2.555441	3.011824	-6.12777	40.07618
capital_openness	1,944	1.93786	0.8413734	-1.21854	2.333585
Latin American Panel					
credit_growth	504	0.020933	0.1698064	-0.439793	1.71199
policyrate_growth	377	0.0735466	0.6787663	-1	6.44
vix_growth	504	1.815278	38.35502	-60.6	166
gdp_growth	480	3.352823	4.828627	-15.2197	22.1026
sum_17	504	0.1468254	0.8566602	-4	4
inflation_growth	364	5.188172	2.502352	-3.029207	16.85826
capital_openness	504	0.802214	1.333033	-1.920278	2.333585
Full Sample					
credit_growth	2,490	0.1519322	5.655626	-1.799857	279.2292
policyrate_growth	2,179	-0.0890715	0.675592	-15.30976	6.44
vix_growth	2,520	1.815309	38.32456	-60.6284	166
gdp_growth	2,496	3.203709	3.32606	-15.2197	29.17192
sum_17	2,520	0.1242063	0.6680253	-4	5
inflation_growth	2,328	2.889216	3.090259	-6.12777	40.07618
capital_openness	2,520	1.722037	1.056781	-1.920278	2.333585

4.7. Appendix L

L.1. Maddala and Wu Test (Maddala and Wu, 1999) for the Presence of Panel Unit Roots

Table L1 - Maddala and Wu Unit Root Tests

H0: Presence of a Unit Root							
	Observations	Statistic	P-Value		Observations	Statistic	P-Value
Latin Panel				**The UK**			
Credit_Growthit-1	504	59.05	0.0000	Credit_Growthit-1	71	6.913	0.032
iit-1	377	85.119	0.0000	iit-1	71	5.815	0.055
Macrorudential_Indexit-1	504	181.012	0.0000	Macrorudential_Indexit-1	72	38.92	0.0000
yit-1	480	64.091	0.0000	yit-1	72	19.397	0.0000
vixt-1	504	65.053	0.0000	vixt-1	72	9.289	0.01
inflationt-1	364	80.884	0.0000	inflationt-1	72	17.291	0.0000
capital_opennesst-1	504	45.982	0.0000	capital_opennesst-1	72	0.0000	0.0000
EU Panel				**Japan**			
Credit_Growthit-1	1914	223.166	0.0000	Credit_Growthit-1	72	13.223	0.001
iit-1	1743	210.896	0.0000	iit-1	59	8.637	0.013
Macrorudential_Indexit-1	1944	746.022	0.0000	Macrorudential_Indexit-1	72	17.796	0.0000
yit-1	1944	322.162	0.0000	yit-1	72	17.197	0.0000
vixt-1	1944	250.92	0.0000	vixt-1	72	9.289	0.01
inflationt-1	1892	210.417	0.0000	inflationt-1	72	7.009	0.03
capital_opennesst-1	1944	46.974	0.74	capital_opennesst-1	72	29.511	0.0000
Full Sample				**Portugal**			
Credit_Growthit-1	2490	295.438	0.0000	Credit_Growthit-1	72	3.36	0.186
iit-1	2179	304.651	0.0000	iit-1	62	7.498	0.024
Macrorudential_Indexit-1	2520	944.83	0.0000	Macrorudential_Indexit-1	72	49.631	0.0000
yit-1	2496	403.45	0.0000	yit-1	72	5.284	0.071
vixt-1	2520	325.263	0.0000	vixt-1	72	9.289	0.01
inflationt-1	2328	298.309	0.0000	inflationt-1	72	4.978	0.083
capital_opennesst-1	2520	122.468	0.0000	capital_opennesst-1	72	0.0000	1

Note: First generation Maddala and Wu Test for panel unit roots (Maddala and Wu, 1999) results based on: Ho: All panels contain unit roots and Ha: At least one panel is stationary. The results of an Inverse Chi-squared test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1. Statistical test results based on regression equations with sum of the macroprudential policy choices included as the index value.

L.2. First Generation Fisher Type Tests (Phillips–Perron Test) for the Presence of Panel Unit Roots

Table L2 - Results of Fisher Type Unit Root Tests

Fisher Type Tests (Phillips–Perron Test) for the Presence of a Unit Root							
H0: Presence of a Unit Root							
	Observations	Statistic	P-Value		Observations	Statistic	P-Value
Latin Panel				**The UK**			
Credit_Growthit-1	504	36.3021	0.0009	Credit_Growthit-1	71	5.0454	0.0802
iit-1	377	26.1996	0.0244	iit-1	71	1.5772	0.4545
Macrorudential_Indexit-1	504	337.0854	0.0000	Macrorudential_Indexit-1	72	43.9736	0.0000
yit-1	480	26.9912	0.0193	yit-1	72	4.6501	0.0978
vixt-1	504	100.2856	0.0000	vixt-1	72	14.3197	0.0008
inflationt-1	364	66.9196	0.0000	inflationt-1	72	72.0873	0.0000
capital_opennesst-1	504	35.595	0.0012	capital_opennesst-1	72	0.0000	1
EU Panel				**Japan**			
Credit_Growthit-1	1914	232.9835	0.0000	Credit_Growthit-1	72	5.2564	0.0722
iit-1	1743	145.7935	0.0000	iit-1	59	3.6549	0.1608
Macrorudential_Indexit-1	1944	1432.4526	0.0000	Macrorudential_Indexit-1	72	37.0954	0.0000
yit-1	1944	235.4274	0.0000	yit-1	72	9.1435	0.0103
vixt-1	1944	386.816	0.0000	vixt-1	72	14.3197	0.0008
inflationt-1	1892	136.7716	0.0000	inflationt-1	72	5.3363	0.0694
capital_opennesst-1	1944	41.0301	0.9785	capital_opennesst-1	72	20.0388	0.0000
Full Sample				**Portugal**			
Credit_Growthit-1	2490	274.5419	0.0000	Credit_Growthit-1	72	2.4659	0.02914
iit-1	2179	175.648	0.0000	iit-1	62	2.9358	0.2304
Macrorudential_Indexit-1	2520	1806.6334	0.0000	Macrorudential_Indexit-1	72	70.0601	0.0000
yit-1	2496	271.5622	0.0000	yit-1	72	4.2489	0.1195
vixt-1	2520	501.4213	0.0000	vixt-1	72	14.3197	0.0008
inflationt-1	2328	209.0274	0.0000	inflationt-1	72	2.667	0.2635
capital_opennesst-1	2520	96.6638	0.0191	capital_opennesst-1	72	0.0000	1

Note: First generation Fisher Type test for panel unit roots (Phillips–Perron test) results based on: Ho: All panels contain unit roots and Ha: At least one panel is stationary. The results of an Inverse Chi-squared test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1. Statistical test results based on regression equations with sum of the macroprudential policy choices included as the index value.

L.3. Second Generation Pesaran Test (Pesaran, 2007) for the Presence of Panel Unit Roots

Table L3 - Pesaran Unit Root Tests

Pesaran Test (Pesaran, 2007) for the Presence of a Unit Root			
H0: Presence of a Unit Root			
	Observations	Statistic	P-Value
Latin Panel			
Credit_Growthit-1	504	-2.627	0.004
iit-1	377	-2.790	0.003
Macrorudential_Indexit-1	504	-8.649	0.0000
yit-1	480	-3.568	0.0000
vixt-1	504	12.764	1
inflationt-1	364	-5.257	0.0000
capital_openness t-1	504	-0.471	0.0000
EU Panel			
Credit_Growthit-1	1914	-3.470	0.0000
iit-1	1743	-13.182	0.0000
Macrorudential_Indexit-1	1944	-19.806	0.0000
yit-1	1944	-9.944	0.0000
vixt-1	1944	24.851	1
inflationt-1	1892	-6.968	0.0000
capital_openness t-1	1944	11.029	1
Full Sample			
Credit_Growthit-1	2490	-8.088	0.0000
iit-1	2179	-11.973	0.0000
Macrorudential_Indexit-1	2520	-21.778	0.0000
yit-1	2496	-13.246	0.0000
vixt-1	2520	26.677	1
inflationt-1	2328	-8.174	0.0000
capital_openness t-1	2520	9.482	1

Note: Second generation Pesaran test for panel unit roots (Pesaran, 2007) results based on: Ho: All panels contain unit roots and Ha: At least one panel is stationary. The results of an Inverse Chi-squared test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The presence of a unit root is rejected for the cases where the p-value < 0.1. Statistical test results based on regression equations with sum of the macroprudential policy choices included as the index value.

L.4. Wooldridge Test for Autocorrelation in Panel Data and Durbin Watson Test for Autocorrelation:

Table L4 - Results of Wooldridge Test for Autocorrelation in Panel Data and Durbin Watson Test for Autocorrelation

Wooldridge Test for Autocorrelation in Panel Data **H0: No First-Order Autocorrelation**							
	Observations	Statistic	P-Value		Observations	Statistic	P-Value
Latin Panel				**EU Panel**			
I	347	88.763	0.0001	I	1695	74121.895	0.0000
II	347	19.746	0.0044	II	1723	44.115	0.0000
III	272	30.981	0.0026	III	1674	294.81	0.0000
Full Sample							
I	2100	68755.738	0.0000				
II	2128	32.018	0.0000				
III	2004	341.184	0.0000				

Durbin Watson Test for Autocorrelation **H0: No First-Order Autocorrelation**				
	Observations	Statistic	dL	Du
The UK				
I	70	1.652052	1.283	1.645
II	71	0.998289	1.313	1.611
III	71	1.849911	1.283	1.645
Japan				
I	58	1.486066	1.214	1.639
II	58	1.353391	1.248	1.598
III	58	1.76191	1.214	1.639
Portugal				
I	62	1.736066	1.214	1.639
II	62	1.567498	1.248	1.598
III	62	1.499759	1.214	1.639

Note: Wooldridge Test for Autocorrelation results based on: Ho: No First-Order Autocorrelation and Ha: First Order Autocorrelation. The results of the F-test and the corresponding p-values are presented in the above table. The null hypothesis of no first-order autocorrelation is rejected for the cases where the p-value < 0.1. Durbin Watson test for Autocorrelation results based on: Ho: No Autocorrelation and Ha: Positive Autocorrelation or Inconclusive Results. The Durbin Watson Test Statistic is quoted in the table above, the upper and lower Durbin Watson bounds from Savin and White at a 1% Confidence Interval are also quoted in the above table. Test Statistic values above the upper bound result in the null hypothesis not being rejected and hence, no positive serial correlation is present. A test statistic below the lower bound results in the assumption that positive serial correlation is present and a test statistic within the bounds results in an inconclusive result. Statistical test results based on regression equations with sum of the macroprudential policy choices included as the index value.

L.5. Modified Wald Test for Heteroskedasticity:

Table L5 - Results for Modified Wald Test for Heteroskedasticity

Modified Wald Test for Heteroskedasticity **H0: sigma(i)^2 = sigma^2 for all i**							
	Observations	Statistic	P-Value		Observations	Statistic	P-Value
Latin Panel				**The UK**			
I	347	321.92	0.0000	I	70	0.00	1
II	347	936.76	0.0000	II	71	0.00	1
III	272	81.27	0.0000	III	71	0.00	1
EU Panel				**Japan**			
I	1695	8.60E+06	0.0000	I	58	0.00	1
II	1723	1.80E+05	0.0000	II	58	0.00	1
III	1674	15554.62	0.0000	III	58	0.00	1
Full Sample				**Portugal**			
I	2100	35000000	0.0000	I	62	0.00	1
II	2128	3.20E+07	0.0000	II	62	0.00	1
III	2004	13429.18	0.0000	III	62	0.00	1

Note: Modified Wald Test for Heteroskedasticity results based on: Ho: No Heteroskedasticity present and Ha: Heteroskedasticity present. The results of a Chi-squared test are presented in the above table with both the Test Statistic as well as the p-value being quoted. The absence of heteroskedasticity is rejected for the cases where the p-value < 0.1. Statistical test results based on regression equations with sum of the macroprudential policy choices included as the index value.

4.8. Appendix M

M.1. Additional Regression Results: Sum of Macroprudential Policy Choices with Instrumental Variable

Table M1 focuses on the sum of macroprudential policy choices and the value of the macroprudential policy choice index is therefore indicative thereof. An instrumental variable (Regulatory Quality) is included to account for any measurement error, omitted variable bias or simultaneity bias that may occur due to the endogeneity of the macroprudential policy tool index. The coefficient on lagged credit growth is positive and statistically significant for the first regression in the case of the Latin American panel and Japan, in the remaining cases the sign is positive with the exception of the negative sign in the case of Portugal. The coefficient on lagged GDP growth is positive and statistically significant for the second regression for the cases of the EU panel, the Latin American panel, Japan and Portugal while, in the case of the full sample, the sign is negative. Further, the coefficient on lagged inflation growth is positive and statistically significant in the all cases except that of the UK. In the remaining cases, the sign is positive with the exception of the first regression for the case of Portugal, the second regression for the full sample and the third regression for the case of the UK. When considering the full sample for the third regression, the coefficient on the macroprudential index is positive and statistically significant implying that a tighter macroprudential stance generally results in higher inflation when looking at the full sample.

Table M1 - Regression Results for Sum of Macroprudential Policy Changes with Instrumental Variable

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0817483 (0.8705784)	0.8610963 (0.0449542)***	0.0219851 (0.0227024)	0.8239383 (0.0425642)***	-0.4830896 (10.07119)	1.417408 (0.9615648)
	β_2	$Policy\_Rate\_Growth_{t-1}$	-2.921221 (40.61888)	-0.0011467 (0.0048165)	-0.0563277 (0.278236)	-0.000434 (0.0007227)	-0.0402322 (0.4571003)	0.1161182 (0.1884163)
	β_3	VIX_Growth_{t-1}	0.174899 (2.428263)	0.0001397 (0.0000955)	0.0014732 (0.0094169)	0.0000302 (0.0000204)	0.0006485 (0.0046172)	0.000199 (0.0001801)
	β_4	$Macroprudential\_Index_{t-1}$	105.3643 (1445.647)	-0.0190306 (0.0274582)	1.657144 (4.775139)	0.0011498 (0.0078768)	-1.229053 (9.613394)	0.128137 (0.2073969)
	β_5	GDP_Growth_{t-1}	-0.152851 (2.434375)	0.0004713 (0.0010312)	-0.0100037 (0.0705537)	-0.0034664 (0.0005359)***	-0.0136732 (0.0845804)	-0.0061815 (0.0093833)
	β_6	$Capital\_Openness_{t-1}$	-2.17194 (29.23126)	0.0010377 (0.0025176)	0.0267699 (0.1470326)	0 -	0 -	0 -
		Constant	-6.992062 (99.47175)	0.0041088 (0.0044732)	-0.0536109 (0.6131413)	0.0046879 (0.0013689)***	0.05968 (0.3638306)	-0.0098889 (0.0318928)
	R^2		0.0075	0.6249	0.0048	0.8964		
	Observations		1695	347	2100	58	62	70
	P-Value		1	0.0000	0.9738	0.0000	0.0084	0.0078
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.8284323 (0.0782798)***	0.888455 (0.0445013)***	-0.1235349 (0.0216846)***	0.5894249 (0.0786967)***	0.8736202 (0.1493686)***	1.580192 (5.558758)
	β_2	$Policy\_Rate\_Growth_{t-1}$	-0.3170842 (1.292723)	-0.4037757 (0.1944129)**	0.8384399 (0.0902296)	0.1228965 (0.1116625)	-0.5777394 (0.9365128)	-11.91454 (87.90353)
	β_3	VIX_Growth_{t-1}	0.0252677 (0.085518)	-0.0103564 (0.004206)**	0.0032127 (0.0028974)	-0.0224873 (0.0075524)***	-0.0072241 (0.0089508)	-0.0082899 (0.0229639)
	β_4	$Macroprudential\_Index_{t-1}$	14.33734 (54.03415)	1.009688 (1.340987)	2.24032 (1.499236)	-0.0358806 (0.9064993)	-4.866813 (11.04661)	-18.00333 (135.0697)
	β_7	$Capital\_Openness_{t-1}$	-0.2696348 (1.063536)	0.1532495 (0.0957914)	0.0472033 (0.051013)	0 -	0 -	0 -
		Constant	-0.4422068 (3.782952)	0.1518724 (0.2154586)	0.1471691 (0.1953409)	0.3885559 (0.3002736)	-0.0208439 (0.3566587)	0.537446 (2.681875)
	R^2		0.0214	0.785	0.4545	0.7068	0.4635	
	Observations		1723	347	2128	58	62	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.4014
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	1.028875 (0.2331527)***	0.9311501 (0.0318994)***	0.9210215 (0.021599)***	0.829856 (0.0841376)***	0.8287673 (0.0936777)***	-0.191814 (0.129476)
	β_2	$Policy\_Rate\_Growth_{t-1}$	-0.1208392 (0.4606807)	0.0718167 (0.0944811)	0.0535982 (0.0719593)	-0.0516506 (0.0487463)	0.5935618 (0.7966981)	-0.0362797 (0.1337148)
	β_3	VIX_Growth_{t-1}	0.0092519 (0.0172849)	0.0008922 (0.001979)	0.0014147 (0.0018739)	0.0002799 (0.0019865)	-0.0064271 (0.0068411)	-0.0004377 (0.0021852)
	β_4	$Macroprudential\_Index_{t-1}$	8.326188 (12.80773)	0.5306734 (0.4745282)	2.159593 (1.087263)**	-0.160095 (0.3988338)	4.953237 (9.9669)	0 -
	β_5	GDP_Growth_{t-1}	-0.0055549 (0.0504448)	0.024877 (0.0288993)	0.0005545 (0.0159293)	0.1048672 (0.0330735)***	0.1072706 (0.1270128)	0.0009877 (0.0292518)
	β_6	$Capital\_Openness_{t-1}$	-0.0395592 (0.2862227)	-0.0045958 (0.0586517)	-0.0617458 (0.0649662)	0 -	0 -	0 -
		Constant	-0.8491962 (2.36614)	0.1268831 (0.1915983)	0.0850342 (0.2603134)	-0.0125874 (0.106381)	0.4369486 (0.3181745)	0.6124889 (0.0958414)***
	R^2		0.1258	0.7428	0.5647	0.7327	0.2432	0.0315
	Observations		1674	272	2004	58	62	71
	P-Value		0.0000	0.0001	0.0000	0.0000	0.0000	0.6948

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

4.9. Appendix N

N.1. Policy Instruments

Table N1 - Summary of Various Macroprudential Policy Instruments

		Definition
1	Countercyclical Buffers (CCB)	A requirement for banks to maintain a countercyclical capital buffer. Implementations at 0% are not considered as a tightening in dummy-type indicators.
2	Conservation	Requirements for banks to maintain a capital conservation buffer, including the one established under Basel III.
3	Capital Requirements*	Capital requirements for banks, which include risk weights, systemic risk buffers, and minimum capital requirements. Countercyclical capital buffers and capital conservation buffers are captured in their sheets respectively and thus not included here. Subcategories of capital measures are also provided, classifying them into household sector targeted (HH), corporate sector targeted (Corp), broad-based (Gen), and FX-loan targeted (FX) measures.
4	Leverage Limits (LVR)	A limit on leverage of banks, calculated by dividing a measure of capital by the bank's non-risk-weighted exposures (e.g., Basel III leverage ratio).
5	Loan Loss Provisions (LLP)	Loan loss provision requirements for macroprudential purposes, which include dynamic provisioning and sectoral provisions (e.g. housing loans).
6	Limits on Credit Growth (LCG)*	Limits on growth or the volume of aggregate credit, the household-sector credit, or the corporate-sector credit by banks, and penalties for high credit growth. Subcategories of limits to credit growth are also provided, classifying them into household sector targeted (HH), corporate sector targeted (Corp), and broad-based (Gen) measures.
7	Loan Restrictions (LoanR)*	Loan restrictions, that are more tailored than those captured in "LCG". They include loan limits and prohibitions, which may be conditioned on loan characteristics (e.g., the maturity, the size, the LTV ratio and the type of interest rate of loans), bank characteristics (e.g., mortgage banks), and other factors. Subcategories of loan restrictions are also provided, classifying them into household sector targeted (HH), and corporate sector targeted (Corp) measures. Restrictions on foreign currency lending are captured in "LFC".
8	Limits on Foreign Currency (LFC)	Limits on foreign currency (FC) lending, and rules or recommendations on FC loans.
9	Limits on the Loan-to-Value Ratio (LTV)	Limits to the loan-to-value ratios, including those mostly targeted at housing loans, but also includes those targeted at automobile loans, and commercial real estate loans.
10	Limits on the Debt-Service-to-Income Ratio (DSTI)	Limits to the debt-service-to-income ratio and the loan-to-income ratio, which restrict the size of debt services or debt relative to income. They include those targeted at housing loans, consumer loans, and commercial real estate loans.
11	Tax Measures	Taxes and levies applied to specified transactions, assets, or liabilities, which include stamp duties, and capital gain taxes.
12	Liquidity Requirements	Measures taken to mitigate systemic liquidity and funding risks, including minimum requirements for liquidity coverage ratios, liquid asset ratios, net stable funding ratios, core funding ratios and external debt restrictions that do not distinguish currencies.
13	Limits on the Loan-to-Deposit Ratio (LTD)	Limits to the loan-to-deposit (LTD) ratio and penalties for high LTD ratios.
14	Limits on Foreign Exchange Positions (LFX)	Limits on net or gross open foreign exchange (FX) positions, limits on FX exposures and FX funding, and currency mismatch regulations.
15	Reserve Requirements (RR)*	Reserve requirements (domestic or foreign currency) for macroprudential purposes. Please note that this category may currently include those for monetary policy as distinguishing those for macroprudential or monetary policy purposes is often not clear-cut. A subcategory of reserve requirements is provided for those differentiated by currency (FCD), as they are typically used for macroprudential purposes.
16	SIFI	Measures taken to mitigate risks from global and domestic systemically important financial institutions (SIFIs), which includes capital and liquidity surcharges.
17	Other	Macroprudential measures not captured in the above categories—e.g., stress testing, restrictions on profit distribution, and structural measures (e.g., limits on exposures between financial institutions).

Source: Alam et al. (2019)

Note: * indicates that subcategories are available and included in the iMaPP Database.

N.2. iMaPP Database and Other Existing Databases

Table N2 - Summary of Data Sources and Coverage of the iMaPP Database, constituting Databases as well as Other Macroprudential Databases

	Sources	Sample Period	Country Coverage	Instruments[1/]	Frequency	Text Info	MaPP Indexes[2/]
The iMaPP database	Databases 1-6 below, national sources, IMF official documents, and websites of the BIS and the FSB.	1990M1-2016M12	138	27	M	Yes	- Average LTV limit - T/L indexes by instrument
Databases Integrated in the iMaPP Database							
1 Lim et al. (2011)	IMF Financial Stability and Macroprudential Policy Survey, 2010	1990-2011	49	10	As reported	Yes	-
2 Lim et al. (2013)	National sources	2000M1-2013M7	39	12	M	Yes	- Institutional arrangement indexes
3 Global Macroprudential Policy Instrument (GMPI, 2013)	IMF survey to authorities	2013 and history	133	17	As reported	Yes	-
4 Shim et al. (2013)	National sources, and data from published papers when they are verified at national sources.	1990M1 - 2012M6	60	8	M	Yes	- T/L indexes by instrument
5 ESRB database	Country authorities	2013M1-latest	28 (Europe)	18	M	Yes	-
6 IMF's Annual Macroprudential Policy Survey	Country authorities	2016 and some history	141	69	As reported	Yes	-
Other Databases							
7 Crowe, Dell'Ariccia, Igan, and Rabanal (2013)	The IMF survey of central bankers and bank regulators.	2010 and history	36	3	A	Yes	-
8 Vandenbussche et al (2015)	National sources, IMF papers, and academic papers	late '90 - 2010	16 (Europe)	29	Q	Yes	- Intensity-adjusted T/L indexes by instrument
9 Dimova, Kongsamut, and Vandenbussche (2016)	Vandenbussche et al. (2015) and national sources.	2002Q1-2012Q4	4 (Europe)	6	Q	Yes	-
10 Kuttner and Shim (2016)	Extended Shim et al. (2013) for 1980M1-1989M12 and added housing taxes and subsidies	1980Q1-2012Q2	60	9	M	Yes	- T/L indexes by by instrument
11 Zhang and Zoli (2016)	Lim et al. (2013), and national sources	2000Q1-2013Q4	46	-	Q	No	- Aggregate T/L index
12 Bruno, Shim, and Shin (2017)	Shim et al. (2013) and national sources	2004Q1-2013Q4	12	-	Q	No	- Aggregate T/L indexes
13 Cerutti et al. (2017a)	The GMPI and official documents, cross-checking with Kuttner and Shim (2016), Crowe et al. (2011), and other surveys	2000-2013	119	12	A	No	- Number of instruments in place - Indicator of the use by instr.
14 Cerutti et al. (2017b)	The GMPI and national sources	2000Q1-2014Q4	64	9	Q	Yes	- T/L indexes by by instrument
15 Akinci and Olmstead-Rumsey (2018)	Lim et al. (2011), supplemented with Shim et al. (2013), national sources, the GMPI (2013), and Cerutti et al. (2017a,b)	2000Q1-2013Q4	57	7	Q	No	- T/L indexes by instrument
16 Budnik and Kleibl (2018)	Country authorities	1995-2014	28 EU member states	64	M	Yes	- NA, while tightening/loosening tags are available
17 Richter, Schularick, and Shim (2018)	Extended Shim et al. (2013), adding an intensity-adjusted LTV index	1990Q1-2012Q2	56	7	Q	Yes	- Intensity-adjusted LTV change index - T/L indexes by instrument

Source: Alam et al. (2019)

Note (As Defined by Alam et al. 2019):

1.) The classification of instruments differs across databases. The column "Instruments" shows the number of categories, including subcategories, available in each dataset, without standardizing classification.

2.) "T/L indexes" is the dummy-type indexes for tightening and loosening actions of macroprudential policy measures.

4.10. Appendix O

O.1. Additional Regression Results: Sum of Macroprudential Policy Choices with No Corrections

Table O1 - Additional Regression Results: Sum of Macroprudential Policy Choices with No Corrections

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0059189 (0.0244298)	0.7823114 (0.0338425)***	0.006312 (0.0219761)	0.8230526 (.051438)***	0.7766441 (0.0749115)***	0.8520598 (0.077977)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0946064 (0.2581429)	-0.0037244 (0.0037171)	0.0717589 (0.2024196)	-0.0006232 (0.0011249)	0.0061151 (0.006016)	0.0164257 (0.0085853)*
	β_3	VIX_Growth_{t-1}	-0.003789 (0.0041954)	0.0002128 (0.0000641)***	-0.0029388 (0.0033805)	0.0000274 (0.0000298)	0.0000717 (0.0000645)	0.0001522 (0.0000584)**
	β_4	$Macroprudential\_Index_{t-1}$	-1.010256 (0.2790192)***	0.0014113 (0.0028933)	-0.6894186 (0.2081145)***	-0.0023392 (0.0027371)	-0.0279864 (0.0100226)***	0.0012489 (0.0042777)
	β_5	GDP_Growth_{t-1}	0.000966 (0.071626)	-0.0001761 (0.0006387)	0.0026166 (0.049833)	-0.0034298 (0.0005217)***	-0.0035456 (0.0013573)**	-0.0024881 (0.0014124)*
	β_6	$Capital\_Openness_{t-1}$	0.4023289 (0.3546762)	-0.0117602 (0.0047523)**	0.2680623 (0.2814574)	0 -	0 -	0 -
		Constant	-0.4530667 (0.7387277)	0.0131741 (0.0047523)***	-0.2063507 (0.524907)	0.0051848 (0.0014489)	0.0104075 (0.0045707)**	0.0093935 (0.0045783)**
	R^2		-0.01072859	0.66353782	-0.01360521	0.88991182	0.74555149	0.72558328
	Observations		1695	347	2100	58	62	70
	P-Value		0.0299	0.0000	0.0665	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7238014 (0.0165377)***	0.8901103 (0.0236197)***	0.7954908 (0.0132962)***	0.5872694 (0.0836645)***	0.8772434 (0.0650269)***	0.8242594 (0.0630578)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0765058 (0.060115)	-0.2943094 (0.1383985)**	-0.0029561 (0.0542907)	0.1329487 (0.1712942)	-0.3286959 (0.3137176)	-0.0545052 (0.3685111)
	β_3	VIX_Growth_{t-1}	0.0030874 (0.0009764)***	-0.0139152 (0.0024002)***	-0.0007448 (0.0009066)	-0.0223408 (0.0047449)***	-0.0107414 (0.0033047)***	-0.0097123 (0.0026186)***
	β_4	$Macroprudential\_Index_{t-1}$	-0.0656865 (0.0644136)	-0.0843304 (0.1079446)	-0.0522325 (0.055474)	0.1573152 (0.4543072)	0.25069 (0.5205357)	-0.1181703 (0.0026306)
	β_5	$Capital\_Openness_{t-1}$	0.0567047 (0.0779451)	0.2919294 (0.1713261)*	0.1004534 (0.07211)	0 -	0 -	0 -
		Constant	0.7808545 (0.1625272)***	0.282858 (0.1645414)*	0.4895407 (0.1347771)***	0.3617903 (0.2015045)	0.0298111 (0.146165)	0.3317422 (0.1749883)*
	R^2		0.53588917	0.8271407	0.63199732	0.68571863	0.78701294	0.83133918
	Observations		1723	347	2128	58	62	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.7989028 (0.0134563)***	0.8833104 (0.0320161)***	0.8187899 (0.0119897)***	0.830779 (0.0747252)***	0.8117249 (0.0574808)***	-0.1572532 (0.1209746)
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2576169 (0.0478702)***	0.124691 (0.0870712)	0.2209965 (0.0409001)***	-0.0527018 (0.0743644)	0.3981855 (0.1994255)*	-0.0058362 (0.2125575)
	β_3	VIX_Growth_{t-1}	-0.0007023 (0.0127658)	0.0013333 (0.00165)	-0.0006002 (0.0006862)	0.0002581 (0.0021329)	-0.0031711 (0.0017142)*	-0.0003125 (0.0015242)
	β_4	$Macroprudential\_Index_{t-1}$	0.0286936 (0.0505173)	0.075595 (0.0663019)	0.0433775 (0.0418044)	-0.1800057 (0.1986316)	0.2343187 (0.26995)	0.1038853 (0.1095719)
	β_5	GDP_Growth_{t-1}	0.0046874 (0.0127658)	0.0551074 (0.0187826)***	0.0163294 (0.0105972)	0.1050399 (0.036492)***	0.1029085 (0.0338939)***	-0.0000123 (0.0364303)
	β_6	$Capital\_Openness_{t-1}$	-0.729214 (0.089009)***	-0.0603642 (0.1127281)	-0.5236985 (0.0729699)***	0 -	0 -	0 -
		Constant	2.022422 (0.2028064)***	0.3948352 (0.3948352)*	1.458545 (0.1572224)***	-0.0099613 (0.0877365)	0.4334994 (0.1643794)**	0.5753979 (0.121104)***
	R^2		0.77630587	0.76780531	0.77189031	0.70708549	0.87231899	-0.02746756
	Observations		1674	272	2004	58	62	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.6807

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

O.2. Additional Regression Results: Sum of Macroprudential Policy Choices with Correction for Heteroskedasticity and Serial Correlation

Table O2 - Results of Additional Regression Results: Sum of Macroprudential Policy Choices with Correction for Heteroskedasticity and Serial Correlation

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.0059189 (0.0052025)	0.7823114 (0.0504681)***	0.006312 (000489591)	0.8230526	0.7766441	0.8520598
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0946064 (0.1088356)	-0.0037244 (0.0033032)	0.0717589 (0.085447)	-0.0006232	0.0061151	0.0164257
	β_3	VIX_Growth_{t-1}	-0.003789 (0.0044298)	0.0002128 (0.000088)*	-0.0029388 (0.0035434)	0.0000274	0.0000717	0.0001522
	β_4	$Macroprudential\_Index_{t-1}$	-1.010256 (01.025082)	0.0014113 (0.0016785)	-0.6894186 (0.7034781)	-0.0023392	-0.0279864	0.0012489
	β_5	GDP_Growth_{t-1}	0.000966 (.0091515)	-0.0001761 (0.0014666)	0.0026166 (0.007133)	-0.0034298	-0.0035456	-0.0024881
	β_6	$Capital\_Openness_{t-1}$	0.4023289 (0.4699396)	-0.0117602 (0.0055587)*	0.2680623 (0.3265332)	0	0	0
		Constant	-0.4530667 (0.7810681)	0.0131741 (0.0091235)	-0.2063507 (0.4782596)	0.0051848	0.0104075	0.0093935
	R^2		0.00483951	0.66947539	0.00286043	0.88991182	0.74555149	0.72558328
	Observations		1695	347	2100	58	62	70
	P-Value		0.0299	0.0000	0.0031	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7238014 (0.0251099)***	0.8901103 (0.050121)***	0.7954908 (0.0396531)***	0.5872694	0.8772434	0.8242594
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0765058 (0.0703834)	-0.2943094 (0.2141572)	-0.0029561 (0.0513425)	0.1329487	-0.3286959	-0.0545052
	β_3	VIX_Growth_{t-1}	0.0030874 (0.0010658)***	-0.0139152 (0.0033281)***	-0.0007448 (0.0016069)	-0.0223408	-0.0107414	-0.0097123
	β_4	$Macroprudential\_Index_{t-1}$	-0.0656865 (0.0869803)	-0.0843304 (0.0850607)	-0.0522325 (0.0669946)	0.1573152	0.25069	-0.1181703
	β_5	$Capital\_Openness_{t-1}$	0.0567047 (0.0764052)	0.2919294 (0.1096296)**	0.1004534 (0.0831149)	0	0	0
		Constant	0.7808545 (0.1355502)***	0.282858 (0.1292073)*	0.4895407 (0.1636873)***	0.3617903	0.0298111	0.3317422
	R^2		0.54291706	0.83018221	0.63789369	0.68571863	0.78701294	0.83133918
	Observations		1723	347	2128	58	62	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.7989028 (0.0755476)***	0.8833104 (0.77218634)***	0.8187899 (0.0602564)***	0.830779	0.8117249	-0.1572532
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.2576169 (0.0846978)***	0.124691 (0.126212)	0.2209965 (0.0588114)***	-0.0527018	0.3981855	-0.0058362
	β_3	VIX_Growth_{t-1}	-0.0007023 (0.001542)	0.0013333 (0.0027921)	-0.0006002 (0.0014099)	0.0002581	-0.0031711	-0.0003125
	β_4	$Macroprudential\_Index_{t-1}$	0.0286936 (0.0466593)	0.075595 (0.0505478)	0.0433775 (0.0371122)	-0.1800057	0.2343187	0.1038853
	β_5	GDP_Growth_{t-1}	0.0046874 (0.0152029)	0.0551074 (0.0353442)	0.0163294 (0.0137041)	0.1050399	0.1029085	-0.0000123
	β_6	$Capital\_Openness_{t-1}$	-0.729214 (0.651594)	-0.0603642 (0.0904158)	-0.5236985 (0.4855452)	0	0	0
		Constant	2.022422 (0.1.51678)***	0.3948352 (0.1852597)*	1.458545 (01.086981)	-0.0099613	0.4334994	0.5753979
	R^2		0.7797948	0.76780531	0.77565977	0.70708549	0.87231899	-0.02746756
	Observations		1674	272	2004	58	62	71
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.6807

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

O.3. Additional Regression Results: Sum of Macroprudential Policy Choices with Dummy for Post Crisis Period

Table O3 - Additional Regression Results: Sum of Macroprudential Policy Choices with Dummy for Post Crisis Period

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$	0.8784232 (0.020717)***	0.8420389 (0.0330471)***	0.8657963 (0.0190679)***	0.7713535 (0.068322)***	0.4277425 (0.0900858)***	0.8475945 (0.1064577)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0006429 (0.0008491)	-0.0031116 (0.0016905)	0.0000791 (0.0008953)	-0.010799 (0.0087835)	-0.0020275 (0.0055717)	0.0196595 (0.0110924)*
	β_3	VIX_Growth_{t-1}	0.0002006 (0.0000408)***	0.0003092 (0.0001746)	0.0002104 (0.000045)***	-0.0033293 (0.0005555)***	-0.0001932 (0.0000909)**	0.0001505 (0.000118)
	β_4	$Macroprudential\_Index_{t-1}$	-0.0007745 (0.0012354)	-0.0009379 (0.0018457)	-0.0007362 (0.0010337)	-0.0028415 (0.0029317)	-0.0136277 (0.007992)*	0.0030279 (0.0046347)
	β_5	GDP_Growth_{t-1}	-0.0001594 (0.0005096)	0.0013015 (0.0007355)	0.0001737 (0.0004906)	0 -	-0.0116013 (0.001724)***	-0.0033823 (0.002273)
	β_6	$Capital\_Openness_{t-1}$	-0.0006899 (0.0008255)	-0.0047946 (0.001298)**	-0.0012273 (0.0007203)*	0.0009576 (0.0014977)	0.0021963 (0.0020201)	0.0028692 (0.0028154)
		Constant	0.001755 (0.000513)***	0.0048943 (0.0028113)	0.0022704 (0.0005669)***	0.0018112 (0.0017369)	0.0017013 (0.0022108)	0.0022892 (0.0029929)
	R^2		0.75571486	0.7023553	0.73969639	0.81849291	0.86825757	0.66792496
	Observations		1695	347	2100	57	62	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.7444553 (0.0262663)***	0.8890019 (0.0424217)***	0.8101029 (0.0397698)***	0.4314178 (0.1203868)***	0.4717259 (0.1499917)***	0.5855079 (0.1083126)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	-0.0188973 (0.0711605)	-0.3609217 (0.1383985)**	-0.0690705 (0.0524125)	-1.165349 (1.886662)	0.5837154 (0.527572)	0.0070475 (0.613202)
	β_3	VIX_Growth_{t-1}	0.0039787 (0.0018552)**	-0.017397 (0.00625792)**	-0.0021532 (0.0024839)	0 -	0 -	0 -
	β_4	$Macroprudential\_Index_{t-1}$	0.0392847 (0.0659811)	-0.0408583 (0.0187201)*	0.045659 (0.0468197)	0.0961177 (0.5580819)	-0.1366069 (0.4184991)	-0.0588645 (0.1703393)
	β_5	$Capital\_Openness_{t-1}$	0.2069806 (0.0490401)***	0.2659065 (0.1338928)*	0.1004534 (0.0580132)**	0.5003238 (0.3482791)	0.8560481 (0.3803036)**	0.510544 (0.1760155)***
		Constant	0.1804028 (0.0245211)***	0.1318279 (0.06832)	0.4895407 (0.0237567)***	-0.6240246 (0.3384575)*	-0.8882242 (0.1329653)	-0.3034699 (0.1288013)**
	R^2		0.64901552	0.85226436	0.70063329	0.20445539	0.13552071	0.46893246
	Observations		1723	347	2128	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0030	0.0157	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	-0.0408783 (0.0082058)***	0.9142908 (0.030865)***	0.9138356 (0.0278743)***	0.863969 (0.0706889)***	0.7963129 (0.0605226)***	0.0537148 (0.1166347)
	β_2	$Policy\_Rate\_Growth_{t-1}$	-0.0006474 (0.0008734)	0.1729025 (0.1062025)	0.0357314 (0.0239381)	-0.2743561 (0.4681035)	0.6799434 (0.1966335)***	0.1210442 (0.1566665)
	β_3	VIX_Growth_{t-1}	0.000063 (0.000064)	-0.0036878 (0.0023862)	-0.0009872 (0.0005969)	-0.0050178 (0.0030214)	0 -	-0.0044289 (0.0017058)**
	β_4	$Macroprudential\_Index_{t-1}$	0.0027102 (0.0027134)	-0.0211205 (0.0257381)	-0.0035438 (0.0072154)	-0.2308997 (0.1740352)	0.2393719 (0.2108842)	0.169372 (0.0693678)**
	β_5	GDP_Growth_{t-1}	-0.0000547 (0.0000628)	0.0182517 (0.019319)	0.0142576 (0.0060838)**	0.0732398 (0.0336261)**	0.1328841 (0.0327579)***	-0.0632765 (0.0304697)**
	β_6	$Capital\_Openness_{t-1}$	-0.000319 (0.0003352)	-0.0095903 (0.0095339)	-0.0119967 (0.0102839)	-0.013115 (0.0763176)	0.294274 (0.0738394)***	0.2311849 (0.0447492)***
		Constant	-0.0003626 (0.0001786)*	0.2366967 (0.0883597)**	0.0359363 (0.0117017)***	-0.0059376 (0.1018435)	0.0017656 (0.0606843)	-0.0063686 (0.0436357)
	R^2		0.00562412	0.85927847	0.85190086	0.75759697	0.8952895	0.53964735
	Observations		1695	297	2050	58	61	71
	P-Value		0.0000		0.0000	0.0000	0.0000	0.0000

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

O.4. Additional Regression Results: Sum of Macroprudential Policy Choices with Serial Correlation Correction Included (xtregar)

Table O4 - Results of Additional Regression Results: Sum of Macroprudential Policy Choices with Serial Correlation Correction Included (xtregar)

Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
I	β_1	$Credit\_Growth_{t-1}$		0.5301404 (0.0447219)***		0.8071 (0.0629277)***	0.696902 (0.0887753)***	0.7463031 (0.0963985)***
	β_2	$Policy\_Rate\_Growth_{t-1}$		-0.0080915 (0.0052002)		-0.0005191 (0.0013954)	0.0048045 (0.0070375)	0.0180764 (0.0102949)*
	β_3	VIX_Growth_{t-1}		0.0002338 (0.0000747)***		0.0000426 (0.0000314)	0.0000383 (0.0000719)	0.0001725 (0.0000654)**
	β_4	$Macroprudential\_Index_{t-1}$		0.0008186 (0.0025947)		-0.0022817 (0.0026833)	-0.0231836 (0.0113094)**	0.0023707 (0.0040475)
	β_5	GDP_Growth_{t-1}		-0.0016675 (0.0000747)*		-0.003274 (0.0005805)***	-0.0041542 (0.0016804)**	-0.0030895 (0.0017866)*
	β_6	$Capital\_Openness_{t-1}$		0.0038975 (0.0042419)		0 -	0 -	0 -
		Constant		0.0135381 (0.0073428)*		0.0054692 (0.0012939)***	0.0133511 (0.0043599)***	0.0131637 (0.0041186)***
	R^2			0.6391		0.82579227	0.63898402	0.53445431
	Observations			347		57	61	69
	P-Value			0.0000		0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	4.778434 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
II	β_1	GDP_Growth_{t-1}	0.6948923 (0.0171219)***	0.6029924 (0.0424197)***	0.7392679 (0.014547)***	0.4720355 (0.0987679)***	0.7295806 (0.0930466)***	0.7213979 (0.0921264)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0586722 (0.0648896)	-0.2065879 (0.2012049)	0.0056034 (0.0612696)	0.1535347 (0.2341916)	0.0502553 (0.4136299)	-0.1377188 (0.4966202)
	β_3	VIX_Growth_{t-1}	0.0034184 (0.0010656)***	-0.0062666 (0.0027552)**	0.0001676 (0.0010238)	-0.0227976 (0.0050802)***	-0.0100192 (0.0039166)**	-0.0031169 (0.0025041)
	β_4	$Macroprudential\_Index_{t-1}$	-0.0577892 (0.0644956)	-0.0063761 (0.0917202)	-0.0287078 (0.0551551)	0.1246331 (0.4325313)	0.3609994 (0.5595399)	-0.0345607 (0.1319053)
	β_5	$Capital\_Openness_{t-1}$	0.0430282 (0.0732347)	0.3672242 (0.2228489)*	0.0604924 (0.0593476)	0 -	0 -	0 -
		Constant	0.8960575 (0.1699473)***	1.296489 (0.4141646)***	0.7419911 (0.1316623)***	0.4599378 (0.1806623)**	0.1632883 (0.1407042)	0.4334067 (0.1047723)***
	R^2		0.5442	0.8292	0.6385	0.49931207	0.5689902	0.52714018
	Observations		1723	347	2128	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regression Equation	Coefficient	Variable	EU Panel 2000-2017	Latin American Panel 2000-2017	Full Sample 2000-2017	Japan 2000-2017	Portugal 2000-2017	The UK 2000-2017
III	β_1	$Inflation\_Growth_{t-1}$	0.1736548 (0.0164949)***	0.7141814 (0.0456266)***	0.2109383 (0.01575767)***	0.7759143 (0.0855801)***	0.7487464 (0.0772812)***	-0.6517481 (0.093286)***
	β_2	$Policy\_Rate\_Growth_{t-1}$	0.0937901 (0.0369938)**	0.0284546 (0.1279963)	0.1042405 (0.0355246)***	-0.0512099 (0.086532)	0.4307944 (0.2424432)*	0.0110691 (0.3057193)
	β_3	VIX_Growth_{t-1}	0.0000144 (0.0006109)	-0.0003967 (0.0016163)	0.0001581 (0.0005652)	0.0003908 (0.0022588)	-0.001218 (0.0019923)	-0.0022518 (0.0016773)
	β_4	$Macroprudential\_Index_{t-1}$	-0.0235392 (0.0278125)	-0.0221841 (0.0526568)	-0.0273384 (0.0244793)	-0.1813888 (0.2024662)	0.4224756 (0.2880893)	0.0820377 (0.1095719)
	β_5	GDP_Growth_{t-1}	-0.0412833 (0.0127202)***	0.0544402 (0.0296423)*	-0.0263229 (0.0118963)**	0.1014353 (0.0403086)**	0.1023354 (0.0471756)**	0.0212589 (0.0563656)
	β_6	$Capital\_Openness_{t-1}$	-1.161835 (0.1863562)***	-0.0431189 (0.1315055)	-0.7487986 (0.139625)***	0 -	0 -	0 -
		Constant	4.778434 (0.4884923)***	1.237991 (0.3443989)***	3.869477 (0.3742941)***	0.0084828 (0.0084828)	0.5467249 (0.1405185)***	0.799412 (0.0777854)***
	R^2		0.6319	0.7732	0.6928	0.61358469	0.74688054	0.41216244
	Observations		1674	272	2004	57	61	70
	P-Value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: The R^2 value quoted is the adjusted R^2 value, the p-value quoted is associated with an F-test. The value quoted for each variable is the coefficient value with the value in parenthesis being the standard error.
* Represents statistical significance at 10%, ** at 5% and *** at 1%. (0, .) indicates results omitted due to cointegration.

Reference List

Agénor, PR, Alper, K and Pereira da Silva, L. 2012: Sudden Floods, Macroprudential Regulation and Stability in an Open Economy. Banco Central do Brazil 267.

Agur, I and Demertzis, M. 2015: Will Macroprudential Policy Counteract Monetary Policy's Effects on Financial Stability? IMF Working Paper WP/15/283, December.

Ahmed, S and Zlate, A. 2013: Capital Flows to Emerging Market Economies: A Brave New World? Board of Governors of the Federal Reserve System International Discussion Papers 1081, June.

Ahuja, A and Nabar, M. 2011: Safeguarding Banks and Containing Property Booms: Cross Country Evidence on Macroprudential Policies and Lessons from Hong Kong SAR. IMF Working Paper WP/11/284, December.

Akinci, O and Olmstead-Rumsey, J. 2015; How Effective are Macroprudential Policies? An Empirical Investigation. International Finance Discussion Papers 1136.

Alam, Z, Alter, A, Eiseman, J, Gelos, G, Kang, H, Narita, M, Nier, E and Wang, N. 2019: Digging Deeper – Evidence on the Effects of Macroprudential Policies from a New Database. IMF Working Paper WP/19/66, March.

Allen, F and Gale, D. 2007: Understanding Financial Crises. Clarendon Lectures in Finance, http://www.sfu.ca/~dandolfa/Allen%20and%20Gale%202007.pdf, accessed 8 April 2020.

Allen, WA and Wood, G. 2006: Defining and achieving financial stability. Journal of Financial Stability. Elsevier 2(2) (June): 152-172.

Baba, C. and Kokenyne, A. 2011: Effectiveness of Capital Controls in Selected Emerging Markets in the 2000s. IMF Working Paper WP/11/281, December.

Bazillier, R and Hericourt, J. 2017: The Circular Relationship between Inequality, Leverage, and Financial Crises. Journal of Economic Surveys 31(2): 463-496.

Belkhir, M, Naceur, SB, Candelon, B and Wijnandts, JC. 2020: Macroprudential Policies, Economic Growth, and Banking Crises. IMF Working Paper No. 20/65, May.

Borio, C. 2003: Towards a macroprudential framework for financial supervision and regulation? BIS Working Papers 128, February.

Bruno, V, Shim, I and Shin, HS. 2015: Comparative Assessment of Macroprudential Policies. BIS Working Paper 502, June.

Caruana, J. 2010: Macroprudential policy: working towards a new consensus. Remarks at the high-level meeting on "The Emerging Framework for Financial Regulation and Monetary Policy" jointly organised by the BIS's Financial Stability Institute and the IMF Institute, Washington DC, 23 April, https://www.bis.org/speeches/sp100426.pdf, accessed: 8 April 2020.

Cerutti, E, Dagher, J and Dell'Ariccia, G. 2015: Housing Finance and Real-estate booms: A Cross-Country Perspective. IMF Staff Discussion Note SDN/15/12, June 2015.

Cerutti, E, Claessens, S and Laeven, L. 2017: The use and effectiveness of macroprudential policies: new evidence. Journal of Financial Stability 28: 203–24.

Chinn, MD and Ito, H: 2008. A New Measure of Financial Openness. Journal of Comparative Policy Analysis 10(3) (September): 309 – 322.

Claessens, S. 2017: Macroprudential policies: Seven issues and seven questions. BIS, Session II: Macroprudential Policy Issues Banco de Portugal Conference on Financial Stability Lisbon, 17 October 2017, https://www.bportugal.pt/sites/default/files/ii_1_stijn_claessens.pdf, accessed: 8 April 2020.

Committee on the Global Financial System (CGFS). 2010: Macroprudential Instruments and Frame- works: A Stocktaking of Issues and Experiences. CGFS Papers 38 (Basel: Bank for International Settlement)

Constâncio, V. 2017: Macroprudential Policy in a Changing Financial System. Second ECB Macroprudential Policy and Research Conference in Frankfurt, European Central Bank, 11 May 2017, https://www.ecb.europa.eu/press/key/date/2017/html/ecb.sp170511.en.html, accessed: 8 April 2020.

Crockett, A. 2000: Marrying the Micro- and Macro-prudential Dimensions of Financial Stability. Eleventh International Conference of Banking Supervisors, held in Basel,

20-21 September 2000, https://www.bis.org/speeches/sp000921.htm, accessed: 8 April 2020.

Crowe, CW, Igan, D, Dell'Ariccia, G and Rabanal, P. 2011: How to Deal with Real Estate Booms, IMF Staff Discussion Note 11/02.

Dell'Ariccia, G, Igan, D, Laeven, L and Tong, H. (with Bakker, B and Vandenbussche) 2012: Policies for Macrofinancial Stability: How to Deal with Credit Booms. IMF Staff Discussion Note 12/06.

Financial Stability Board, International Monetary Fund, and Bank for International Settlements. 2011: Macroprudential Tools and Framework. Update to G20 Finance Ministers and Central Bank Governors, February, https://www.imf.org/external/np/g20/pdf/021411.pdf, accessed: 8 April 2020.

Galati, G and Moessner, R. 2011: Macroprudential policy - a literature review. BIS Working Papers 337, Bank for International Settlements.

Gourinchas, PO and Obstfeld, M. 2012: Stories of the Twentieth Century for the Twenty First. American Economic Journal: Macroeconomics 4(1): 226–265.

Gupta, S, Mulas-Granados, C and Baldacci, E. 2009: How Effective is Fiscal Policy Response in Financial Crises? Fiscal issues and central banking in emerging economies. IMF Working paper WP/09/160.

Habermeier, K, Kokenyne, A and Baba, C. 2011: The Effectiveness of Capital Controls and Prudential Policies in Managing Large Inflows. IMF Staff Discussion Note SDN 11/14, August.

Hong Kong Monetary Authority. 2011: Loan-to-value ratio as a macroprudential tool Hong Kong SAR's experience and cross-country evidence. BIS Research Papers, BIS 57.

Houben, A, Kakes, J and Schinasi, G. 2004: Towards a framework for financial stability. DNB Occasional Studies 201, Netherlands Central Bank, Research Department.

IMF. 2013: Key Aspects of Macroprudential Policy—Background Paper. IMF Policy Paper, June. http://www.imf.org/exter nal/np/pp/eng/2013/06101 3c.pdf

International Monetary Fund. 2014: Staff Guidance Note on Macroprudential Policy. December 2014, https://www.imf.org/external/np/pp/eng/2014/110614.pdf, accessed: 8 April 2020.

International Monetary Fund. 2016: Elements of Effective Macroprudential Policies: Lessons from International Experience. IMF-FSB-BIS, 31 August 2016, https://www.imf.org/external/np/g20/pdf/2016/083116.pdf, accessed: 8 April 2020.

Kaufmann, D, Kraay, A and Mastruzzi, M. 2010: The Worldwide Governance Indicators: Summary of Methodology, Data and Analytical Issues. World Bank Policy Research Working Paper 5430, World Bank: Washington, D.C.

Kim, C. 2014: Macroprudential policies in Korea – Key measures and experiences. Financial Stability Review 18(April): 121-130, Banque de France.

Kim, S and Mehrotra, AN. 2017: Effects of Monetary and Macro-Prudential Policies – Evidence from Inflation Targeting Economies in the Asia-Pacific Region and Potential Implications for China. BOFIT Discussion Paper No. 4/2017, March.

Kuttner, KN and Shim, I. 2013: Can non-interest rate policies stabilise housing markets? Evidence from a panel of 57 economies. BIS Working Papers 433, November.

Lim, C, Columba, F, Costa, A, Kongsamut, P, Otani, A, Saiyid, M, Wezel, T and Wu, X. 2011: What Instruments and How to Use Them? Lessons from Country Experiences. IMF Working Paper WP/11/238, October.

Lopez, C and Bruni, F. 2019: The Macroprudential Policy Framework Needs to Be Global. International Financial Architecture for Stability and Development/ Crypto Assets and Fintech, March 2019, https://t20japan.org/wpcontent/uploads/2019/03/t20-japan-tf2-6-macroprudential policy-framework-needs-to-be-global.pdf, accessed: 8 April 2020.

Maddala GS, Wu S. 1999: A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test. Oxford Bulletin of Economics and Statistics, special issue, 631–652.

Nier, EW, Kang, E, Mancini, T, Hesse, H, Columba, F, Tchaidze, R and Vandenbussche, J. 2012: The interaction of monetary and macroprudential policies: background paper, International Monetary Fund, December.

Peia, O. and Roszbach, K. 2015: Finance and growth: Time series evidence on causality. Journal of Financial Stability 19(C): 105-118.

Pesaran H (2007) A Simple Panel Unit Root Test in the Presence of Cross Section Dependence. J Appl Econ 22:265–312. https ://doi.org/10.2139/ssrn.457280.

Peydró, JL. 2016: Macroprudential Policy and Credit Supply. Swiss Journal of Economics and Statistics 152 (4): 305–318.

Reinhart, C, and Rogoff, K. 2009: This Time is Different: Eight Centuries of Financial Folly, In: Economics Books, Princeton University Press, https://econpapers.repec.org/bookchap/puppbooks/8973.htm, accessed 8 April 2020.

Schularick, M and Taylor, AM. 2012: Credit Booms Gone Bust: Monetary Policy,Leverage Cycles, and Financial Crises, 1870–2008. American Economic Review 102:1029 1061.

Vandenbussche, J, Vogel, U and Detragiache, E. 2012: Macroprudential Policies and Housing Prices – A New Database and Empirical Evidence for Central, Eastern, and Southeastern Europe. IMF Working Paper Series 12/303 (December), IMF, Washington, D.C.

Zhang, L and Zoli, E. 2014: Leaning Against the Wind: Macroprudential Policy in Asia. IMF Working Paper 14/22.

Chapter 5

Conclusion

The number of studies aimed at analysing the impact of macroprudential policy tool implementation sky-rocketed in the aftermath of the GFC as policy makers realised that global financial integration, global liquidity and global risk aversion are indeed major determinants of global financial cycles. Crockett (2000) points out that macroprudential policy tools target the stability of the financial system as a whole with the aim of minimizing the macroeconomic costs associated with periods of financial distress whereas, microprudential policy tools focus on individual institutional risks. Smets (2013) concludes that the primary objective of monetary policy should remain price stability while, financial stability should be included as an explicit objective of monetary policy. Further, he concludes that macroprudential policy tools should be used to maintain financial stability and in times when this is not effective, monetary policy should be the default policy choice. Bruno et al. (2015) note that the combination of macroprudential policy tool implementation and monetary policy is more efficacious than a policy framework that only includes macroprudential policy tools or monetary policy. Bruno et al. (2015) note that the combination of macroprudential policy tool implementation and monetary policy is more efficacious than a policy framework that only includes macroprudential policy tools or monetary policy. Effective information sharing is required to ensure the successful interaction of the two policy choices which in turn, protects both the independence and credibility of Central Banks. The relationship between conventional monetary policy tools, CBI and more recently, macroprudential policy tools as well as the crucial need to study financial stability following the cataclysmic repercussions of the GFC

paved the way for the work done in this thesis.

The primary objective of this thesis was to analyse the relationship between both conventional monetary policy and unconventional monetary policy tools and financial stability. To do this, I studied the impact of monetary policy tool implementation on three measures of financial stability namely, credit growth, the exchange rate and the stock market index. I also studied the impact of monetary policy tool implementation on the industrial production index. Using an SVAR model and impulse response functions, I studied the impact of policy rate shocks in both the short and long run on credit growth, the exchange rate, the level of the stock market index and the industrial production index. The results show that an inverse relationship exists between the policy rate and the stock market index for the cases of Colombia and the UK. Further, the results show that a positive policy rate shock results in an appreciation of the currency in both the short and the long run for the cases of Chile, Portugal and the UK while the currency depreciates for the cases of Colombia and Japan. The results also show that the policy rate may be used to stabilise the real business cycle as an inverse relationship exists between the industrial production index and the policy rate for the cases of Colombia, Japan, Portugal and the UK. Finally, an inverse relationship exists between credit supply and the policy rate for the cases of Chile, Japan and Portugal and hence, the policy rate may be an effective tool when abundant credit supply needs to be reined in.

I went on to look at the institutional setting in the relevant countries, the Central Banks of these countries and both the political environment and financial stability of these countries over time and substantiated the discussion with an empirical analysis focusing on the impact of CBI on financial stability by using credit growth as a proxy for financial stability. The main results show that a positive relationship exists between credit growth and the level of CBI due to the positive and statistically significant coefficient on the interaction term between the growth in the level of domestic credit to the private sector and the level of the ECBI index for the cases of the UK and Portugal for the second regression equation and the interaction term between the growth in the level of domestic credit by deposit banks and other financial institutions for the cases of Chile, Portugal and the UK for the second regression equation and the case of the UK for the third regression equation. Higher levels of CBI are associated with higher levels of credit growth and hence, CBI would need to be reined in in times of credit abundance.

I finally went on to look at unconventional monetary policy tools namely, macroprudential policy tools and their impact on three veins of financial stability during uncertain times. The main results show that a tighter overall macroprudential policy tool stance would result in lower credit growth as well as lower GDP growth while, a tighter overall stance would result in higher inflation in the majority of cases. Further, our results show that the level of capital openness plays a bigger role in Latin American countries, this makes intuitive sense as Latin American countries are more dependent on foreign capital inflows and developments in the exchange rate. Lastly, assets tend to flow into safer markets such as the EU in times of higher perceived market volatility (through the level of the VIX index). This is confirmed by our results where a higher level of the VIX index leads to higher levels of GDP growth and lower levels of inflation in the EU panel whereas, in the other cases, higher levels of the VIX index result in higher inflation, higher credit growth and lower GDP growth.

The results throughout this thesis focus on five individual country cases. The five countries studied in this thesis have inflation targeting and independent Central Banks as well as floating exchange rate regimes. Still, fundamental differences exist in the institutional setting, the political environment and the establishment and functioning of the Central Banks of these five countries. Overall, both the results and policy recommendations should be analysed and made on an individual country basis instead of drawing aggregate conclusions. The results show that conventional monetary policy tools may be effective when used in conjunction with alternative policy tools such as macroprudential policy tools. Further, when considering the independence of Central Banks, policy makers should attempt to rein in CBI in times of abundant credit supply. In summary, it is clear that the macroprudential stance of a country depends on both the geographic location as well as the choice of policy tools implemented as factors such as the influence of global market sentiment as well as capital openness play a fundamental role in the success or failure of these policy tools.

Reference List

Alam, Z, Alter, A, Eiseman, J, Gelos, G, Kang, H, Narita, M, Nier, E and Wang, N. 2019: Digging Deeper – Evidence on the Effects of Macroprudential Policies from a New Database. IMF Working Paper WP/19/66, March 2019.

Bruno, V, Shim, I and Shin, HS. 2015: Comparative Assessment of Macroprudential Policies. BIS Working Paper 502, June 2015.

Cerutti, E, Correa, R, Fiorentino, E and Segalla, E. 2017: Changes in Prudential Policy Instruments- A New Cross-Country Database. International Journal of Central Banking 13(S1), March 2017.

Cocriş, V and Nucu, AE. 2013: Monetary policy and financial stability: empirical evidence from Central and Eastern European countries. Baltic Journal of Economics 13(1): 75-98.

Crockett, A. 2000: Marrying the Micro- and Macro-prudential Dimensions of Financial Stability. Eleventh International Conference of Banking Supervisors, held in Basel, 20-21 September 2000, https://www.bis.org/speeches/sp000921.htm, accessed: 8 April 2020.

Romelli, D. 2018: The political economy of reforms in Central Bank design: evidence from a new dataset**.** BAFFI CAREFIN Centre Research Paper No. 2018-87, BAFFI CAREFIN, Bocconi University: Milan, Italy.

Smets, F. 2013: Financial Stability and Monetary Policy: How Closely Interlinked? Economic Review (Sveriges Riksbank) 2013:3 (Special Issue): 121–159.